



Virtuous circles between innovations, job quality and employment in Europe? Case study evidence from the manufacturing sector, private and public service sector

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with contributions from

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CHAPTER 1 – Introduction: Prospects for Virtuous Circles? The institutional and economic embeddedness of companies' contemporary innovation strategies in Europe

Karen Jaehrling

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CHAPTER 1 – Introduction: Prospects for Virtuous Circles?

Advanced capitalist economies currently face ‘disruptive’ innovations that profoundly challenge existing market structures and business models. Most notably, a new generation of digital technologies and a more general trend towards the ‘digital economy’ are expected to revolutionise the production and consumption of goods and services across industries, such as through advanced robotics and the industrial internet in the manufacturing sector, or FinTechs in the banking and finance sector.

Although radical innovations are not new, their current apparent ubiquity across industries and countries raises concerns and questions about their cumulative impact on labour markets. Even if they may point to their overall long-term benefits, assessments on the transformational power of these technological innovations have tended to highlight their potential to undermine the very fundamentals of work and society ‘as we know it’. The potential consequences include large-scale job losses linked to the substitution of human labour by machines (Brynjolfsson and McAfee, 2012; Frey and Osborne, 2013). Unlike the ‘skill-biased technological change’ theorem, which predicts that job losses will be concentrated among low-skilled employees, it is assumed that the new technologies will replace many ‘skilled’ routine tasks and thereby affect a much broader share of the workforce. With regard to the remaining jobs, the re-casualisation of labour as well as sustained attacks on employment status in the ‘gig economy’ are expected to gain speed and scope; some even predict the end of paid employment and of market-based transactions due to the spread of networked prosumerism and the sharing economy in the ‘collaborative commons’ (Rifkin, 2014).

The merit in such projections into the future lies in raising awareness of the potential benefits, risks and challenges and the need for action in order to manage these changes in a socially sustainable way, thereby trying to turn the ‘race against the machine’ into a ‘race with the machine’ (Brynjolfsson and McAfee, 2014). Despite a general commitment to the almost commonsensical view that technology is not a “destiny”, the specific role attributed to policies and society is often rather narrow. Policy recommendations by Brynjolfsson and McAfee, for instance, focus primarily on adapting the institutional framework to the projected future by providing the necessary human capital resources – for example through immigration policies that allow ‘talents’ from the periphery to access the centres of globalised capitalism; through policies that promote entrepreneurship and basic research; or through an overhaul of the education system in order to produce the kind of flexible, creative, problem-solving thinking needed as a complementary resource to the machines.

It is this reductionist view of the role of policies and of society at large, among others, that has seen these projections face a lot of criticism for their inherent technological determinism and a resulting overestimation of the scale, scope and pace of change. In the economic and social sciences a much broader range of economic, institutional and societal factors has come to be considered as shaping the adoption, design and implementation of technologies, thereby mitigating their potentially negative impact. Pointing to experiences with earlier waves of computerisation and the diffusion of information and communications technologies (ICTs), researchers have, for instance, questioned the assumption of a direct causal link between technological innovations and increased productivity gains (Valenduc and Vendramin, 2016), or highlighted the way in which technologies are shaped through their uses, and how this in turn depends on contextual factors and on the power, preferences and perceptions of a broad diversity of actors (e.g. Holtgrewe, 2014).

The debate about disruptive innovations has thus revitalised both public policy and academic interest in the interrelationships between innovations and the world of work. These interrelationships lie at the heart of this working paper. As illustrated above, many contributions to the current debate are either future

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projections based on generalisations from new phenomena considered as emblematic (e.g. crowdwork), or an analysis of and extrapolation from past experiences. By contrast, there is little empirical evidence on contemporary innovation dynamics and how they interact with employment systems. The working paper seeks to fill this gap by investigating the relationship between innovation, job quality, employment, social inclusion and inequality at the firm level, based on comparative case study research in seven European countries (Sweden, the United Kingdom, Germany, France, Hungary, the Netherlands and Spain). This introductory chapter briefly revisits core arguments and findings from research on the institutional and economic embeddedness of innovations (1), before presenting the analytical approach and methods (2). The final section provides an overview of key issues and findings (3), which will be presented in more detail in the eight industry chapters that constitute the core of this working paper.

1 Interrelationships between innovations and the world of work

The institutional and economic embeddedness of innovations has been at the core of several strands of literature. Many of them, for instance the ‘National Innovation Systems (NIS) approach (Lundvall, 1992; Nelson, 1993)’, or the ‘societal effects’ school (Maurice et al., 1986; Maurice and Sorge, 2000), have focused on the micro-dynamics of knowledge building and learning activities at the firm level and the rootedness of innovation strategies in national education and training systems. One of the key findings has been that certain forms of work organisation are more conducive to individual and organisational learning and hence are an important element of a firms’ ‘innovative capacity’; and that the dominant modes of work organisation are linked to national education and training systems.

The ‘Varieties of Capitalism’ (VOC) approach has additionally highlighted the role played by the overall institutional framework and organisational patterns in orchestrating the competitive strategies of companies. This includes corporate governance modes, inter-firm relations, as well as laws and institutionalised patterns of conflict regulation with regard to extrinsic aspects of job quality, i.e. wages, working time and job security. In this account, strong employment protection, multi-employer collective bargaining and other institutional features of coordinated market economies would prepare the ground for ‘incremental innovations’ benefiting the market position of companies in certain industries, whereas the institutional framework in liberal market economies would be geared towards ‘radical innovations’ and provide them with competitive advantages in other industries (Hall and Soskice, 2001).

1.1 ‘Virtuous circles’ between innovations and inclusive employment systems

The assumption of a ‘virtuous circle’ or a complementary relationship between innovations and institutions safeguarding employee interests is contrary to an assumption in neo-classical economics that strong trade unions, for example, may impede innovation as they reduce incentives for employers to invest in innovations because high wage increases divert too much of the productivity gains (‘hold-up problem’) – an assumption that has often failed to be confirmed by empirical research (e.g. Addison et al. 2013; Kleinknecht et al. 2014). Streeck (1997) has even described the institutional framework in coordinated market economies as a source of ‘beneficial constraints’. From this perspective, high levels of wages, strong trade unions and employment protection may work to the benefit of both economic performance and job quality in various ways. They may, for example, weaken worker resistance to the introduction of new technologies and enable employees to accumulate the tacit knowledge required for ‘incremental innovations’. Furthermore, they may reduce turnover and related costs, thereby creating incentives for firms to invest in training, and support relationships of trust, thereby enhancing knowledge sharing and reducing transaction costs. Finally, union-imposed obligations on employers to improve working

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conditions may change the way in which new technologies are deployed on the shop floor. Taken together, “a set of constraints of this kind may virtuously move the production profile of a company, industry or economy towards more demanding markets that can sustain both high wages and high profits” (Streeck, 1997, p. 204).

The viability as well as the distributive effects of this kind of ‘virtuous circle’ has, however, since been questioned by many empirical and theoretical contributions.

Distributive effects of virtuous circles?

“Beneficial to whom?” asks Wright in his critique, and points out that “the optimal level of institutional constraints (...) might be systematically different for different categories of actors” (Wright, 2004, p. 410), thereby emphasising conflicts of interest and the importance of power relations *between classes*. Hence, “enlightenment of the capital class to their long-term interests in a strong civic culture of obligation and trust” will not be sufficient, since even the long-term interests of shareholders and managers may be different from those of employees. Moreover, critical analyses of company-level pacts for employment have called attention to potentially differential benefits *within classes*: even if employee representatives are involved in restructuring and innovation processes and help to develop alternatives to, for example, staff reductions at company level, this might partly be traded off against disadvantages for more vulnerable groups of the workforce, thereby reinforcing labour market segmentation or ‘dualisation’ (e.g. Hassel 2014). Another distributive dimension – the distribution between *countries* – is addressed by Hancké (2013). According to him “beneficial constraints within one [the German, K.J.] economy produced perverse external effects” and reinforced the effects of the financial crisis starting in 2008.

Diverse and hybrid virtuous circles

Apart from the critiques relating to the potentially selective and biased *benefits* of virtuous circles (where they exist), the *empirical prevalence* of these stylised national models of mutually reinforcing, complementary relationships between the institutional framework, innovation patterns, job quality and competitive advantages in certain industries have been called into question by a number of empirical findings. They reflect the fact that this theory was generated from studies examining the restructuring of manufacturing industries in a few selected coordinated market economies during the 1980s and 1990s. Studies focusing on different industries and countries and on more recent developments have provided ample evidence of sectoral and regional models of capitalism (and systems of innovation) that deviate from the national models (e.g. Crouch et al., 2004, Kirchner et al., 2012). Researchers have also questioned the alleged affinity of liberal market economies with radical innovations, arguing that certain features regarded as paradigmatic for coordinated market economies, such as long-term obligational forms of coordination both within and between firms, might be a necessary condition for radical innovations in some industries (Allen et al., 2011). In a similar vein, Witt and Jackson (2016) find some empirical support for their hypothesis that competitive advantages result from certain combinations of conflicting institutional logics, i.e. non-market and market institutions, rather than from the self-reinforcing institutional coherence emphasised by the standard VOC literature. These hybrid institutional configurations can be “beneficial for dealing with radical innovation by providing for both flexibility in restructuring of economic organisation as well as trust and coordination to solve problems of asymmetric information or hold-up.” (Witt and Jackson, 2016: 784). It is worth recalling that, in this analysis (which refers to the period up until 2003), company-level pacts for employment figure as one example of the successful recombination of ‘liberal’ and ‘coordinated’ institutions. The positive effect of company-level pacts on innovativeness, competitiveness and wages is partly confirmed by empirical research (Addison et

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al. 2015), while other studies have found few if any effects (e.g. on investment in training, see Bellmann and Gerner, 2012) or, as mentioned above, have called into question the distributive effects of such pacts (see Rehder, 2003; 2012; Hassel, 2014). Thus it is a contested issue whether in fact mixed institutional configurations necessarily combine ‘the best of two worlds of capitalism’, so to speak.

The empirical relevance and competitiveness of ‘hybrid’ or mixed institutional configurations were also revealed by analyses of foreign investors’ strategies in the new member states of the European Union. Comparing two Volkswagen automotive assembly plants in Germany and Hungary, Keune and co-authors (2009) highlight how the institutional settings of the multinational corporation’s home country were successfully adopted by the Hungarian subsidiary; this points to the capacity of multinational companies (MNCs) to “mould” the institutional framework (Keune et al., 2009, p. 114). According to Allen and Aldred (2009), foreign investors do in fact shape the innovation dynamics in new member states. However, they argue that “domestic institutions play an important role in shaping the competitive strengths of firms” in these countries as well so they cannot be easily subsumed into the group of ‘dependent market economies’ (Allen and Aldred, 2009, p. 593).

Erosion of institutional prerequisites for virtuous circles

While these studies have provided a more nuanced picture of the broad range of diverse institutional configurations that shape innovation patterns and firms’ competitive strategies, more fundamental doubts about the significance of any ‘coordinated’ institutions arise from studies pointing to their limited reach. Studies of the retail industry, for instance, have shown that the introduction of information technology-based automation led to higher service productivity but did little to improve wages, work organisation or training, either in the US (Bernhardt, 1999) or in European coordinated market economies (Carré et al., 2010). A likely part of the explanation is that the institutional framework of coordinated market economies has never had the same strength and influence in private service industries. Furthermore, the liberalisation of product markets, globalisation and financialisation have created challenges for the functioning of ‘beneficial constraints’, even in the core manufacturing sectors of coordinated market economies, as they have increased the exit options available to owners of capital and contributed to the erosion of ‘patient capital’, among other things (Scharpf, 2006). On a more general note, several scholars have highlighted how financialisation of the economy has also weakened coherent institutional complementarities in liberal market economies, by breaking the mechanisms of exchange and trust, and the ‘implicit contracts’ (Appelbaum et al., 2013) between management and employees that previously under laid business models in these countries (see also Thompson, 2003). Moreover, in view of the increasing shift from inclusive to exclusive employment systems (Gallie, 2007), it could be argued that the workplace-based prerequisites for incremental innovation are potentially disappearing, because an increasing share of workers are not or are only partially covered by the protective institutions that previously characterised coordinated market economies. In line with the assumption of a complementary relationship, the incentive for companies to invest in training and to adopt a form of work organisation that supports incremental innovation and thereby helps to sustain ‘high wages and high profits’ would probably decrease as well.

One possible conclusion could be that the erosion of ‘beneficial constraints’ even in the last protected corners of coordinated market economies facilitates the adoption of radical innovations and helps companies to stay competitive in the contemporary ‘disruptive’ age. However, the mere absence or weakness of (non-market) institutional constraints is not a sufficient condition for innovation, nor does it establish a ‘level playing field’ for companies and make them converge towards similar competitive

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strategies, innovation patterns or employment relationships. Rather, these are also shaped by economic dynamics and structures, as well as by organisational prerequisites at the firm level.

1.2 Organisational prerequisites for innovation at the company level

While the legal foundations and power resources supporting the enforcement of workplace characteristics favourable to incremental innovations seem to be in decline, paradoxically an ever broader range of academic literature and management philosophies has long been lauding the benefits of ‘high performance workplaces’, which in a similar way are assumed to reconcile competitiveness, innovation and job quality. For instance, an essential element of the Japanese Kaizen philosophy, which found its way into American and Western European management strategies through the ‘lean’ approach (Womack et al. 1990), is its emphasis on employee involvement in decision-making, team work and job rotation as means of ensuring greater flexibility and commitment in the workforce and harnessing their tacit knowledge and problem-solving skills. In a similar vein, empirical and conceptual contributions to the literature on national innovation systems (NIS) have underscored the importance of an *experience-based*, ‘doing-using-interacting (DUI)’ mode of innovation that “can be intentionally fostered by building structures and relationships, which enhance and utilise learning by doing, using and interacting. In particular, organisational practices such as project teams, problem-solving groups, and job and task rotation, which promote learning and knowledge exchange, can contribute positively to innovation performance.” (Jensen et al. 2007: 684).

There is also a strong overlap with other concepts such as ‘high involvement work practices’ (Ichniowsky et al., 1996); ‘high performance work systems’ (Appelbaum et al., 2000), ‘high involvement innovation’ (Bessant, 2003), ‘employee-driven innovation’ (Høyrup et al, 2012) and ‘workplace innovation’ (Oeijs et al., 2017). Their origins can partly be traced back to concepts and policy programmes that long preceded the diffusion of ‘lean’ principles but succeeded in infiltrating management thinking and innovation policies and guidelines on a broader scale around the same time as lean principles, i.e. from the mid-1990s onwards, at both national and supranational level (see Brödner and Latniak, 2003; Alasoini, 2009; Totterdill, 2016; Pot et al., 2017 for Europe, Kochan et al., 2013 for the US; see also the QInnE Working Paper by Csaba et al. 2016 for a critical evaluation of current European innovation policies). The common thread running through all these concepts is that both job quality and the innovation capacity and competitiveness of companies require participatory practices suited to developing and leveraging creativity, individual and collective learning at all levels of the organisation, thereby generating a complementary resource to technological innovations.

It might be expected that an almost hegemonic consensus of this kind would result in the widespread uptake of such practices. To the extent that management subscribes to these ideas they may be a possible source to compensate for the increasing weakness of the institutional foundations of virtuous circles. The empirical evidence is, however, mixed. On the one hand, survey results clearly indicate that, while the share of Taylorist organisations remains high in some sectors and countries, many firms have moved away from Taylorist forms of work organisation towards organisational practices suited to enhancing learning and problem-solving. On the other hand, empirical and conceptual studies have established that these organisational practices vary considerably from each other and that different types of organisational learning need to be distinguished in order to adequately capture the “institutionalised variation in organisational learning” (Lam, 2000). Based on a cluster analysis of employee survey data, Lorenz and Valeyre (2005) for instance have identified two models that are associated with strong learning dynamics and rely on employees’ contributions to problem-solving; they call them the ‘learning’ and the ‘lean’ models. Compared with the ‘learning’ model, however, the ‘lean’ model is characterised by relatively low

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levels of autonomy in work and the use of tight quantitative production norms to monitor employee effort. These two models are diffused unevenly across European countries, with the learning model most prevalent in the Netherlands and the Nordic countries, and the ‘lean’ model most prevalent in the UK and Spain and to a lesser extent in France. The two models also correspond to distinct HRM practices around training and extrinsic factors of job satisfaction such as job security and pay (Lorenz and Valeyre, 2005). Further research established that they also correlate with distinct innovation patterns: Arundel et al. (2007) find evidence that the ‘lean’ model is more highly correlated with technology adoption, while the ‘learning’ or ‘discretionary learning’ model is more conducive to “in-house innovation activities that lead to the creation of new-to-the-market innovations and possibly radical innovations” (Arundel et al., 2007: 22).

Although these studies, in part, explicitly refer to the VOC approach in order to explain country differences in the prevalence of the ‘discretionary’ model, their findings actually contradict a core assumption of VOC, i.e. that the institutional setting in liberal market economies is more favourable to radical innovations. On the contrary indeed, “relatively well-developed systems of employer coordination around matters of pay and vocational training constitute a favourable institutional setting for establishing learning forms of work organisation characterised by high levels of employee competence and autonomy at all levels of the organisational structure”. (Lorenz and Valeyre, 2005). Further contributions additionally link the ‘learning’ model to less ‘elitist’ national education systems (Lam, 2000) or else to more generous systems of unemployment protection, as the latter are assumed to support the inter-firm mobility of professionals on whose expert knowledge the ‘learning’ model relies to a certain extent (Lorenz and Lundvall, 2011; Lorenz, 2015). Finally, the persistence of adverse “historically inherited management-worker relations” and low levels of generalised trust in a society (Arundel et al., 2007) are considered to be further possible obstacles. Taken together, these factors might help to explain both country differences and the overall stagnation or even decreases in the diffusion of discretionary learning modes across countries (Lundvall, 2012).

Thus compared to studies in the VOC tradition, those that adopt the NIS approach place greater emphasis on the micro-level aspects of work organisation and provide a more detailed framework for analysing the mechanisms through which innovations are generated. They also take into account additional factors, such as cultural ones, that impact on these mechanisms. Like studies in the VOC tradition, however, they see non-market, ‘coordinated’ institutions as important levers for the kind of organisational practices that are regarded as a “key to genuinely sustainable competitive advantage” (Totterdill et al., 2016: 64) – albeit with one important difference. Namely, their findings suggest that incremental innovations based on the mobilisation of tacit knowledge are *in practice* not a separate mode of innovation but a complementary resource to radical innovations. By implication, the erosion of non-market institutions would not free companies from institutional constraints detrimental to ‘radical innovations’ but rather dry up an important source of enabling factors.

With their primary focus on cross-country comparisons, however, there has been comparatively little research in this body of literature on *changes* in the institutional and economic context in which innovations and job quality are embedded.

1.3 Power relations and current economic trends and structures as important contextual conditions for innovation dynamics

What is largely absent in the analyses discussed in the previous section is the role played by recent economic trends, and by power relations both between and within firms. For instance, changes in

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industrial relations systems, financialisation of economies or the restructuring of value chains are hardly taken into account as factors potentially explaining the uneven, and in some cases sluggish, diffusion of ‘discretionary learning’ practices. Arguably, the quality of management-labour relations, the extent of a firm’s shareholder value orientation or the degree of interdependence and power characterising the relationship between a lead firm and its suppliers might be difficult to capture in quantitative surveys, on which these studies primarily relied. On the other hand, these issues have figured prominently in qualitative industry and company case studies of technological change and their interaction with employment systems.

The way in which *inter-firm relations* impact on the innovation-employment-job quality nexus was highlighted by studies adopting the ‘societal analysis’ approach. As Sorge and Maurice (1990) show in their analysis of the different business strategies among French and German machine tool firms with regard to new CNC technology, the differences can partly be explained by differences in customer requirements – large industrial plants in France versus smaller firms in Germany – and the relative status of firms vis-à-vis their customers. This angle has been developed more systematically by the ‘global value chains (GVC)’ body of literature (e.g. Gereffi et al. 2005; Huws, 2006). The growing importance of multinational corporations and the increasingly international division of labour in the production of goods and (more recently) services have focused greater attention on the different characteristics of these inter-firm relationships and how they impact on the competitive strategies of firms. Building on the key insight “that coordination and control of global-scale production systems, despite their complexity, can be achieved without direct ownership” (Gereffi et al., 2005: 81), that is through networks rather than vertically integrated transnational firms, the GVC literature develops more fine-grained analytical tools in order to describe the nature of transactions and coordination in these networks of firms. The dichotomous distinction between producer and buyer-driven value chains¹ soon proved insufficient in capturing the complexity and variety of governance modes that have developed as a result of several economic trends facilitated and triggered not least by advanced ICT (Gereffi 2001). In the networked forms of value chains, besides legal and financial or economic power (depending on ownership structures), transactions are shaped by the uneven distribution of “functional power” which “tends to be more and more concentrated in the hands of the customer, through the establishment of a wide and increasing variety of specific contract regulations such as vendor contracts, service level agreements, quality control certification, competence certifications, etc.” (Ramioul and Huws, 2009: 28). This is also corroborated by the industry analyses below

While Gereffi and co-authors (2005) and others in the GVC body of literature have focused mainly on *global value chains* in the *manufacturing sector* and how this impacts on firms’ *competitive strategies*, other researchers have developed the concept further, with a view to also analysing the different power and control mechanisms governing *domestic value chains*, including in the *public and private service sector* (cf. in particular Huws, 2006 and Huws et al., 2009). Moreover, they focus on how power relations between firms have more or less direct consequences for *employment relations* and working conditions within each firm, depending on the firm’s position in the value chain (Flecker et al. 2009). However, the value chain is not viewed as a static system but rather as a dynamic system that allows firms to move up and down, with

¹ The aerospace and the automotive industry have for a long time been regarded as examples of the ‘producer-driven’ type of value chain characterised by vertical integration by transnational corporations based on ownership and control; while the food value chain was regarded as an example for the buyer driven chain, based on global sourcing networks established by large retailers and pure marketers (which build and commercialise their own brand names, but own neither factories nor stores).

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possible effects on job quality (Flecker et al. 2009: 78). The analyses assembled in Huws and co-authors (2009) (based on the EU-financed WORKS project) also show that value chain restructuring not only encompasses external realignments (for example, off-shoring, out-sourcing), but also continuous processes of internal reorganisation, including the conversion of business units into separate profit centres, or ‘internal outsourcing’ into separate subsidiaries.

The focus of the WORKS project was predominantly on the effects on work organisation, job quality and industrial relations, less so on the innovative capacity of firms. However, the study still addresses interactions with innovations by examining the part played by advanced information and communication technology (ICT) as well as workers’ knowledge in the overall process of value chain restructuring. Advanced ICTs in this account both enable and drive the development of ever more complex and spatially distributed value chains, by facilitating the codification of knowledge and thereby the integration of business partners outside the organisational boundaries of the firm. Value chain restructuring is also closely interconnected to other product or process innovations which trigger changes in the labour division both between and within firms. The joint effect of these trends is found to be the increasing standardisation and formalisation of skills and tacit knowledge (Greenan et al., 2009; Ramioul and De Vroom, 2009). In the case of process innovations “tacit knowledge is made explicit and extracted from the individual worker to become the collective property of the team or the private property of the employer or customer; and ‘skills’ are disembodied from the workers who have traditionally exercised them” (Ramioul and Huws, 2009: 30). This assessment resonates with and explicitly refers to the classic Labour Process Theory (LPT) (Braverman, 1974), which was developed on the basis of an analysis of the functioning and effects of Taylorist production. Classical LPT sees innovations essentially as means to increase management control of the labour process, thereby enhancing productivity but leading to a deskilling of jobs and a degradation of job quality. Thus the greater knowledge intensity that now characterises economic activity is not necessarily accompanied by a change in the organising principles underlying restructuring, according to this perspective. Even though most pronounced for low-skilled jobs – which are therefore most likely to be either outsourced or substituted by technology – the organisational case studies from the WORKS project aim to show that the standardisation of knowledge stretches across all skill levels and business functions (such as R&D, customer service, IT services). This can also help to explain the overall decrease in work complexity found in survey-based analyses, i.e. declining levels of discretion with regard to the pace and methods of work and declining weight of problem-solving tasks (Greenan et al., 2009). Skilled labour and tacit knowledge do not invariably decrease though, not least because new functions and work roles are needed for inter-organisation transactions in the value chain (Flecker et al., 2009). Moreover, moving up the value chain by developing higher value-added services may increase skill requirements at the company level. However, as Ramioul and Dahlmann point out, even for those parts of the business function that have increased skill requirements the ‘learning’ organisation is not a necessary corollary. The case studies rather point to “contradictory pressures, such as the speeding up of business processes and the shortened time to market of product innovation”. “Furthermore, increased performance monitoring and control systems (such as scripts and procedures) accompanying new value chain structures, supported by ICT, may limit the opportunities employees get to use and develop their professional skills.”

As mentioned above, there is a strong overlap, both with regard to analytical concepts and empirical findings, between these studies and more recent ones following in the footsteps of LPT (see contributions assembled in Briken et al, 2017). As Pfeiffer (2017) shows, for instance, opportunities for improved job quality associated with advanced manufacturing systems fail to materialise, as in practice such systems

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are predominantly oriented towards rationalisation and standardisation. In attempting to explain the limited spread of high performance work practices, labour process scholars have recently pointed in particular to the financialisation of the economy, i.e. an increasing concentration of capital, the power of new financial institutions such as private equity funds and the predominant focus of management on short-term performance and shareholder value (Thompson 2003; 2013). These factors exert contradictory pressures on firms, creating tensions not only between management and labour, but also between lower and higher management levels. “Local, unit and functional managers were tasked with responsibility for pursuing high performance from labour, but they ultimately lacked the capacity to sustain the enabling conditions. (...) Such disconnections and their largely negative consequences for innovation and stability at firm level and for opportunity and security for labour belie the optimistic promises of a new stable and progressive settlement associated with post-Fordist and related perspectives such as the knowledge economy or informational capitalism.” (Thompson, 2013). Still, as Kochan and co-authors (2013) aim to show, even financial investors are well advised and might be persuaded that fostering high performance workplaces is in their best own interests – or to pick up Wrights’ dictum, they might be ‘enlightened to their long-term interest’, to the extent that they have long-term interests.

A common thread and a core takeaway lesson from these studies is the importance of the competitive economic environment in which innovation strategies operate, and more specifically the power relations both between and within firms. This is seen as an important factor that limits the spread of certain workplace characteristics beneficial to both job quality and innovation capacity. GVC and LPT studies likewise share the view (as do other strands of research discussed above) that companies still largely depend on employees’ tacit knowledge and experience and that, besides the potential divergence of interests between employees and management, this is a source of constant tension between diverging principles or logics, namely “more learning and autonomy versus more control and less complexity” (Ramioul and De Vroom, 2009, p. 53). As Briken and co-authors (2017b: 5) note, the view of the “workplace as a contested terrain” also restrains authors from advancing deterministic arguments about the impact of innovations in conjunction with economic trends.

1.4 Virtuous circles: prospects and research questions

In sum, several signs point to an undermining of the institutional foundations supporting a virtuous circle that – at least in some countries and industries – has helped to reconcile innovation dynamics and inclusive employment systems. One possible conclusion could be that the erosion of ‘beneficial constraints’ facilitates the development and adoption of radical innovations and helps companies to stay competitive in the contemporary age of ‘disruptive’ innovations. There is, however, a broadly shared understanding across different disciplines and professional contexts that the mere absence of non-market constraints is not conducive to any innovation. Instead, both theoretical-conceptual considerations and empirical findings suggest that certain workplace characteristics are required – which in part at least seem to be anchored also in non-market institutional constraints. Recent economic trends like financialisation and value chain restructuring can be identified as factors that run counter to the proliferation of these workplace practices, despite a broad awareness, at the normative level, of their potential benefits for both job quality and innovativeness.

Merely pointing to persisting discrepancies between theory and practice, however, would miss the more relevant takeaway lesson that also informed the empirical research assembled in this Working Paper. This literature review seeks to highlight the interplay of *contradictory drivers of change* and the need to take them into account when investigating our **core research question**, which is, **how and why companies currently do (or do not) succeed in reconciling innovation with ‘more, better and inclusive jobs’**. Under

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what conditions and through what mechanisms can innovation capacity, employment and job quality support each other in a productive way? What factors and dynamics tend to block such a ‘virtuous circle’? Based on the available empirical evidence we can certainly assume that powerful ideas about the benefits of high performance work practices are themselves one of the drivers of change. But how do they interact with recent changes in the institutional and economic context in which companies’ innovation activities are embedded, such as the financial crisis in 2008, the resulting constraints on public budgets, the ongoing dynamics of value chain restructuring, the deregulation of labour markets, or societal changes like the ageing workforce and the increasing inclusion of women into the labour market?

As we will see, the findings presented in the industry chapters below are, to varying degrees, linked to the different theoretical approaches touched upon in this overview, depending on the disciplinary background of the researchers involved as well as on the specific characteristics and dynamics present in each industry. What these analyses share, however, is an awareness of the diverse factors that may either support or inhibit ‘virtuous circles’. Moreover, while many of the studies discussed in this overview primarily focus on intrinsic dimensions of job quality, the industry studies below take a comprehensive view on job quality, encompassing both intrinsic and extrinsic aspects, following a multi-dimensional definition of job quality that was adopted for the QInnE project (based on Davoine et al. 2008 and Munos de Bustillo et al. 2011)². Finally, they seek to shed light on the inclusiveness (or otherwise) of virtuous circles. The potentially uneven distribution of the benefits of ‘virtuous circles’ has been touched upon in parts of the literature (see 1.2) but has so far been rather neglected in empirical research. As noted in the QInnE operational guide, ‘high performance’ work practices may be implemented in a selective way. For example, they may be restricted to those with relatively high skills, thereby “sharpening the polarisation between an elite stratum of ‘knowledge’ workers and the lower skilled” (Warhurst et al., 2016). An important research question therefore is whether a spread of innovation-conducive workplaces (in conjunction with other trends) helps to reduce or rather accentuates long-standing social differentials in work (by age, gender, skills, nationality) or whether it is largely neutral to these inequalities.

2 Research design and analytical approach

The working paper investigates the relationship between innovation, job quality, employment, social inclusion and inequality at the firm level in eight different industries (aerospace, automotive, agri-food, banking, computer games, retail logistics, social care and health care), based on comparative case study research in seven participant countries (France, Germany, Hungary, Netherlands, Spain, Sweden, United Kingdom) (see Table 1 below). This comparative setting allows us to explore the extent to which different regulatory constraints and economic contexts in the countries and industries under investigation result in different organisational strategies.

The inclusion of a range of different industries as well as the focus on industry-specific innovation dynamics have several implications. Firstly, the types of innovations studied in this working paper are more varied than in analyses that focus on certain technologies (advanced ICTs) or on specific types of innovations (radical). The industry analyses cover the whole spectrum of innovations distinguished by the Oslo manual (OECD/Eurostat 2005) – thus both technological innovations (either product or process innovations), as

² The definition includes six dimensions of job quality: wages, employment quality (e.g. job security), education and training, working conditions (e.g. individual discretion, work intensity), work-life balance and consultative participation and collective representation.

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well as non-technological innovations (including organisational and marketing innovations)³. While this heterogeneity narrows down the empirical basis for each of the innovations studied and thus imposes constraints on generalisability, this approach was best suited to the purpose of our study. In line with the literature and with the overall approach of the QulnnE project, we assume that organisational innovations are of particular importance, particularly from the point of view of job quality. Moreover, they are of considerable empirical relevance, not only in the sense that they are increasingly recognised as being either a necessary prerequisite, corollary or consequence of technological innovations, but also as key innovations in their own right, particularly (but not solely) in service sector industries. The inclusion of incremental innovations is also in line with the overall approach of the QulnnE project, which seeks to transcend a rather narrow focus on the ‘science, technology and innovation’ (STI) mode of innovation that makes use of codified scientific and technical knowledge through research and development (R&D) and interactions with research institutions; to pay particular attention to the ‘doing, using, interacting’ (DUI) mode of innovation (Jensen et al. 2007).

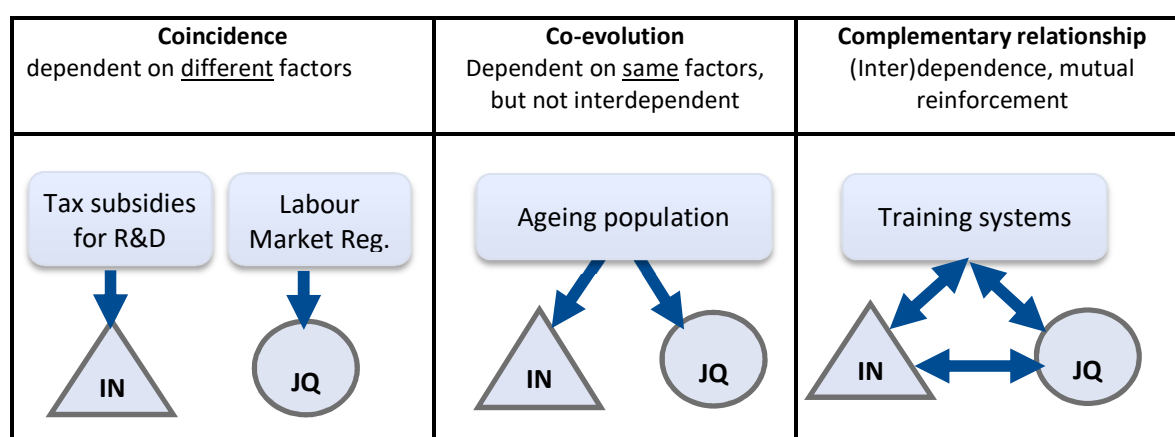
A second feature that sets our approach apart from other studies that have focused on particular innovations is the particular attention we pay to factors in play at the meso-economic industry level. Such factors are acknowledged in the literature as being of crucial importance. Factors impacting on both innovation dynamics (such as demand conditions, company structures, technological regimes or innovation policies) and those directly affecting job quality (such as the industrial relations system) vary between industries at least as much or even more than between countries (e.g. Malerba, 2005; Bechter et al., 2011).

Thirdly, and related, the primary goal of this investigation is to generate fresh empirical knowledge on how job quality and inclusiveness are changing and how such changes might be related to innovation dynamics. That is, rather than analysing how a particular innovation changes certain aspects of job quality, while leaving aside other, potentially more important dynamics that are impacting on job quality as well. This requires us to systematically take into account the broad set of other factors affecting job quality – either in close conjunction with, or independently of – innovation dynamics. This holistic design is a typical feature of qualitative case study research and fully exploits its strengths, namely that it accounts for the multitude of historically contingent, simultaneous trends. It is widely acknowledged that the strength of quantitative research lies in *isolating and measuring* the effects of a single factor (e.g. a certain innovation), whereas case study research is best suited to *identifying and describing the mechanisms* of causal relations (i.e. ‘why and how’ these effects are generated) (e.g. Gerring, 2007). Another, less frequently acknowledged advantage of case study research is that it opens up opportunities to identify and describe what happens when diverse and potentially unrelated trends come together at one place and one point in time and to assess their cumulative impact. This is an advantage the QulnnE case study research seeks to exploit. To give an example: instead of trying to isolate the impact of an organisational innovation, such as the introduction of ‘scrum’ methods in a computer games developer studio, preferably by comparing it with similar firms who have not yet introduced scrum, the approach adopted for this

³ The classification of the Oslo manual distinguishes between four different types of innovations (cf OECD/Eurostat 2005: 53ff). *Product innovations* involve new or significantly improved goods and services *Process innovations* represent significant changes in production and service delivery methods. *Organisational innovations* refer to the implementation of new organisational methods, such as changes in business practices, in workplace organisation or in the firm’s external relations. Finally, *Marketing innovations* involve the implementation of new marketing methods, including changes in product design and packaging or in methods for pricing goods and services.

project is to study how this organisational innovation interacts with other related or unrelated factors that shape job quality in this industry and to consider their cumulative impact on job quality. Thus, in addition to the kind of complementary relationships that many of the theoretical approaches discussed above focus on, case study research also needs to be sensitive to possible *co-incidences*, i.e. the simultaneous impact of different factors (e.g. tax subsidies for research and development on the one hand and labour market regulation on the other hand) affecting job quality and innovations independently from each other, or a *co-evolution* whereby the same factor impacts on job quality and innovation, but in a largely unrelated way (see figure 1). To give a hypothetical example for the latter, an ageing population can, for instance, benefit both job quality and innovation, as it may force firms to make workplaces more sustainable (+ job quality) and at the same time incentivise firms to develop innovative services and products tailored to the needs of ageing customers (+innovation).

Figure 1: Potential causal relationships between innovation, job quality and institutional, economic and societal constraints



Source: own elaboration

2.1 Selection of industries and company cases

The selection of industries was motivated by a number of aims. Firstly, to not solely focus on manufacturing but to also include public and private sector service industries. Secondly, to include industries with different skill structures and social composition of the workforce, so as to be able to investigate the inclusiveness of innovation/job quality interrelationships, as explained above. Relatedly, the industry selection also sought to include industries with both higher and lower levels of aggregate job quality, as well as both higher and lower levels of innovations. The final decision about which industries to study in which of the seven participating countries was informed both by statistics on innovation intensity and job quality made available by the Work Package 5 of the QuInnE project, as well as by desk-based research and consultations with national stakeholders via workshops and interviews. Taken together, this information provided valuable intelligence and assessments on the industries that would be most interesting to study, due to their relevance for the respective national economy and in light of current dynamics thought likely to have an impact on the job quality/innovation nexus. The original research design envisaged the selection of four industries, each to be studied in at least three countries. Ultimately, in order to reach a more balanced sample of industries that took into account the above selection criteria, it was decided to increase the number of industries studied from four to eight and for each industry to be studied in at least two countries. The resulting sample is shown in table 1 below.

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Table 1: Sample of industries and countries, number of case studies and interviews

| | UK | FR | NL | SE | ES | HU | GER | Total number of case studies | Total number of interviews |
|-------------------------------|----------|----------|-----------|----------|----------|----------|----------|------------------------------|----------------------------|
| Manufacturing sector | | | | | | | | | |
| Aerospace | 1 | 3 | | 2 | | | | 6 | 78 |
| Automotive | | | | | | 3 | 2 | 5 | 34 |
| Agri-food | | | | | 4 | 3 | | 7 | 59 |
| Private Service Sector | | | | | | | | | |
| Computer games | 2 | | 6 | 3 | | | 3 | 14 | 86 |
| Banking | | 3 | | | 2 | | | 5 | 42 |
| Retail Logistics | | 2 | 2 | | | | 3 | 7 | 52 |
| (quasi) Public Sector | | | | | | | | | |
| Elderly / Home care | 3 | | 2 | | | 3 | | 8 | 56 |
| Hospitals | | | | 4 | 2 | | | 6 | 54 |
| TOTAL | 6 | 8 | 10 | 9 | 8 | 9 | 8 | 58 | 461 |

According to the clustering of industries by job quality and technological innovation, as provided by WP5, the selected industries spread across three of the four cluster types (see table below). The ‘high job quality – low innovation’ cluster is not represented. It should be kept in mind that the table below only covers technological innovation (due to the absence of data in the EWCS on organisational innovation).

Table 2: Relationship between job quality and technological innovation

| | | Innovation | |
|-------------|------|---------------------------------------|---|
| | | Low | High |
| Job Quality | Low | Food production (A1; C10); Care (Q88) | Retail logistics (H52; H53) |
| | High | | Hospitals (Q 86); Aerospace (C30), Car Manufacturing (C29), Computer Games (J58); Banking (K95) |

Source: EWCS (based on data provided by WP5, see also Erhel and Guergoat-Larivière, 2016). The numbers in brackets refer to the NACE codes that include the respective industries under study

The rationale for selecting the case studies in each industry is explained in the relevant industry chapters. As a general rule, however, the selection criteria was chosen on the basis of characteristics that were reasonably expected to ‘make a difference’ for the investigated issue. In our case, the selection criteria should make a difference to the innovation/job quality nexus. Criteria chosen for the selection of cases were decided by each cross-national industry team, based on national industry profiles on competitive structures, current innovation dynamics and job quality written beforehand. These industry profiles were in turn based on relevant literature, available statistics and interviews with industry experts. In order to exploit the analytical potential of the comparative method, the sample of cases was selected in order to be as similar as possible between the countries. At the same time, consideration was given to the different business structures in the selected countries. For instance, while in one country, there may be

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predominantly large firms operating in the selected market segment, it may be almost exclusively SMEs in another country – in which case selecting companies based on firm size would neither be feasible nor appropriate. The industry teams therefore needed to agree on the appropriate selection criteria, depending on the relevant features in the particular industry.

2.2 Case study methods

Case study research is particularly appropriate for studying a contemporary phenomenon ('the case') within its real-world context (Yin, 2009, p. 16). A first important step in case study design is thus to define the social, spatial and temporal boundaries of the case, as well as the relevant context conditions. This primarily depends on the research questions and propositions. Our investigation seeks to contribute to a better understanding of organisations' recent and upcoming decisions on innovation and job quality related issues, and of the interplay of these decisions and their outcome with regard to employment, job quality and inclusiveness. Our 'cases' are thus not certain types of innovations but companies or more generally organisational units that produce goods or services. The majority of the selected cases are indeed legally independent companies; however, in several instances a focus on organisational units within a larger company (e.g. an in-house warehouse of a large logistics company, a hospital ward) was more appropriate in order to narrow down the broad variety of innovation processes to be studied; and in other instances, where production processes are typically strongly networked, as in the computer games industry, a case could also include freelancers working for a company or be a network of self-employed workers cooperating in temporary projects. With regard to the relevant context conditions, as spelled out above, the innovation and job quality related strategies of these organisational units are both enabled and constrained by their institutional environment, their position in the value chain, by their organisational context (if part of a larger company) and by support from infrastructures and institutions at the regional, sectoral, national or international level. In order to capture the impact of this 'real-world' context, research for each case study included, firstly, desk-based research in order to retrieve as much information on these contextual conditions for the company or organisational unit under study beforehand. Secondly, in addition to the interviews at company level – with managers, employees and employee representatives – the fieldwork included interviews with representatives from this wider context, for example trade unions and business organisations, public administration, or research institutions. These interviews are included in the total number of interviews listed in Table 1. Thirdly, a semi-structured thematic protocol was jointly developed to guide the interviews and subsequently, to be used as the initial basis for the case study report. The protocol included a broad range of questions aimed at identifying the broad range of possibilities that embed companies' innovation strategies

Wherever interviewees gave their consent, interviews were recorded and transcribed and supplemented by documents and statistics, available media reports and expert interviews. These materials were thematically coded along the questions defined beforehand and emerging issues and written up as case study reports. As mentioned above, for the purpose of comparability between cases, the interview guidelines and the case study reports followed a common protocol that was developed jointly and finalised after a first set of pilot case studies in a few industries.

A common concern about case study research is its apparent limits to generalise findings based on a few cases only. However, as Yin (2009, p. 21) notes, case studies are in principle generalisable to theoretical propositions (analytic generalisations), not to populations, as in quantitative research (statistical generalisations). Thus the findings do not allow us for example to make any assumptions about how many organisations in the same market segment or industry are characterised by similar innovation-job quality interlinkages as those identified in the organisations under study. They however do allow for more general

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conclusions about the conditions that support these particular interlinkages, provided that researchers take the necessary precautions when seeking to establish the causal relationships for their particular case (internal validity) – for example by considering rival explanations – and when reflecting on whether findings are generalisable beyond the particular case (external validity) – for instance by comparing the findings to earlier research and theoretical propositions. The latter task was most importantly assumed by the author teams who wrote up the cross-case analyses in the industry chapters below. There are however two inevitable limits to generalisability that are linked to the boundaries of the cases and therefore need to be noted here: the first is to do with the temporal boundaries: The time span that we were able to observe was often shorter than some of the causal relationships discussed, as recent and current innovations only deploy their impact over the longer term. This leaves us with open questions and merely preliminary conclusions into which directions job quality, employment and inclusiveness will ultimately evolve – even more so with a view to the constant adjustment processes observed in the cases under study (see next section) . Secondly, by focusing on single organisations we’re studying micro-economic effects of the interaction between job quality and innovation, not the effects at the macro-level. There might be quite successful models that are beneficial to the market position of a firm and to secure jobs in this organisation; yet whether this translates into beneficial effects (on innovativeness, job quality, competitiveness) at the macro-level is another question.

3 Overview on chapters: key issues and findings

The industry analyses below illustrate the broad variety of strategies that companies adopt in dealing with the diverse challenges brought about by technological changes, customer demands and societal needs, labour market as well as competitive structures in their respective industries. They also shed light on the variety of reasons why companies opt for organisational changes geared towards fostering individual and organisational learning and making better use of employees’ knowledge and skills. The dynamics in value chain restructuring are an important factor here. A number of case studies from various industries, for instance, show how companies’ innovation strategies (including workplace innovations) are motivated by the aim to improve their position in the value chain by developing higher value added products and services. Another recurrent finding is the importance of skill and labour shortages, not only for high skilled, but also for medium and, to some extent, even lower skilled occupations: When labour markets are tight, employers are likely to be incentivised to improve job quality in order to attract and retain scarce workers; hence they can be a key driver behind companies’ efforts to improve both intrinsic and extrinsic determinants of job quality. However, the incentives inherent in the broader economic context are neither uni-directional nor necessarily strong enough to channel company strategies unambiguously in the direction of ‘high performance work systems’. In fact, few occupational and regional labour markets are characterised by skill shortages; and strong cost pressures imposed by dominant players in the value chain can also trap companies in price-competitive strategies that come along with Taylorist or hierarchical ‘Lean’ forms of work organisation.

Companies however do not neatly fall into two or three distinct types of strategies. Our argument here is however not that reality is more complex and requires more nuanced typologies in order to adequately describe them. Rather, the point we want to make here, and perhaps the most important contribution of these qualitative analyses, is that they shed light on the contradictory effects – a) of *diverse* factors on job quality and innovations; b) of *one and the same factor* on innovations and job quality, and c) of one and the same *innovation* on job quality – and on the tensions, dynamics and constant adjustment processes resulting from these contradictory effects at the company level. For instance, some innovations may

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improve intrinsic aspects of job quality, but come along with work intensification (see for example, chapters on Automotive and Banking). Value chain restructuring can turn organisational innovations which *prima facie* sought to increase employee involvement into strategies predominantly geared towards cost-cutting; and this in turn can lead to dissatisfaction among both managers and employees and trigger new organisational changes (see for example, Aerospace chapter). Tight public budgets can result in unsatisfactory wage levels and amplify recruitment problems, which in turn can motivate companies to seek organisational innovations that improve other aspects of job quality, yet still constrain companies' investments in training (see chapters on Care and Hospitals). An ageing workforce can lead companies to implement job rotation as a means to reduce physical strain, but in a context of increasingly Taylorised workplaces and strong pressures to remove 'down' times, job rotation also reduces forced breaks and makes employees rotate between highly repetitive tasks (see chapter on retail logistics). Instead of framing company responses as a coherent set of strategic choices, the analyses rather point to simultaneously diverse and partial responses to the challenges faced by companies and trace the resulting winding paths of company development. They nevertheless display the impact of structural factors on these dynamic adjustment processes and show how, next to the economic environment, institutional and cultural factors (e.g. management styles; power resources and attitudes of trade unions, national training systems or corporate governance) can – and do - make a difference.

The following sections provide summaries of the industry analyses, in particular highlighting their findings regarding

- the economic context in which the innovations operate and how the economic context impacts on these innovations
- the interactions of recent/current innovations with employment levels, skill requirements, job quality and inclusiveness, with a particular emphasis on the incidence of high performance workplaces; and
- the factors that make a difference in how companies innovate and deal with the challenges (national institutional setting, position in value chain, corporate governance; management styles)

3.1 Aerospace industry

The chapter on the aerospace industry by *Gautie and co-authors* covers both original equipment manufacturers (OEMs) and supplier firms in France, Sweden and the UK. With the dominant position of transnational corporations like Boeing and Airbus the aerospace industry still preserves key elements of the 'producer driven' value chain. The state however plays a more important role here than in other manufacturing industries: Private companies in all three countries under study are benefitting from public purchases of military and security devices; moreover, public funding is a very important source for research and development (R&D). In the 2000s, several trends gained speed and scope and thoroughly modified the aerospace value chain: Most importantly, a modularisation of production, accompanied by outsourcing and thus a shift to networked production in long-tailed value chains; and a stronger vertical differentiation within the group of suppliers, and accordingly an increased variety of relationships between them – ranging from fully integrated partnerships with some suppliers, to simple market relationships with others. Finally, financialisation in the aerospace industry has oriented firms more strongly toward the goal of maximising shareholder value. In the past decade, the trend towards globalisation has accelerated, partly induced also by the 2008 crisis that has further curtailed the purchasing capacity of the public customer (lower military and space budgets) and pushed firms to look for new clients, often at the international level. Moreover new international competitors have emerged and gained market shares,

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such as Bombardier (Canada), Embraer (Brazil), and Comac (China), which are breaking down the duopoly between Airbus and Boeing in the aircraft segment.

These changes have also modified the innovation processes, as Gautié and co-authors emphasise, and led to a shift from an innovation process largely dominated by R&D departments of OEMs to networked innovation processes with a more active role of sub-contractors and suppliers. In addition to the shift of innovation activities ‘down’ the supply chain, the authors note a shift ‘up’ the supply chain towards the client. This more client-driven innovation process also implies that cost-benefit considerations have become more central for innovations.

The company sample includes both OEMs and 1st and 2nd tier suppliers. The chapter focuses most importantly on technological process innovations and organisational innovations as these were most relevant to recent changes in the internal division of labour, employment and job quality. Since the beginning of the 2000s, three dimensional *computer aided design* (3D CAD), *computer aided manufacturing* (in particular CNC machines, and more recently, robots) and the use of digital tools to organise and monitor work have been the most important technological innovations implemented on a broader scale in these companies. Moreover, most companies under study have also adopted organisational innovations, most importantly the introduction of ‘lean’ principles, albeit with large differences in the way they were implemented. Management has acknowledged that these organisational innovations are of crucial importance in an industry context where no radical innovation in products has occurred during the two past decades. According to Gautié and co-authors, while the ‘science, technology and innovation’ (STI) mode of innovation is very important during early stages of the product life-cycle, the ‘doing, using and interacting’ (DUI) mode (see above, section 1.2) becomes progressively important as products mature. Under this scenario, they suggest that "incremental innovations by way of continuous improvement are the main way to increase productivity and quality, therefore providing a strong incentive to make organisational innovations".

The authors identify characteristics consistent with the whole range of organisational models distinguished by Lorenz and Valeyre (2005) – Taylorist, Craft, Lean, Learning – in their company sample. To some extent their findings tend to confirm earlier research regarding the uneven distribution of these organisational models across countries, with the Swedish companies being closer to the ‘learning’ type (but interestingly also the UK case, albeit less pronounced) and the French firms more akin to the ‘lean’ type. In analysing the factors contributing to this, over and above the competitive environment that partly turned organisational innovations which prima facie sought to increase employee involvement into strategies predominantly geared towards cost-cutting, Gautié and co-authors emphasise the importance of cultural and institutional factors: The more hierarchical management style in the French cases which is rooted not least in the elitist education system (*‘Grandes Écoles’*) that provides managers (often with an engineering background) with high symbolic capital and status awareness. This seems to be one important factor that is favourable to the STI-mode of innovation, a top down ‘planning and control’ approach in implementing innovations, and a predominant focus on the standardisation and formalisation of procedures – even including more formalised forms of employee involvement (e.g. suggestion boxes or meetings). This is mirrored by the different degrees to which employee representatives took part in the innovation processes. While employee representatives enjoyed substantial participatory rights in both French and the Swedish companies (whereas they were absent in the UK case), the French employees and employee representatives were much less involved in decision making. In a complementary fashion, the top-down ‘planning and control’ approach of management is matched by employee representatives’ more

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defensive stance towards innovations, whereas in Sweden employee representatives were both formally and informally “more part of the ‘process and learning’ mode of organisational change”.

The chapter however also illustrates the strength of case study research in identifying contradictory trends and effects and the dynamics generated by them. In the French cases, several companies have more recently sought to countervail some of the negative effects of ‘lean’ principles: As the authors note, “the new forms of mobilising the operators’ suggestions via formalised ‘meetings’ or with formalised tools (e.g. suggestion boxes) were supposed to, in the managers’ view, replace the daily on-the-job creativity by more effective procedures”. Yet in the experience of employees “this informal daily creativity was still necessary, as a dimension of the DUI-mode of innovation, but, undesirably, was displaced by standardisation and work intensification. Interestingly, in all the French cases, some senior managers realised that a too rigid / technocratic form of lean organisation became an obstacle to the making of an innovative workplace, but effective changes had not always been put in place.”

Whereas intrinsic aspects of job quality were often enhanced by the organisational changes (although to a different degree), the case studies also point to work intensification as result of both some organisational and technological innovations. Moreover, the extrinsic aspects did not necessarily evolve in the same direction as the intrinsic aspects, as they were partly accompanied by restrictive wages policies and more extensive use of temporary agency work in order to cope with strong cost pressures. The consequences of the technological changes on employment were mediated by managerial choices and by the institutional context, as the authors note. Strong employment protection in Sweden for instance is regarded as factor explaining the relatively important investments in training of older workers in order to cope with the new skill requirements linked to the introduction of 3D CAD – while the stronger use of early retirement schemes in France facilitated an “age-biased technological change”. Overall, the technological innovations according to the authors have had mixed effects on skill requirements: apart from the new (rather than higher) skill requirements for white-collar workers and partly an upgrading of jobs (more formal skill requirements), some of the technological innovations impacting on blue-collar jobs required new skills, but also led to a shift in the work activity from ‘making’ to ‘controlling’, which was experienced by workers as a loss of the ‘craft’ dimension of their jobs. The case studies also highlight the room to manoeuvre regarding the impact of advanced ‘digital’ options on the monitoring and control of the labour process. The issue raised here is important, beyond the particular case of the aerospace industry, as digitalisation allows the gathering and computation of a huge amount of information about the production process, that can be used to monitor very closely the workers’ activity – in particular by measuring individual performance of workers in real time - with potential negative impacts on job quality.

3.2 Automotive Industry

The chapter by *Makó and co-authors* on the automotive industry focuses on Hungary and Germany, two countries where companies are strongly interconnected in the car manufacturing value chain. Despite considerable wage increases over the past two decades in Central and Eastern European (CEE) countries, the wage gap between CEE and the Western European countries like Germany is still important and remains a key driver for the delocalisation of manufacturing activities to CEE countries. This exerts strong cost pressures, on both OEM subsidiaries and supplier firms in Hungary but also on supplier firms in Germany, so they tend to channel their strategies towards cost competition. However, as Makó and co-authors aim to show, competition strategies based on low costs bear a ‘lock-in’ risk both in countries and firms’ development paths. The case studies analysed in the chapter illustrate efforts by companies to move up in the value chain, by enhancing their strategic ability to develop higher value-added, more knowledge-intensive products and services. This is partly also initiated and supported by OEMs, as exemplified by the

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recent establishment of R&D research centres of large German OEMs in Hungary. Apart from lower labour costs, this responds not least to the local establishments' increased experiences in car manufacturing and a general growth of higher skilled workforces in the 'peripheral' countries of the automotive value chain. As the authors stress, it also illustrates a more general shift observed in the industry – from an OEM-centred approach in innovation towards an innovation network concept integrating different companies across countries. Makó et al. emphasise the crucial role of knowledge mobilisation and organisational learning in this context. In interpreting the case studies they therefore rely both on the value chain perspective (with its emphasis on governance and power relations) and on analytical distinctions between different types of knowledge highlighted by the NIS school of thought.

Accordingly, most of the innovations analysed in the case studies reflect the ambition of the companies to mobilise and collectively share the tacit knowledge of employees, thereby more fully exploiting the skills and experience of employees. The organisational innovations range from a very comprehensive strategy involving all shop-floor employees in a continuous improvement process designed according to Kaizen principles, to smaller groups of employees from different organisational units who are charged to systematically develop innovative ideas, thereby complementing classical R&D departments and breaking down functional 'silos'. Next to these strategies labelled 'seeking knowledge-efficiency', there are however also organisational innovations labelled 'seeking cost-efficiency', which involved a centralisation of decision-making, a standardisation of production processes and a closer monitoring of performance levels. Various combinations of these strategies may also be evident in the same firm. As the authors note, this is a result of contradictory objectives that companies have to manage: the competitive advantage generated by increased knowledge-efficiency is limited or counterbalanced by other trends such as increasingly smaller production batches, shorter delivery times, and a sharp price-based competition which continuously force automotive companies to look for compromises between the two strategies. The most radical innovation studied in the chapter exemplifies the shift from production to mobility services: it analyses how a car-sharing company in Germany is seeking to adjust their business model to the changing environment (new players entering the market; higher customer expectations) in this fast growing market segment in Germany.

While the effect of the pure 'cost-efficiency' strategy on employees' job satisfaction not surprisingly is negative overall, the mixed and the knowledge-efficiency strategy has led to a more inclusive and participative work organisation model, which benefits parts or even the majority of employees (depending on how many employees are involved in these organisational innovations). These organisational innovations have increased the creative character and benefitted intrinsic aspects of job quality, yet Makó and co-authors emphasise that it has not transformed these jobs altogether, as the basic tasks in production remain routine, hence these activities are performed as 'add-on' work. Since the resources devoted to these 'add-on' tasks are not increased in line with the time they require, this tends to translate into increased workloads, irrespectively of how many employees are involved. In one Hungarian case the newly introduced 'Quality Circle' resulted in higher workloads and increased overtime for their members; but also to increased workloads for their non-participating colleagues as they have to compensate for the frequent absence of their colleagues from the shop floor. Unlike in other industries, the innovations are accompanied by improvements in extrinsic aspects of job quality, most notably wages for those involved in the organisational innovation. Again, this is not an automatic consequence but partly also a result of the bargaining power of workers' representatives.

In terms of employment levels and inclusiveness, all innovations (including the 'cost-efficiency' seeking strategy) helped to stabilise employment levels or led to employment growth. The case of the German

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supplier is particularly interesting as it illustrates a shift towards *less* automation and instead the “smart use of manual work” as the authors note. It seems worth highlighting that in this case, where employee involvement was broadest, this additionally contributed to enhance and sustain inclusiveness, as it helped to avoid a polarisation of jobs by giving both unskilled and semi-skilled jobs an active role in the Kaizen-inspired continuous improvement process.

3.3 Agri-food industry

The chapter on the agri-food industry by *Martín and co-authors* focuses on Hungary and Spain. In both countries, the agri-food sector comprises an important share of both GDP and employment. The enlargement of the European Union and the financial and economic crisis starting in 2008 are major events that have affected the European agri-food sector in the past two decades, and the two countries under study have been exposed to these changes to varying degrees: Whereas the most important event for Hungary was its accession to the European Union in 2004, Spain was particularly strongly affected by the economic crisis beginning in 2008. The agri-food sector was less severely hit by the crisis than other industries in Spain, but companies still faced more difficulties in accessing finance as a result. However, as Martín and co-authors note, the economic crises as well as the EU enlargement also forced agri-food companies to increase their competitiveness through product and process innovations and an increased export-orientation. For Hungary, the accession to the European Union likewise meant both enhanced export opportunities and competitive pressures from abroad. Moreover, foreign direct investment and ownership has strongly increased; today two-thirds of food processing companies in the country belong to foreign investors. Still, a key feature distinguishing ownership structures in this industry is the important role played by cooperatives and family-owned businesses. The chapter focuses particularly on this segment of the agri-food industry, with all but one company in the sample being either a cooperative or a family-owned business. Linked to this, with two exceptions the company sample includes mostly micro and small companies with less than 50 employees. With small and medium sized companies making up for around 50 per cent of turnover in the industry, they thereby focus on a specific, but highly relevant segment of the agri-food industry.

A key feature characterising the competitive and innovation strategies of the small and medium-sized companies under study is that they strongly rely on external cooperation from both competitors and other organisations involved in R&D. While the two medium sized firms in the company sample do have their own R&D departments, several innovations in the other companies were carried out in close cooperation with universities and other research organisations; with competitors in ‘roundtables’ and associations, or else they were based on close collaboration between members of the cooperative. In the case of the medium sized market leading Pasta Company in Hungary, the financial participation of employees and management (using Employee Stock Ownership Plan (ESOP) and Management Buy-Out (MBO) schemes) was a key social innovation in the privatisation process that began in the 1990s. This financial participation by employees and management in the first place offered urgently needed financial resources for technological and organisational renewal, but it also resulted in a cooperative organisational culture that benefitted the adoption and implementation of process innovations (automation) over the past decade. Overall, the small size of the companies and the ownership structure seems to facilitate employee involvement in innovation processes. The direct and close communication between workers and managers is regarded by Martín et al. as an asset that benefits the implementation of improvements in the daily operation of production processes.

Next to automation, a large part of the innovation strategies of the firms under study – most of whom do not only *process* food but also *own* land and crop or livestock – is focused on a better knowledge and

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subsequently on an improvement of raw materials. In the case of wineries, for instance, different technologies (computer applications, sensors, drones, new applications, etc.) permit more detailed knowledge of the vine, of conditions which affect the grape quality (climate, soil, irrigation, etc.) and of farming techniques. Other innovations are predominantly organisational (albeit partly facilitated by ICT), and basically serve two goals: to increase exports or to diversify business. Several companies in the sample have made efforts to increase their exports through marketing innovations; partly also prompting the creation of new job profiles and the need for new skills, e.g. language skills. Several other case study companies try to complement their business with tourism and gastronomy services, partly also strongly relying on ICT-based community marketing activity in which Facebook, websites and different mobile applications play an important role. Thus, in a way these companies more strongly integrate functions like export and marketing into their own business models, thereby reducing dependency on larger food processing firms or retail firms.

In terms of job quality and employment levels and structure, the most sizable effect of these innovations is on skill requirements which tend to increase and become more diverse. All innovations are accompanied by some new knowledge requirements. Much of the new skills are learnt on the job, but this is partly supported by some off-the-job training provided by external organisations. Moreover, in the two medium-sized factories, a diversification of job profiles and an increasing emphasis on engineering skills, as well as communication and marketing skills could be observed. In one case this was accompanied by a slight shift in the gender composition of the workforce, with more male employees being employed in the ‘engineering’ roles.

Despite the presence of unfavourable working conditions such as longer and unsocial working hours (in particular in the harvest seasons), or increased workloads associated with the introduction of innovations, interviewed employees tend to voice a positive perception of job quality. Martín et al. attribute this primarily to the size and ownerships structure of companies, as well as their recruitment strategy (largely relying on a local workforce) which fosters close and ‘almost family like’ relationships among employees and between employees and managers and generates a high trust environment. According to survey data, average job quality in the agri-food industry is lower in several aspects than in other industries, therefore this sample might not be particularly representative of the whole industry. However, the findings reconfirm that job quality depends to an important extent on factors that are largely unrelated to innovation dynamics, such as a positive social environment, and a high commitment on the part of (co-)owners towards employee involvement and employment stability. This might in turn foster incremental innovations, but this does not appear to be the primary motive and causal mechanism for improving job quality in these cases.

3.4 Banking industry

The chapter on the banking industry by *Perez and Martín* focuses on retail banking, where current restructuring processes involve the pruning of the network of local retail branches. This trend was amplified by a sharp decrease in interest rates after the 2008 crisis and resulting pressure on banks to cut costs. It is additionally accelerated by the market entry and rapid growth of low cost internet competitors specialising in online services (pure online banks; FinTechs). Both factors fuel the shift of retail banking activities from local branches to online services and products, thereby increasingly exploiting the technological opportunities offered by advanced ICT. Innovations in this industry thus predominantly involve the development of new online financial products and services, more recently including the use of artificial intelligence (Watson by IBM). The organisational choices made by banks differ in terms of the

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division of labour between back and front offices, and with regard to the integration of new activities into the existing organisational structure.

Resulting challenges for employment and job quality are threefold: firstly, the job destruction linked to the downsizing of the physical banking network and digital transformation; secondly the new skills required for the new remote banking services; and thirdly changes in the work organisation in order to adjust it to remote banking services. While artificial intelligence in the form of ‘chatbots’ (conversational robots) and virtual assistants has generated a lot of anxiety about job destruction, first experiences in one of the companies studied rather point to limited substitution effects at this stage of implementation. While many tasks have been standardised over the last decade and can in fact be substituted through the use of technology, the job profile of customer advisors has changed at the same time. In particular, customer advisors in remote banking services now have to deal with more informed and demanding clients who are challenging their knowledge, know-how and interpersonal skills. This can be seen as background context to an upskilling trend in terms of formal skill requirements: as available statistics show, the average education level of employees in the industry has increased over the last decade.

In terms of actual skill requirements and job content, the analysis by Perez and Martín however shows that organisational choices do make a difference. Two distinct strategies were identified in the companies studied (involving both traditional banks and new players). The first involves creating distinct organisational units dedicated to provide online banking services, either within the organisation or as a legally independent unit. This strategy is associated with *job polarisation*, with young employees dealing with standard online customers on the one hand, and a smaller group of customer advisors for more personalised relationships with high revenue clients on the other hand. The first group of employees (‘e-advisors’ and call center contact agents) are paid relatively low wages, and work exclusively online, with longer working hours and fewer career prospects compared to their counterparts in the physical network. The second strategy is *job enrichment* whereby the provision of online services is added to the job profile of customer advisors in traditional banks. In these cases, companies’ investment in training exceeds the industry average. Moreover, management places particular emphasis on empowering employees at all levels of the company; and abstains from closely monitoring and rewarding individual performance levels.

Differences in corporate governance are identified as one likely reason for the different strategic choice: one of the two cases adopting the job enrichment strategy is a French cooperative bank with very limited pressure from shareholders. At the same time the cases illustrate that ownership structure and shareholder value orientation do not determine the organisational choice of banks: in the case of a Spanish commercial bank, management acknowledges the goal to satisfy shareholders expectations, but tends towards the same organisational choice (job enrichment); whereas a French commercial bank is so profitable that in the view of Perez and Martín, the organisational choice is unlikely to be related to budget constraints but rather to cultural factors.

It is important to note that while the second strategy resembles the features of a high performance workplace in terms of training, discretion and autonomy, job quality has clearly deteriorated in these cases as well. As a result of job destruction, the average number of clients per customer advisor has increased and so have workloads. Unlike one might expect, offering remote banking services in addition to face-to-face contacts does not necessarily decrease workloads, as the every-day management of the diverse communication channels (phone calls, e-mails, chatbots) is time-consuming and difficult to schedule. Moreover, customer expectations of an immediate response adds to time pressures. According to interviewed employees, this negatively affects employee commitment and meaningfulness of work.

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In terms of inclusiveness of jobs, the job polarisation strategy relies on a young workforce who accept the working conditions offered in these jobs (extended working hours, relatively low wages, sales pressures and monitoring of individual performance). These jobs are clearly designed as entry-level jobs, but not necessarily as ‘springboard jobs’ opening up further career paths in the banking industry. Turnover is high and there is relatively little effort from HR management to retain employees or provide career opportunities to this group of workers. This limited sustainability, as well as the job destruction in banks, might ultimately force banks to change their strategy at some stage in the future. While these jobs might allow young graduates to gain their first professional work experience, several interviewees voice their impression that since the financial crisis the banking sector has lost its appeal to young graduates.

3.5 Computer Games

The chapter on the computer games industry by *Keune and co-authors* deals with a relatively young and small industry which has however developed into a global industry with rapidly growing markets over the past two decades. The global value chain is dominated by large transnational video game publishers like Tencent (China), Nintendo (Japan) or Ubisoft (France). With their financial resources and the large network of company-owned developer studios around the globe they have the capacities to produce the large so called Triple A games like *Call of Duty* for personal computers and consoles such as Playstation or Xbox, or the large MMO (massively multiplayer online) games that have recently gained in popularity. Despite increasing concentration of ownership among a few large transnationals, technological developments and low market barriers to entry also allow a large number of smaller companies and self-employed to offer their products in the global value chain. The proliferation of mobile devices, online marketing opportunities and distribution by download as well as the emergence of crowdfunding have made it easier for smaller independent companies (‘indies’) to produce their own games independently from large publishers. Serious or applied games (such as for educational, health, military or marketing purposes) is another new market segment where smaller companies are able to compete for orders from private and public clients from outside the entertainment industry. As Keune and co-authors emphasise, most small companies and self-employed workers in their sample pursued a dual strategy of developing games on behalf of diverse clients (publishers, other companies) to generate an income while continuing work on their own projects. This reflects the strong competitive environment which remains a key feature of this industry.

The company case studies that form the basis for the chapter include the full range of company types and market segments, ranging from (networks of) self-employed game developers to small independent companies to subsidiaries of large transnational companies, and covering both serious and entertainment games. In terms of innovations, the focus of the chapter is predominantly on organisational innovations. This is linked to the important role of creativity as the ‘key driver’ for innovations in the industry, as Keune and co-authors note. Similar to other parts of the Information and Communication Technology (ICT) sector the ‘raw materials’ for both production and consumption of the product (computer game) are hardware, software and communication technology. Importantly, though, the key ingredient, so to speak, is creativity, as the core value added of the product is not the technical functionality but rather the capacity of the game to entertain consumers – and more recently, in the ‘serious games’ segment, to inform and train users. Technological innovations in ICT (new or improved consoles, virtual reality devices; new and improved game engines) are certainly important as they enable companies to develop more complex, interactive, and aesthetically sophisticated games. Yet the effective use of these new technological options is strongly dependent on the creativity of employees from across all occupations who are involved in co-developing a game – such as programmers, designers, artists, musicians, marketers and business analysts.

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The case studies reveal that there is a broad awareness among managers, employees, self-employed and industry experts that creativity and passion are the main sources of innovation in the industry. There is also a broad consensus that creativity is a core element of employees' intrinsic motivation and thus it is a very important source of job satisfaction. As the analysis of Keune and co-authors shows the implications of this "creativity and passion-based occupational discourse" for job quality are however ambiguous and partly contradictory. On the one hand, most of the case study companies provide an 'expansive' learning environment that offer employees time and resources to develop their capabilities. Moreover, in the account of most employees, the possibility of expressing creativity is a primary source of job satisfaction and a key factor attracting them to work in the industry. On the other hand, the high value placed on creativity leads to workers making concessions about the quality of their employment, in particular about their wages, job security and working time arrangements. Wages are considerably lower than in other parts of the ICT sector and in some cases also lower than national average wages. Job insecurity is high particularly in small firms. Finally, the computer games industry has long been characterized by long hours and 'crunch periods' where excessively long working hours are worked in the period leading up to an important deadline. In line with previous research, Keune and co-authors find that the modest levels of extrinsic job quality has not seemed to diminish "the willingness of workers to deploy their innovative capacities to the full", at least in the short-run. The authors partly attribute this to the relatively young workforce, who because they are in the early stages of the life course, are typically less concerned with work-life balance, high wages and even less so with pension plans. At the same time, the authors point to the paradox that even though workers experience high intrinsic work motivation and job satisfaction, some companies reported high labour turnover making retention of good workers a key concern for many companies. This paradox, according to the authors, is likely to be linked to "unevenness across the dimensions of job quality within the games industry". Partly in response to this, several companies in the sample adjusted their work organisation in a way beneficial to more regular working schedules. For instance, in several cases the introduction of Scrum methods helped companies to better plan and distribute workloads and to avoid excessive crunch periods meaning they could operate according to fairly regular working times. There were also several examples of companies, including smaller ones, who had dedicated policies of restricting the use of temporary contracts and freelancers to a minimum in order to increase job security for their employees.

Organisational innovations and strategies like these are usually driven by several goals and factors. High labour turnover and skill shortages seem to have contributed to 'enlighten' computer games companies about their own long-term interest in a more sustainable working environment. Moreover, the analysis suggests that changes to organisational models can, in part, also be understood as a result of organisational learning. In this instance, a relatively young industry moves away from a start-up culture to more 'mature' organisational model, with the organisational learning triggered, in part, by the 'maturing' of the workforce itself as a growing number of employees (and managers) move into different stages of the life course, such as having children. Finally, the authors highlight the importance of company culture and values of the owners. Regardless of the explanatory weight of these different factors, it seems that they have *cumulatively* contributed to organisational models where "high job quality, especially in terms of working time, job security and training opportunities, result in high innovative capacity" and thus can be seen as "virtuous circles". At the same time, the authors emphasise "this argument does not work for collective representation and only to a limited extent, for now, for wages and pensions."

3.6 Retail logistics

The chapter on retail logistics by *Jaehrling and co-authors* focuses on lower skilled manual occupations in French, German and Dutch retail warehouses. Three trends have fundamentally transformed the retail supply chain. First, starting in the mid-1980s, a transformation has taken place resulting in a buyer-driven value chain, where retailers have taken control of logistics services by channelling an increasing proportion of their supplies through their own ‘distribution centres’ (DCs), instead of relying on direct deliveries from manufacturers to retail stores. The business entities that are the focus of this chapter, national and regional DCs, thus emerged as a result of this transformation. The transformation followed an overall goal of reducing inventory costs and ‘time-compress’ logistics processes – a goal that was further strengthened by the adoption of ‘lean’ principles from the late 1990s onwards. Secondly, a broader trend towards the privatisation of non-core activities has increased the market shares of independent ‘Third Party Logistics’ (3PL) providers. Thirdly, e-commerce has forced retailers to establish new distribution channels (home delivery). The growth of e-commerce tends to additionally foster outsourcing to 3PL, as new online retailers have been able to enter the market without the need for their own warehouses; moreover most incumbent retailers do not have home delivery experience and need to develop new logistical solutions, which can motivate them to contract out their logistics functions. Nevertheless, in the three countries under study, large retail chains often continue to operate their own DCs, not least because effective and efficient management of the logistics function is increasingly viewed as crucial to a retailer’s commercial success. With one exception, the case study companies are in-house entities. As *Jaehrling and co-authors* argue, the relationships between retailers and their in-house logistics service providers has been ‘marketised’ where internal contractual relations tend to mimic ‘service level agreements’ with external providers, such as the inclusion of detailed obligations and performance targets. As a consequence, and in response to increasing price competition in retail (not least as a result of e-commerce) retailers exert increasing cost pressures downwards to their logistics service providers. Taken together, these trends exert significant pressures on warehousing costs and contribute to a “structurally asymmetrical relationship between retailers and their logistics service providers”, which impacts on both innovations and job quality, as *Jaehrling and co-authors* argue.

In this context, the most important technological innovations affecting the lower skilled manual jobs under study have been process innovations. While the use of recent technologies such as robots and other ‘autonomous’, sensor-based technologies is still rather limited in retail warehouses, a broad range of fully and semi-automated warehousing technologies that substitute for manual tasks has been increasingly deployed over the last two decades. This primarily involves the use of computer-operated storing, sorting and picking technologies, and the introduction of warehouse management systems (WMS) to keep track of the location and flows of products in the warehouse. At first sight, the process innovations introduced in retail DCs are thus ‘skill biased’ in the sense that they reduce the relative demand for lower-skilled labour. However, as *Jaehrling and co-authors* emphasise, *within* the remaining manual occupations, skill requirements tend to decrease, so the changes do not increase overall skill levels. The technological solutions implemented in warehouses have not been geared to a more extensive use of the remaining employees’ tacit skills and knowledge, but to the contrary have led to a further Taylorisation of the workplace. Job tasks are less varied, work has become more repetitive and the pace of work in these jobs is strongly determined by the automated segments of the production process. The remaining tasks performed by workers are not ‘cognitive tasks’ but routine tasks that at present remain too costly to automate. The case studies thus overall confirm Autor’s (2015) assessment that machines can perform more cost-efficiently *some* but not *all* of the tasks performed by warehouse operatives.

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With regard to the organisational innovations accompanying these technological changes, both similarities and differences are found in the responses of companies in the sample. Most companies use performance measurement and management systems in order to comply with performance targets imposed by retailers as well as to respond to demanding service expectations of customers, but their design and management substantially differs between the cases. While employee representatives vetoed the introduction of individualised performance pay in some of the French DCs, the same companies still use the enhanced technological possibilities for monitoring and controlling performance levels, for instance by operating profit sharing schemes determined by performance indicators at establishment level. The way these schemes are managed tends to re-confirm a more general tendency of French companies (see also the other chapters) towards implementing organisational changes in a quite technocratic way. A contrasting case is found in one of the German case study companies, where management and works council jointly and continuously adjust the companies' performance measurement and pay system based on changes in the work processes as well as changes in the sociodemographic composition of the workforce (ageing workforce). In this respect, they are consciously trying to avoid negative effects on employees' health and safety. Since employee representatives in both countries enjoy considerable legal co-determination rights with regard to performance pay, the two different approaches re-confirms the importance of management styles and organisational cultures.

Where differences in national legislative constraints do seem to play a more important role is in regard to working schedules. Despite a general pressure on companies to reduce lead times and to expand operating hours, working schedules vary considerably between countries with regard to unsociable hours, flexible part-time work and overtime arrangements. Despite legal constraints, there is a common thread across all cases of an extension of operating hours to include nights and weekends, facilitated by de-regulatory reforms (France) or the more extensive use of existing flexibility options (in Germany and the Netherlands). This might be seen as companies' adjustment to a universal 'any-time-any-place' mind-set characteristic of online shoppers. As the analysis reveals, however, logistics companies choose this path for a number of reasons including the simple rationale of cutting labour costs (for example, by avoiding 'slack' times, reducing paid overtime). Finally, as a means to both increase functional flexibility and to avoid negative consequences associated with task repetitiveness, job rotation schemes have been expanded in several companies. Such job rotation strategies are one response to the sustained high levels of physical strain clashing with an ageing workforce. The findings by Jaehrling and co-authors however suggest, that "in the context of the strong Taylorisation of tasks in DCs and the overall pressure to remove 'slack' times, job rotation is increasingly useful for securing flexibility (...) [but] it seems to be less suited to mitigating the considerable physical strains", since multi-tasking also reduces forced breaks and employees still rotate between highly repetitive and strenuous tasks.

Overall, thus, the trend of down-skilling is accompanied by a deterioration of both intrinsic and extrinsic aspects of job quality. In most companies, wages freezes and wage cuts have progressively reduced the wage gap between in-house providers and external 3PL providers. While the down-skilling trend and the degradation of job quality in some cases make jobs more accessible to 'vulnerable groups' like migrants, they exert significant 'collateral' damage both on innovation capacity, and on job quality for incumbent workers. As Jaehrling and co-authors conclude, neither the adversarial labour relations present in the French cases nor the more cooperative labour relations found in the German and Dutch cases seem to exert sufficient pressure on companies to introduce strategies to make routine jobs more sustainable. At the same time, the authors emphasise that the current 'low road' strategies are not an unavoidable consequence of the disruptive technological innovations (automation and e-commerce), but rather a

result of the economic context in which companies operate, and of strategic decisions taken by both retailers and logistics companies.

3.7 Care

The chapter by *Green and co-authors* focuses on paid domiciliary care (often called home care) for elderly (and other) people in need of care – as opposed to both unpaid care by family members and residential care. With services now overwhelmingly provided by private for profit and non-profit companies, the care sector can be characterised as having a buyer-driven value chain, with local commissioning authorities or centrally-managed funds acting as powerful public buyers of care services. The economic and societal context are also important drivers of change, but public care policies assume the role of a gate-keeper shaping service provision. Public policies in response to societal demands (greater demand for care in the context of an ageing population and more complex care needs) and economic pressures (budget constraints, not least as a repercussion of the financial crisis in 2008) lead to similar restructuring processes in the care chain. Reducing relatively expensive institutional care in hospitals and retirement homes continues to be a key public policy objective in all three countries under study (Hungary, Netherlands and the UK). This affects the division of labour between residential care, publicly funded home care and informal care from relatives and neighbours. For home care providers it implies responsibility for a larger group of clients with more diverse care needs, including more complex care needs, that under previous policies might have been referred to residential care homes. This also requires greater collaboration between different parts of the care and health systems. At the same time, the more demanding task for home care providers does not come along with increased budgets; rather to the contrary, recent years have seen a decrease in expenditures on social care in the UK; and in the Netherlands the decentralisation of responsibility for home care (from national level to local municipalities) in 2015 was accompanied by a reduction of around one-third in the funding available for assistance and domestic help. In Hungary, budgets have not decreased but they have not kept pace with the growing number of people in need of care, resulting in a strong increase in the care workload (number of care receivers per care giver).

This context strongly constrains care providers' opportunities to introduce service innovations, in particular innovations which bring to bear the principle of more 'client focused care'. The need to shift away from a hierarchical definition of standard care needs and routine solutions towards more holistic needs assessment and individualised care solutions is broadly acknowledged in the professional and public discourse across countries. The standard transaction mode between buyer and public authorities however remains the 'time and task' approach. That is, care tasks are prescribed at the outset and a care provider is contracted to deliver the care specified for a given price and within a given amount of time. Thus, although a key feature of working conditions is that care workers for the most part work alone, their autonomy is strongly limited by the specification of tasks. Financial constraints can even mean that the determination of 'allowable tasks' has become more stringent. Where care providers have experimented with more outcome-related, individualised care, as in two cases in the company sample, this still took place in the context of so far ill-adapted public financing arrangements which impeded the practical operation of these attempts. The constraints imposed by the standard public financing arrangements are also implicitly evidenced by another case study on a UK local franchise of an international company which specialises in privately-funded care, and who benefitted from both more local autonomy in the development of services and greater financial resources. In the context of publicly financed care, the organisational innovation coming closest to the high performance work model was found in the Netherlands, where geographically-based self-organised teams of carers were introduced. As the authors note, this innovation is strongly reliant on a skilled and experienced workforce; formal skill requirements

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are considerably higher in the Netherlands as compared to UK and Hungary and increased even more in conjunction with this innovation.

Other organisational innovations found in the company case studies mostly deal with changes in the internal division of labour and job design of those providing personal care and home help (e.g. cleaning, cooking), with a view to improve the quality of care and enable employees to cope with increasing skill requirements that come along with more complex care needs. As mentioned above, in the UK and Hungary in particular, the increase in skills requirements started from a low base. National or local regulations imposing quality standards are an important trigger here, but this is also matched by many organisation's desire to improve the quality of care, as Green and co-authors emphasise. Apart from investing in some formal training (but within overall limited budgets that were partly curtailed during the course of some projects showcased in the case studies), other innovative measures adopted by several care providers in the sample sought to increase collaboration between employees and peer group social support, for instance by giving employees 'lead' roles with enhanced responsibilities (e.g. regarding medication; contact with clients' family members).

While these innovations strongly rely on employees' pronounced intrinsic motivation to improve the quality of care, and partly also benefit the intrinsic aspects of job quality, they do little to improve the overall poor extrinsic job quality (particularly in the UK and Hungary), in terms of low wages and working at unsocial hours. Overall, as Green and co-authors note, the intrinsic interests of employees and managers in improving the quality of care "can act as a positive resource for innovation, albeit this was not always apparent in practice – partly because their energy can be (almost entirely) expended in performing their current roles and also because of a lack of experience in taking the initiative in a wider work environment and a shortfall in resources. "

Care jobs are relatively inclusive, providing employment opportunities for people who may experience difficulties in finding employment elsewhere. The changes and innovations outlined above have so far not translated into widespread changes regarding the level of inclusiveness in these jobs (in terms of higher entry barriers for employees from vulnerable groups).

3.8 Hospitals

While the focus of the care chapter is on decentralised services provided predominantly by small organisations, the chapter on hospitals (in Spain and Sweden) by *Mathieu and co-authors* analyses innovation processes in large and medium-sized organisations within the healthcare system. The case study sample includes public and private hospitals, ranging from university hospitals to hospitals that are primarily oriented towards clinical activities. Similar to the care sector, the state plays an important role as a regulator and financer, but unlike in the care sector, most employment is within the public sector, often at the regional or county level in the two countries. Service provision, education and training as well as research and innovation in hospitals are predominantly funded by public budgets and are regulated by public policies. As Mathieu and co-authors note, tax-revenues and the political willingness to invest in healthcare are thus the primary factors impacting employment volumes. Decreases in public budgets also contribute to changes in the value chain: In Spain, the declining level of investment in public healthcare as a result of the finance crisis of 2008 is one explanation for the growth of the private healthcare sector. One of the Spanish cases, a private hospital, illustrates this dynamic: It started operation in 2009 and almost exclusively treats patients with (predominantly Spanish) private health insurance. Employment in this hospital more than doubled in the period between 2009 and 2016. According to national statistics, private healthcare is used by 30% of the population today in Spain.

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As the analysis of the case studies shows, the volume of public budgets as well as the governance of these budgets also impacts on innovation processes, in both public and private hospitals. One innovation studied in the case of the Spanish private hospital is the opening of an international care unit in order to better meet the demands of middle to upper income northern European patients (whose insurance pay more than Spanish private insurance) who make up a considerable share of patients in this hospital. This is linked to the fact that the hospital is located in a region that attracts many tourists and foreign-born residents. The opening of the unit responded to linguistic, cultural and culinary barriers that had led to patients' dissatisfaction. As Mathieu and co-authors note, while the key motive for the innovation thus was to find a solution to promote customer satisfaction, "the ability to create and staff such a ward was based on the non-occupational skills and knowledge of the existing staff". Thus, the hospital's strategy to compete for 'higher value added' services in this case was both relying on employees "peripheral" skills (cultural understanding, linguistic abilities) and in turn also improved their job quality (use of 'peripheral' skills, salary bonuses, but also closer connection to patients). Competing for 'higher value added' services is not a strategy confined to private hospitals, as the case of a Swedish public hospitals shows. In this hospital, one ward has applied to become a 'National Specialised Medical Care centre' with the right to treat a set of three diagnoses. These three diagnoses are put out to a sort of competitive tender among the hospitals in Sweden in order to concentrate this relatively infrequent treatment to improve quality. If successful, the hospital will receive a large share of the patients with these diagnoses in Sweden. The innovation was thus initiated by a change in public funding policies (i.e. 'buyer driven'), with a view to improve *service quality*. But as the analysis by Mathieu and co-authors shows, the innovation processes in the hospital set in motion by this external trigger is again strongly interconnected with *employment and job quality* issues: An improvement in job quality (in terms of variety of tasks, prestige, opportunities for education, training, and career development) is both an expected outcome of, and motive for, the innovation; and the innovation itself is strongly dependent upon a great deal of voluntary or "discretionary" effort on the part of many diverse occupations involved in the writing of the application (as the activity is not budgeted for). Moreover, the success of the application is dependent on the stability, reliability and credibility of the hospital ward as this is a central point of evaluation, and this requires a good working environment and skill and training track records.

As these examples illustrate, in line with the QulnnE concept, the chapter avoids a narrow focus on the STI type of innovations (which in the case of hospitals is associated with a narrow focus on medical innovations). In fact, while technology-heavy innovations like robots-assisted surgery and tele-medicine are among the innovations studied, the vast majority of innovations discussed in the chapter are of the 'doing-using-interacting' (DUI), workplace innovation type, even though some of them are initiated by external (political) incentives or requirements. Many more of the innovations studied in the chapter are geared towards making better use of employees' knowledge and experiences. Moreover, as Mathieu and co-authors stress, many innovations are also based on and shaped by the status and power of high-standing occupational groups, most importantly physicians, to impact and facilitate innovations. Several innovations were physician-led, in the Swedish cases, and respect for and deference to professional knowledge is also evidenced by their veto power and influence in the implementation of proposed innovations (including those introduced top-down). A comparison of the Spanish and Swedish cases tends to confirm the familiar differences (noted in the literature, but also found in the other chapters in this Working Paper) in the way how hospitals try to elicit employee involvement (including that of physicians) – with more formalised and hierarchical forms in the Spanish cases (e.g. idea competitions) and more informal forms and peer-to-peer learning in the Swedish cases. The more hierarchical approach in the Spanish cases however is likewise welcomed by employees, which is probably due to the fact that they still

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set these organisational strategies apart from the standard, even more hierarchical organisational models. Another set of workplace innovations revolve around staffing issues and demonstrate a different source of power – power that derives from the structural factor of a broad shortage of skilled labour, especially nurses. Innovations in this respect range from the expansion and systematisation of the internship programmes, and internal temporary staffing agency and task-shifting to and from nurses. The innovations primarily seek to improve conditions other than wages and are oriented towards improving temporal and geographic flexibility, education and training.

The examples illustrate the complex and contradictory interrelationships between innovations and job quality in the context of tight and externally imposed hospital budgets: As Mathieu and co-authors note, dissatisfaction with wage levels (in Sweden at least) contributes to recruitment problems and understaffing, “leading to both innovative attempts to deal with and remedy this situation, as well as negative impacts on other aspects of job quality” – such as work intensity and work-life balance.

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CHAPTER 2 – Innovation, Job Quality and Employment Outcomes in the Aerospace Industry: Evidence from France, Sweden and the UK

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1 Introduction

To cope with fierce competition in an increasing globalised context, many companies tend to reduce wage costs and intensify work, adopting what could be labelled as social dumping strategies, with negative effects on job quality (JQ) - this term encompasses compensation, employment status, work conditions, but also training and promotion opportunities. Innovation is often presented as the solution to break this potential vicious circle. The rhetoric of innovation - defined as any significant and valuable change in product, process, marketing or organisation - is indeed widespread, both at the macro (States and international organisations) and micro (firms) levels. Still, this positive view must be assessed. To do so, in complement to statistical studies, we also need to open the 'black box' of firms, to analyse more precisely the nature, the motivation, the modes of implementation, and the outcomes of innovation, by scrutinising all the mechanisms at play.

This chapter focusses on the interplay between innovation and JQ, and the associated employment outcomes in a specific industry, aerospace (AeS). This industry is indeed particularly interesting from our perspective. It is an innovation leader - at least in products and new materials, as well as in processes -, with numerous spill-over effects on other sectors of manufacturing. According to Hartley (2014), one of the key reasons why AeS is usually seen as an "economically strategic industry" is that "it provides proportionately more high quality jobs than many other industries. Examples include scientists, technologists, engineers and skilled production workers, including the numbers and proportions with university degrees [...] Aerospace is one such area which provides an R&D-intensive and knowledge-intensive manufacturing industry capable of providing the next generation of highly paid jobs able to sustain and raise living standards". This view is widespread, and justifies, beyond also often military considerations, strong support from public institutions, whereby AeS is often identified as a key sector in national industrial policy. The choice of AeS is also driven by methodological reasons. AeS has experienced steady growth since the mid-2000s, and was much less affected by the crisis that began in 2008 than other sectors in manufacturing. These reasons make AeS relevant as a sector to explore factors influencing JQ and employment as opposed to focussing merely on the economic context.

Beyond existing literature and documentation, our study relies on qualitative empirical evidence, from two main sources. Industry experts were interviewed to obtain a comprehensive view of the evolution of the industry and the main innovations it has undergone. "Experts" here cover consultants, members of employers' organisations and unions at the industry level, stakeholders (managers, trade union delegates and employees) in companies other than our case studies, professionals working in support institutions in the industry, such as research and development agencies, clusters, national and regional business associations. The second source is based on in-depth company case studies. Cases were chosen based on different positions in the global supply-chain, and in three different countries: France (FR), Sweden (SW) and the United-Kingdom (UK). This choice of countries has two justifications. First, the three countries produce civil and/or military aircrafts and have also an important activity in the space sector. AeS represents an important employer: in 2016, the number of employees amounted to more than 100,000 in both France and the UK, to about 17,000 in Sweden⁴. Second, these three countries are quite different in terms of varieties of capitalisms (Hall and Soskice, 2001). While the UK is considered a liberal-market economy, Sweden is often seen as a typical illustration of a co-ordinated-market economy. France does

⁴ The number of employees depends on the delimitation of the industry - see section 2.1.

not fit very well within this Varieties of Capital (VoC) typology, as it differs notably from the two types; it is sometimes labelled as a 'state-led' market economy, because of the specific role of the State in both industrial organisation and industrial relations. It must be emphasised here that our purpose is not to provide a comparative analysis of the AeS industry in the three countries. The diversity of countries serves as a basis to compare variation in institutions to better understand the factors underlying and impacting the interplay between innovation and JQ and the outcomes in terms of employment at micro-level.

The chapter is structured as follows: Section 2 presents an overview of the evolution of the AeS industry and its innovation profile from the end of the nineties until present, and introduces our case study sample and methodology. Section 3 focuses on the impact of technological changes on JQ and employment in our cases. Section 4 addresses the organisational changes and their interplay with JQ, and analyses how these changes may contribute to the making of innovative workplaces. Eventually, section 5 draws out the main lessons from our research.

2 Overview of the AeS industry structure and innovation profile, and of our case study companies

2.1 The AeS industry: specificity and changes since the 2000s

The perimeter of the industry depends of the definition one takes (see Hartley, 2014, chap.1). A restrictive definition is based on the nature of the product. For example, Eurostat defines the industry - codified NACE 30.30 - as the manufacture of air and spacecraft and related machinery. This classification includes mainly the manufacture of aircraft for the transport of goods or passengers; the manufacture of helicopters, gliders and dirigibles, as well as the manufacture of parts and accessories for the aircraft of this class, including engines and their parts, major assemblies (e.g. fuselages; wings; doors; landing gear; fuel tanks), propellers and helicopter rotor blades as well as aircraft seats. Also included is the manufacturing of ground flying trainers, spacecraft, launch vehicles, satellites and intercontinental ballistic missiles (ICBM), as well as the overhaul and conversion of aircraft or their engines. A wider definition adopts a supply-chain perspective, including, in addition to the previously listed activities, all manufacturing and service firms where the major activity involves providing parts, components and/or services to the firms classified in the aerospace industry *stricto sensu*. We will adopt the second definition, as a company's position in the supply-chain appears to be a potentially important determinant of the innovation-JQ-employment nexus.

The specificity of the AeS does not rely so much on the specificity of its products - if we compare it to the automotive industry, for instance. One important feature is that it is highly sustained - and in a way structured - by public policies and other support institutions - or "institutions for collaboration", as labelled by the Harvard Business School, 2013 (discussed in section 2.1.1). This is important background context for innovation and its potential drivers and impacts. Another important feature is that the industry has undergone significant changes in the two last decades, including restructuring of its global supply-chain (discussed in section 2.1.2).

2.1.1 Public policies and support institutions

It is interesting to note that in the three countries in our sample, the AeS industry benefits from strong public support – without any noticeable difference, at first sight, that could be related to VoC, except maybe with respect to the aspect of state ownership. Even though state ownership has drastically reduced since the 1980s, it has remained relatively important in France up until very recently. The French State

played a crucial role in the establishment of Airbus, the French co-founding company at the time (1970) was the State owned *Aérospatiale*. Some state-ownership, even if substantially reduced, remains a key player in the French AeS industry. For instance, in 2016 the French State held 11 percent of the stock in Airbus, held a 27 percent share of Thales and a 15 percent share of Safran. In contrast, all of the companies of the AeS sector in the UK and Sweden were privatised several decades ago or always privately owned.

In the three countries, AeS benefits from direct purchases from the public sector of military and security devices (Ahlstrand, 2016; Gautié, 2016; Wright, 2016). Public support has also been provided through public subsidies, under different forms. Public funding and support still plays a key role in fostering of R&D and innovation in the AeS (for international comparison, see also Niosi, 2012). The funding of R&D started very early in some countries, with the foundation of public research agencies dedicated to AeS - such as in France the *ONERA* ("*Office National d'Etudes et Recherches Aéronautiques*"), i.e. the "national aerospace research centre", created in 1946), and the *CNES* ("*Centre National des Etudes Spatiales*" - National Centre for Space Studies, funded in 1961). In Sweden, the national innovation agency, Vinnova, under the Ministry of Enterprise and Innovation, plays a key role. In collaboration with industry organisations, universities and other state organisations, Vinnova determines the national strategic innovation programme for AeS - called "*Innovair*". Similar institutions and/or programmes also exist in the UK, where several large, well-funded and often industry-matched programmes support the sector- such as the *Aerospace Growth Partnership* (AGP) which is the principle vehicle to implement the *Aerospace Industrial Strategy*.

Another important feature in the AeS industry is the presence of strong employers' organisations and/or industry associations, which foster the cooperation between companies – in particular concerning R&D and innovation – but they are also powerful lobbyists at national and European level, which have support from national governments for their activities. For example, in 2008, the French Ministry of Industry created the *CORAC* (Council for Civil Aeronautics Research) which brings together all of the French players in the air transport sector – the aeronautics industry, airline companies, airports, ONERA, and relevant institutions and ministries. At regional level, both industry associations and local governments are also very active in supporting *clusters*, which play a key role for training, research and innovation, such as the "Aerospace Valley" in Southwest of France (Gautié, 2016), the Östergötland cluster, so-called "Aerospace Cluster Sweden" (Ahlstrand, 2016), or the regional Aerospace Alliances in the UK (Wright, 2016).

Overall, in all three countries, the AeS industry has highly equipped support institutions and structures in place in the domain of innovation.

2.1.2 Important restructuring of the supply-chain since the late 1990s

Following the automotive industry model, from the 1990s, with acceleration in the 2000s in the European case (with Boeing as the forerunner) the production system in the AeS industry has undergone radical change (Ravix and Mouchnino, 2009; Alfalla-Luque et al., 2013; Oliver Wyman, 2015).

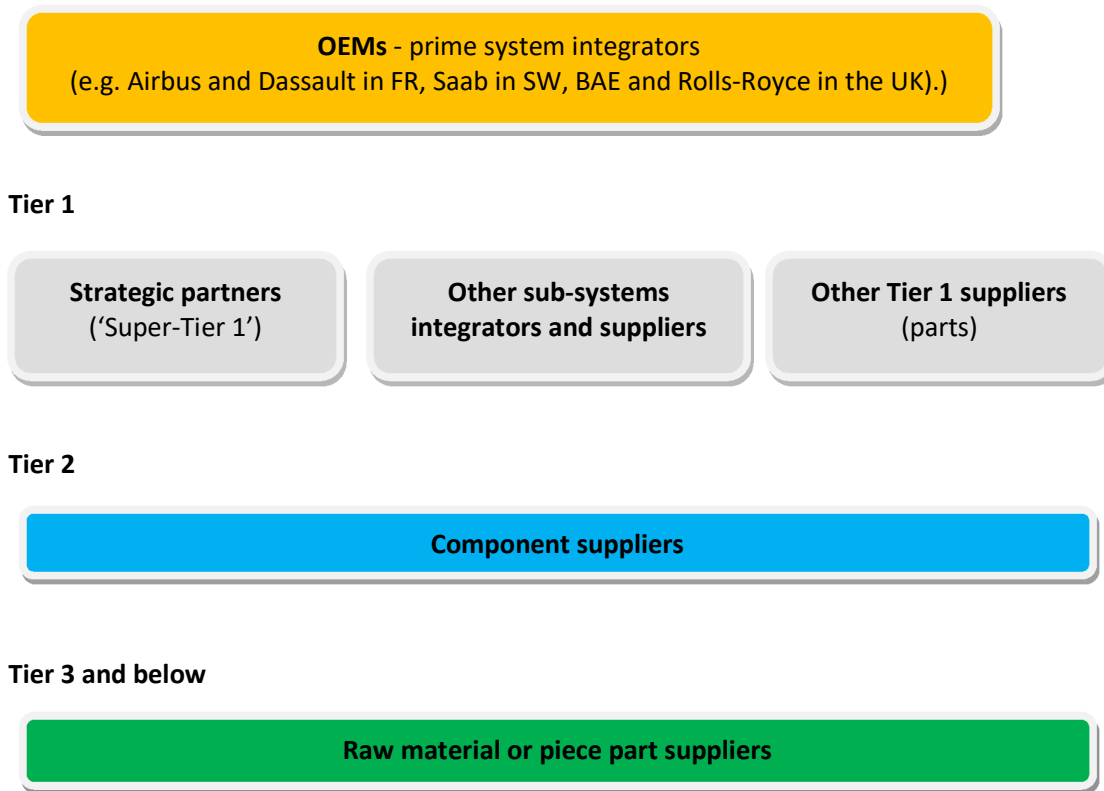
There was a large move towards modularisation and outsourcing of bundles of work. The final product (such as an aircraft) is now conceived as the integration of several sub-systems ('modules'). And these modules are increasingly outsourced to external suppliers as "work packages". Original Equipment Manufacturers - OEMs (beginning with the aircraft manufacturers) primarily became system integrators, in charge of the final product concept, definition of its global architecture, assembly and marketisation of the final product. Modularisation induces both economies of scale and scope as similar modules can be found in different product models.

During the same period, there was also a reduction in the number of Tier 1 sub-contractors. Modularisation was also a way for the OEMs to rationalise their supply-chain. Growth in outsourcing has increased the number of Tier 1 sub-contractors (up to about 700 for Airbus alone), and, correlatively, a sizeable increase in transaction costs. The number of Tier 1 sub-contractors significantly reduced in the 2000s – e.g. Airbus had just 90 direct suppliers for its A350 model in 2012, compared with around 200 Tier 1 suppliers for its A380 in 2007 (Oliver Wyman, 2014: 6). Another associated trend was the increasing distinction among Tier 1 suppliers made between strategic partners and other suppliers. The whole supply-chain may be seen as a continuum from fully integrated partnership with some suppliers, to simple transactional ('buy-sell') relationships with others (Atkearney, 2008). This distinction is evident among the Tier 1 suppliers (Figure 1). Some are strategic partners ('Super-tier 1' – ISF, 2014): they are associated at the early stage of the conception of the product, and OEMs organise common 'project platforms' with these suppliers (i.e. with employees of the two firms) during the development stage. Collaboration sometimes involves a '*risk and revenue sharing partnership*' – which implies that the supplier assumes part of the project's industrial and financial risk. Other tier 1 suppliers include sub-system integrators (i.e. 'module' supplier) and other direct suppliers of parts or services.

Moreover, there has also been a large move during the same period towards consolidation and diversification of suppliers (mainly at Tier 1 and Tier 2 levels). In particular, many medium size suppliers have merged so they can increase their size in order to foster economies of scale, but also so they can diversify their client base, in particular at the international level. This process was often encouraged by first rank OEMs⁵, because they wanted to focus on core activities but they also increasingly needed reliable Tier 1 partners which they intended to transfer part of the risks, as well as some crucial activities (part of R&D for instance - see also below).

⁵ First rank OEMs are the producers of the final products (i.e. aircrafts, helicopters, rockets) whereas other OEMs produce sub-systems such as engines (e.g. Rolls-Royce).

Figure 1: Aerospace supply-chain



The industrial organisation of the supply-chain is quite complex, as many companies operate in a number of different markets, and intervene in different segments (i.e. the same company can operate as an OEM for some of its activities, and as a Tier 1 and/or a Tier 2 supplier for other activities). Another feature, more specific to France and the UK is the 'long tail' of the supply-chain that includes many small enterprises (Gautié, 2016; Wright, 2016).

Several important trends have acted as driving factors in industry restructuring in recent years. The first one is globalisation. While the AeS has been globalised for many years, the process has taken new forms since the mid-2000s, with some acceleration since the 2008 crisis. For OEMs, new international competitors have emerged and/or gained market shares, such as, in the aircraft industry, Bombardier (Canada), Embraer (Brazil), and Comac (Chinese, founded in 2008), which aim to break the duopoly between Airbus and Boeing. Another trend is that OEMs are increasingly off-shoring parts of their activities, not only for reasons of cost, but mainly, to facilitate access to foreign markets. Airbus, for instance, introduced assembly-line factories in China in 2008, and recently announced that it would open a new factory in 2017. It also opened its first final assembly-line in the United-States in 2015. For suppliers of standard components, cost-cutting was the main reason of off-shoring. For other suppliers, it was motivated by the need to follow the OEM offshoring, as spatial proximity to client is important factor for many equipment manufacturers. Along the same line, finding new clients and penetrating new markets is another important motivation.

Another important trend has been the recent reduction in military and space budgets in Europe. Big OEMs were impacted in the three countries of our sample, such as Airbus and Dassault in France, SAAB in Sweden, and BAE and Rolls-Royce in the UK – with a correlative impact on the whole supply-chain in the respective countries (Ahlstrand, 2016; Gautié, 2016; Wright, 2016). This has also pushed many firms to look for new clients, often at the international level – further driving globalisation.

Finally, another change is concerned with increasing financialisation and the correlative changes in corporate governance. The Airbus Group, which plays a key role in the French supply-chain (but which also has production facilities in the UK, and suppliers in Sweden) provides a good illustration. In 2013, the Airbus group CEO Tom Enders, announced that it was time for the company to become "*a normal firm*", i.e. to integrate fully and only economic and financial factors in its decision process, and no longer political considerations. Maximising shareholders value became a clear priority (Syndex, 2013). The consequence has been a cut in non-profitable activities and some downsizing. Cost pressures have been diffused downwards in the supply-chain. In this respect, Airbus is not an isolated case. In the past, technological performance and quality were main objectives with cost as a secondary constraint, increasing productivity and cutting costs are now key priorities.

2.2 The changing nature and process of innovation

2.2.1 New products and services and new processes, but no radical innovations?

As pointed out in the introduction of this chapter, the AeS industry appears as a leader in technological innovations both in terms of products and process. Yet many experts (see Young and Hirst, 2012a) characterise the recent period by its absence of radical – ‘disruptive’ – innovations in the industry, and further, that no such innovation is likely to emerge in the near future (ISF, 2014: 14). "That does not mean, of course, that innovation in the industry has stopped; just that its nature has changed as the industry has matured. Novel, incremental developments take place all the time [...] evolutionary developments that deliver step-change improvements" (Young and Hirst, 2012b: 2). This may be particularly true for product and marketing innovations, as next generation aircrafts rely on many incremental changes rather than radical new innovation.

With *innovations in marketing*, for OEMs the value chain no longer ends with sale of the final product. They now offer their clients ongoing accompanying services. This is commonly known as maintenance, repair and overhaul (MRO). Some no longer sell the product. Instead they sell a service. For example instead of selling landing and braking systems, they now sell a given number of landings and take-offs (FIM, 2015: 61). Another innovation introduced by some OEMs is the "bring back system". This involves buying back older aircraft, rebuilding and updating them only to re-sell them back to the same or different clients.

Even if incremental, these product innovations have been continuous. To summarise, they have mainly revolved around using lighter, stiffer and stronger materials, designing more capable navigation and control systems and quieter and more fuel-efficient engines (Young and Hirst, 2012a). Composite materials have been developed for use in all sections of the aircraft in order to meet a common industry target of achieving a 50 percent composite composition and a 20 percent reduction in weight by 2020 (Oliver Wyman, 2015). The target has already been met in some recent programs such as in Airbus aircrafts where the composite makes up more than 50 percent of the aircraft. *Electrification* is another area where an important trend in innovation has occurred (Oliver Wyman, 2015). Hydraulic and pneumatic power has increasingly been replaced by electricity, which reduces power consumption and energy consumption

(fuel) by reducing weight. It has also noticeably decreased noise pollution. The next stage is the electrification of systems to pressurise, heat, and cool aircraft cabins and to power water pumps. Electrification of propulsion systems is R&D intensive, with the long-term objective of fully electric aircraft. Numerous other innovations have impacted engines and propulsion systems, or in the domain of on-board systems and functionalities, however experts consider these innovations to have had few direct impacts in terms of work and employment. When they have impacted work and employment (such as with composite materials), it was mainly through the implementation of new manufacturing processes.

Process Innovations are particularly relevant for our research purposes. During recent years, there has been continuous improvement in the domain of conception and design, such as improvements in *computer-aided engineering* (CAE) tools. There was a major breakthrough beginning in the late nineties with the development of *computer-aided design* (CAD) systems, which have progressively replaced the drawing board. Today, very sophisticated technologies enable engineers to readily simulate stress states within structural components, to visualise fluid flows and to calculate much more rapidly mass, centre of gravity and moments of inertia. High-fidelity and comprehensive simulations and digital pre-assembly – or Model-Based Definition⁶ – has progressively replaced physical mock-ups and prototypes. These new technologies also establish a more direct link between the designer (engineering) and the shop floor (where parts are manufactured, and segments and final product assembled). CAD has translated into CAM (computer aided manufacturing). For the manufacturing of parts, for instance, *Computer Numerical Control* (CNC) machines have increasingly replaced traditional moulding and turning machines. More recently, the traditional manufacturing processes, relying on machining from solid moulding or casting, have undergone important changes with *additive manufacturing*. If *3D printing* is the most high profile (but still not widespread at the time of our study according to the experts interviewed), the concept covers other processes (FIM, 2015: 94-96), such as power bed manufacturing (use of powders to build part layers-upon-layers), or the laser metal powder fusion process -which is now extensively used to build parts in titanium. Overall, in both ‘traditional’ and ‘new’ manufacturing processes, the use of *CNC machines* is widespread.

Robots for the automation of some processes, both in manufacturing parts and assembling, has also commenced. At the time of the study, robotisation was much less widespread than it was in the automotive industry. This can largely be explained by the fact that AeS firms manufacturer on a much smaller scale in terms of units than do automotive firms. Some companies have begun to introduce *cobots* (i.e. collaborative robots), such as powered exoskeleton devices as well as virtual reality devices (such as provided by google glasses) for some of operators (Manpower, 2015). Virtual reality is now increasingly used not only to simulate the product, but the production process itself.

At the frontier of process and organisational innovations, supply-chain integration, through the adoption of *end-to-end product management software* (such as SAP – ‘Systems, Applications and Products for data processing’) has occurred and it has impacted the whole information and communication system in firms. Supply-chain integration has translated into the production system through the implementation of *concurrent (or simultaneous) engineering*, sometimes also called *integrated product development*. This designates a work methodology based on the parallelisation of tasks where design engineering, manufacturing engineering and other functions are now integrated, accelerating a blurring of boundaries

⁶ MBD working methods rely on the use of “3D Computer Aided Design (CAD) software to provide specifications for individual components and product assemblies. A MBD 3D-model carries all the information that used to be communicated through 2D-drawings” (Malm, 2016).

between research, design, development and manufacturing. The systematic use of *Automatic identification and data capture (AIDC)* devices have been introduced to optimise the whole supply-chain. AIDC consists of identifying objects, collecting data about these objects and the entering of that data directly into a computer system (processed by ‘middleware’). These are steps leading toward *computer-integrated-manufacturing* to monitor the whole process of manufacturing activity (engineering, production, marketing, and support functions). Hence, the arrival of the ‘digital factory’. The challenge now is to implement the ‘big data revolution’, as put forward for instance by Tom Enders, the Airbus Group CEO, who had announced in 2015 that he wanted to “digitalise” his company, to make it a “manufacturer 4.0” (Manpower, 2015).

Note that at the time of our research, many of these innovations were only first appearing. Some may have important impacts in the near future - but they remain beyond the temporal scope of our research.

2.2.2 Change in the process of innovation: widening the perspective

The role of public policy and other institutions to foster cooperation in terms of R&D and innovation has been emphasised above (section 2.1.1). This also reflects important changes in the organisation of the process of innovation itself. This results from new forms of economic organisation of the industry as depicted above (section 2.1.2) where supply-chain integration has become crucial, and not only in its first steps (prime contractors and strategic Tier 1 suppliers). Following Alfalla-Luque and co-authors, supply-chain integration can be defined as "the degree to which SC members achieve collaborative inter- and intra-organisational management on the strategic, tactical and operational levels of activities (and their corresponding physical and information flows) that, starting with raw materials suppliers, add value to the product to satisfy the needs of the final customer at the lowest cost and the greatest speed" (Alfalla-Luque et al., 2013: 769). The innovation process is also unequivocally related to the ‘supply-chain’ perspective. According to Henshaw (2012), the innovation process is now "characterised by systems integration and networking... it recognises that competitive advantage comes through the success of the relationships in the supply-chain and, more particularly, through the knowledge that is generated thereby" (Henshaw, 2012: 206). For a company, innovation is a more and more collaborative process with both its suppliers and clients.

On the *suppliers’ side*, sub-contractors and suppliers are now more heavily involved in R&D activities. As already mentioned above, the ‘Super Tier 1 sub-contractor’ is connected to the first stage of development (and even sometimes conception). They often share a common project platform with the OEM in the form of physical multi-functional and multi-company teams or common web platforms. These web platforms or portals may also serve in particular to facilitate so called ‘crowd outsourcing’ (or ‘open innovation’) – i.e. the involvement of a large number of stakeholders (inside or outside the company) in the innovation process. Overall, there has been a general trend to shift part of the R&D effort, and therefore part of the innovation process, ‘down’ the supply-chain. This trend has reinforced the need for suppliers to reach a critical scale.

However the innovation process also moves ‘up’ the supply-chain, towards the client. Web platforms are sometimes used to obtain information and to ensure that client needs drive the innovation process. Optimising the value chain requires the creation of “digital intimacy” among suppliers and clients (FIM, 2015: 6). As a consequence, the traditional sequence [research => development => new process or product => change in the service/product provided] becomes more flexible and sometimes is reversed. This has led to the increasing subordination of R&D and production to marketisation. Overall, there is a move from a single ‘Inside-Out’ approach (based on the view that innovation comes from the inner strengths and

capabilities of the organisation) to more of an ‘Outside-In’ approach (where it is thought that customer value creation, customer orientation and customer experiences are the key drivers for innovation). This has also been referred to by some experts as a move from a ‘push’ to a ‘pull’ perspective of innovation, where cost-benefit considerations have become more central; seeing the R&D function losing some of its autonomy. As stated by one Research & Technology manager of a company of our sample of cases:

“Of course, we remain in a world where our survival depends on technology. But the technological innovation is much more focused on cost reduction, and more directly driven by the needs of our clients. Nowadays, R&T is focused on specific targets. We have long been in a ‘push mode’ of innovation – i.e. ‘I have got a good idea, let’s see what I can make with this’. We have shifted to a more ‘pull mode’ now [where] to get an R&T project funded, you have to demonstrate what problems you want to solve, and what profit the company can make out of it” (R&T manager, FR-PARTS 2, quoted after Gautié 2017b).

Supply-chain considerations also call attention to the wider organisational dimension of innovation. The AeS industry is a good illustration of emerging business models where the distinctions between products, process, organisation and marketing strategy are very difficult to make (Eurofound, 2017:16). We will turn to the crucial issue of organisation change and its connection to innovation in section 4 below.

2.3 Case study choice and methodology

2.3.1 Looking for cases

The objective of case studies is not to provide a comprehensive assessment of the "innovation-JQ-employment" interplays in the AeS industry. The focus is more about opening the "black box" in order to disentangle some basic mechanisms underlying these interplays. A key idea is also that the interplays under investigation are not universal mechanisms; rather they are embedded in certain organisations, which are themselves embedded in specific institutional contexts.

The sample of case studies is not meant to be representative in the statistical sense, but rather it is suitably illustrative of potential varieties in situations that may influence the interplays. From the industry analysis presented in the previous section, as well as from additional information gathered from experts, the firm’s position in the supply-chain, correlated also to the size of firms and their ownership (in particular establishment or subsidiary company of a big multinational firm *versus* isolated SME), surfaced as an important potential explanatory factor. The nature of the product and its scale of production (mass-production of standardised products *versus* small batches of niche products) was also identified as important.

To better disentangle the potential role played by institutional context compared to other factors, the aim was to choose cases that were as similar as possible across the three countries of France, Sweden and the UK. Unfortunately, significant barriers to access were encountered - particularly in the United-Kingdom – that prevented completion of the targeted number of case studies. When access was possible, interviews (mainly face-to-face, but some by telephone) were carried out with as many stakeholders as possible (managers, employees, employees representatives).

2.3.2 Six cases studies

Six case studies were completed based on data gathered from a total of 74 in-depth interviews (Ahlstrand, 2017a and 2017b; Gautié, 2017a, 2017b and 2017c; Wright and Green, 2017). Table 1 provides an overview

of the case studies that were carried out in France (FR-), Sweden (SW-) and the United-Kingdom (UK-). The interviews were carried out during the second half of 2016 and also during the beginning of 2017. An ethical requirement for anonymity prevents disclosure of specific details about each of the case study companies; with pseudonyms used when referring to the specific companies.

Table 1: overview of case studies

| Pseudonym | type of company / establishment | number of employees (< = 50; 51-500; 501-2500; > 2500) | number of interviews (+interviewed persons*) |
|------------|--|--|---|
| FR-PLANE | OEM, manufacturing aircrafts; multi-national company 2 factories studied; they produced specific segments of planes | Company: > 2500 2 establishments: > 2500 each | 23(23*) |
| FR-PARTS 1 | Company of a big group, which produced parts for OEMs, and other Tier 1 companies. One factory studied | Companies > 2500 Establishment: 51 - 500 | 4 (5*) |
| FR-PARTS 2 | Company of a big group, which produces composite material parts for OEMs on small batches; one establishment studied | Company: > 2500 Establishment: 501 - 2500 | 6 (9*) |
| SW-PLANE | OEM, manufacturing aircrafts; multi-national company; also Tier 1 subcontractors for other aircraft manufacturers | Company > 2500 Establishment: > 2500 | 22 (19*) |
| SW-PARTS | Tier 1 and Tier 2 subcontractor, family-owned company, manufacturing metal parts | Company: 51-500 Single establishment | 16 (11*) |
| UK-PARTS | Tier 1 and Tier 2 subcontractor, family-owned company, manufacturing metal parts | Company: <50 Single establishment | 7 (7*) |

* the number of interviewed persons partly deviates from the number of interviews because either several interviewees took part in one interview (higher number) or because some respondents were interviewed several times (lower number).

Source: Own compilation based on case study reports (see list of reports in section 7 of this chapter).

FR-PLANE is a big OEM airplane manufacturer. It is part of a large multinational group. It is an innovation leader, both in products and processes, with high activity in R&D. We focused mainly on one plant (*FACT 1*), but we also conducted interviews at a second plant (*FACT 2*). Interviews also took place with unions delegates at the company-level. Both plants had a workforce in excess of 2,500 employees, among which about 50 to 60 percent are blue-collar workers. The share of temporary agency workers was high (about 20% in *FACT 1*). So was the unionisation rate (about 80% in *FACT 1* for instance, as compared to an average of about 5% in the French private sector). The two factories assemble specific segments of different types of aircrafts, that themselves are assembled in another factory of *FR-PLANE*. They are organised into different divisions where each division corresponds to one model of an airplane, with some specificity and autonomy in terms of organisation. For both *FACT 1* and *FACT 2*, the activity has increased notably since 2010, with a correlative increase in the number of employees. Still, there is an important pressure to reduce costs and increase profitability. The two factories are located in the same region, and highly

involved in a local cluster, with active cooperation with other companies and public institutions in the field of training and R&D. *FR-PLANE* was concerned by all the majors process (and product) innovations mentioned in section 2.2 (Gautié, 2017a).

FR-PARTS 1 produces parts for OEMs - among which *FR-PLANE* - , but also for other Tier 1 companies are in the supply-chain. It is a member of a large group, which also has activities outside the AeS industry. We mainly focused on plant of less than 500 employees, among which about 75 percent are blue-collar workers. Temporary agency workers account for about 25 percent of the workforce. The unionisation rate is rather low at the establishment-level. The factory was recently created (2010) after taking over an activity that was outsourced by *FR-PLANE*. *FR-PARTS 1* was under high pressure from its clients, with high targets in terms of annual cost reduction (about 10% a year). Competition is high, as *FR-PARTS 1* has to apply for tenders, and the duration of the obtained contracts with clients has decreased in the recent years. The establishments located in France are also experiencing internal competitive pressure because the company has two offshored factories (in North-Africa and South-America). *FR-PARTS 1* has seen a reduced level of autonomy in terms of product innovation compared to an OEM or a 'Super Tier 1' sub-contractor because its product specifications are mostly determined by the client. It has introduced some automated processes – such as Computer Numerical Control (CNC) machines and robots for some parts of the production process (Gautié, 2017b).

FR-PARTS 2 also produces parts for OEMs – but its products are very specific, produced in small batches, in particular in composite materials, for which it is an innovation leader. It also manufactures components for propulsion systems. It is mainly a 'Super-Tier 1' sub-contractor in the supply-chain (see Figure 1 above), with significant R&D activity. It is a subsidiary of a large multinational company. It has undergone multiple restructuring during the past 15 years – illustrative of the restructuring process whereby mergers and buy-outs have affected the whole industry during the period (see section 2.1 above) – with multiple changes in trading names and perimeter. It was state-owned up until to the beginning of the 1990s and used to operate mainly in the military sector. Budgetary constraint used to be relatively soft at that time, but this was no longer the situation at the time of the research. The establishment has more than 500 employees, among which a majority are white-collar workers (many engineers and technicians working in design-departments). There is a low rate of temporary agency workers and the rate of unionisation is rather low. Many innovations mentioned in section 2.2 have been adopted by this company; in particular 3D CAD and CNC (Gautié, 2017c).

SW-PLANE is an OEM of aircraft and it also produces segments for other aircraft manufacturers. In our case study, we focused on the manufacturing of aircraft – where there is a high level of R&D activity. The entity we studied has more than 2,500 employees. The share of blue-collar workers is approximately 30 percent, and the share of temporary agency workers is negligible. Nearly all employees are represented by a trade union (where union density is about 90% among blue-collar workers and about 85% among white-collar workers). The company has undergone a lot of restructuring since the end of the 1990s, with substantial redundancies having been made up to the 2010s. It has, in particular, had to cope with reduced orders from the State (defence activity) and to find new clients abroad. However, in recent years the number of employees has begun to increase in parallel with new orders. Hundreds of engineers have been recruited in the past four years and the number of operators is expected to increase in the coming years. The company is highly involved in the "Swedish Aerospace Cluster", as in several research and innovation programmes mentioned above. As for *FR-PLANE*, *SW-PLANE* has introduced many of the innovations outlined in section 2.2., and in particular, more recently, 3D CAD and 3D CAM. (Ahlstrand, 2017a).

SW-PARTS manufactures metal parts and components for OEMs (among which *SW-PLANE*). It is a small family-owned company (less than 200 employees) with one establishment that had undergone rapid expansion in recent years. The share of blue-collar workers in the entity is about 70 per cent and the share of temporary agency workers is very low (less than 5%). Almost all white-collar workers started working in blue-collar jobs. Most of the workers are unionised, but it was only recently that union entities were created in the establishment. Until recently, the company mainly had clients from outside the AeS industry. It decided to increase its aerospace activity to diversify production. A big step in this direction was taken several years ago when it became a Tier 1 sub-contractor of a large OEM. It has joined one of the national public support programmes for R&D and innovation mentioned in section 2.1.1. Among recent important innovations, there has been a comprehensive introduction of CNC machines (Ahlstrand, 2017b).

UK-PARTS is also a family-owned company (with less than 50 employees). It manufactures small batch, safety critical metal ‘flying parts’ and components for around 20 OEMs or Tier 1 companies in the AeS industry. The company has been in business for more than thirty years and has grown by an average of ten percent year-on-year since 2009; doubling in size in the past decade. All of the employees are permanent with only one degree-qualified worker. With the exception of several administrative staff (i.e. white-collar workers), the vast majority of workforce do blue-collar jobs. There is no union presence in the workplace. The company operates from a single site that sits in the supply-chain of one of the UK’s three main regional aerospace clusters. The cluster comprises one-quarter of the UK aerospace industry, 7 percent of Europe’s and 3 percent of the global aerospace market. In total, the cluster encompasses around 300 companies making flying parts and extends to many more companies, depending how far down the supply-chain is travelled. Currently, around 90 percent of sales are to UK-based companies with the non-UK sales spread across customers located in a number of countries including Spain, Italy, Germany and the US. In contrast to highly automated production methods such as the use of CNC machines, products are mostly hand-made. Recently, cost pressures have led to the company to explore whether any discrete parts of the production process can be automated without impacting on quality. UK-PARTS has participated in a collaborative technology exploitation project to develop bespoke software on the fatigue properties of aerospace materials with a supplier, a specialist research institute and large end users which has helped improve the company’s market position (Wright and Green, 2017).

3 The impact of technological innovations on JQ and employment

As suggested in section 2.2 above, and as also evidenced by our case studies, it is mainly process innovations that have impacted directly the work activity in the AeS industry in recent years. The ones we were able to observe in our sample were all connected to digitalisation. As indeed one manager emphasised when asked a general question about the recent main innovations, the answer was clear cut: *“the first obvious element is the outburst of the digital, which has impacted all the trades in the company”* (Engineer, R&T manager, FR-PARTS 2). Our purpose here is to analyse the impacts of such innovations on both JQ and employment, and how these impacts may be mediated by institutions and/or organisational and managerial choices. In succession, we consider three main innovations that emerged as particularly important in our sample: three dimensional computer aided design – 3D CAD – (3.1), computer aided manufacturing and automated processes – in particular CNC machines, and beyond, robots – (3.2), and the use of digital tools to organise and monitor work (3.3).

3.1 The impact of Computer Aided Design on white-collar workers

3.1.1 The effects of computer aided design (CAD) on the work activity and job contents of white-collar workers

As noted above, the adoption of 3D CAD was a radical innovation and it has been readily adopted by almost all firms in the AeS industry. All the cases in our sample have been impacted, but we will focus mainly on developments in FR-PARTS 2 and SW-PLANE as they are quite illustrative of the mechanisms at play. Both firms were followers when adopting this innovation as CAD had already been adopted by other companies, in particular the large OEMs. For both, even more because they are sub-contractors of these OEMs, there was no alternative, despite any reluctance, because of its radical dimension *“but we had no choice, we could not avoid this big bang”* (R&T manager, FR-PARTS 2).

An important consequence of this new technology is an increase in the integration of the different trades, beginning in the design department. The traditional division of labour was between three clearly-differentiated segments: 1) “architects” (i.e. those who conceived the new product); 2) designers (i.e. those who design what the “architects” have conceived); and 3) “calculators” (i.e. those who make all the calculations based on the laws of physics). A clear division remains between the three segments, however new technologies have brought about greater overlap. In FR-PARTS 2 there was some resistance among some workers, who remained attached to their trade skills and professional identity. The challenge was to bring about a better integration of the different segments of the workforce (conception / design / computation), and this was considered as an organisational rather than technical challenge *“One organisational response [to this challenge] is to put the different workers together to foster the dialogue between them....but this requires some multiskilling, and there is some strong resistance”* (R&T manager, FR-PARTS 2). Younger workers, who were better trained with new technologies, were less resistant to overlap between different trades (Gautié, 2017c).

Beyond the department of design, 3D CAD also facilitated the implementation of concurrent engineering (see section 2.2.1), and it has impacted on the work organisation and integration of the whole supply-chain (from design to production), within the firm but also with some suppliers. As emphasised by the HR Manager at SW-PLANE (Ahlstrand, 2017a):

“[3D CAD and the associated model-based definition working methods] It’s been the most difficult and most important... it has enabled us to work more efficiently, but also makes it possible to cooperate more, different skills can meet, and production and industrialisation departments can work more together, because they can jump into the model-based work in real time, instead of showing each other, this is what I have I done, now it’s your turn. So instead, they can work together in a different way, then.” (HR Manager, SW-PLANE).

3D CAD has also had an observable impact on JQ. All of the white-collar workers acknowledge that the *quality of their work* has improved. It greatly facilitated the work of technicians of methods and manufacturing engineers who used to have to translate ‘models’ produced by the designers into work instructions for the operators in charge of assembly. There was also a direct impact on the working conditions of those workers who used to make 2D drawings, in particular amongst those who worked directly on drawing boards, as this kind of work was physically demanding.

“[thanks to the CAD software] the working conditions nowadays look nothing like what existed before. Of course, you have to spend a lot of time watching a screen; but before, I remember,

we stood up all the day long behind our drawing boards and it was exhausting [...] and you achieve a quality of the work done that you could never have reached with a drawing board.” (technician, former draughtsman, FR-PARTS 2).

3.1.2 What impact of CAD in terms of skills and employment?

Competencies required by CAD were unquestionably new but these competencies are not necessarily higher than the competencies previously required by the workers. Some even think that CAD and more widely, computer-based engineering tools may have resulted in a certain degree of deskilling in certain engineering occupations. These technologies may have induced a transfer from "embrained knowledge" (i.e. based in the conceptual skills of the employees) to "encoded knowledge" (i.e. held in books, computer systems.) – so there is a risk that the employee loses skills, in particular, some basic knowledge of physics (Henshaw, 2012). However this view was not shared by all interviewees (Gautié. 2017c):

“I remember that some of them had a real ‘feeling’ of the mechanical constraints; by just looking at the drawing of the piece, they could say: Ok, it will pass, or, on the contrary, it will break [...] but new materials [such as carbon and ceramics] are much more complex, and you have to make sophisticated calculations [with the software] [...] but you still have to understand the underlying mechanisms.” (engineer, FR-PARTS 2).

For both technicians and engineers, the required knowledge has in fact become more complex, and at the same time, more specialised. As a result, knowledge is more diffused across the collective network.

“Everything has become much more complicated nowadays. The great ‘inventors’ [i.e. those who conceived product innovations] of the past in the company (i.e. about 25 years ago), they dealt in fact with a simple world [...] One guy could have all the required knowledge in his brain [...] It is not possible any more [...] because of the complexity of the new materials, the sophistication of the digital tools, the number of competencies you need [...] You have also more and more to rely on competencies outside the company, in research labs or abroad [...]” (engineer, FR-PARTS 2).

But this necessitated a new way of working: mobilising and sharing the knowledge has become crucial. The great “inventors” of the past, the great “experts”, had a very individual way of working, sometimes even working alone in their office, and the process of innovation was therefore more individualised. With new technologies, the collective dimension has become essential.

“The crucial issue at stake is to keep the individual experts’ excellence, but also to make them share their knowledge, and to make everybody work together [...] experts of different domain of expertise are asked to work together” (engineer, FR-PARTS 2).

Organisational concerns therefore have become critical – we will turn back to this in section 4 below.

Overall, the introduction of 3D CAD is not so much about higher skills, but different skills. Still, it might have had a sizeable impact on employment. Senior workers, even if they had high skills were clearly negatively impacted - a very good illustration of an ‘age biased’ (rather than ‘skill biased’) technological change (Behaghel et al., 2014).

“In the design department (‘bureau d’études’) the shift to 3D has been extremely painful. We had many senior workers [i.e. more than 50 years old] [...] I remember one technician

draughtsman who had put a sign on his office: 'endangered species' [...]" (R&T Manager, FR-PARTS 2).

"Oh shit, what's a computer? How do I handle this? How do I turn on the screen? It was really something... Older male and female employees, mainly male, had never seen a computer before and had to learn to start to work with a computer instead of having their paper drawings. You can understand what a journey it could be." (MBD architect, SW-PLANE).

To cope with this situation, both FR-PARTS 2 and SW-PLANE developed training sessions. They also increased the recruitment of younger technicians and engineers. In FR-PARTS 2, many older workers were pushed out, but using a relatively consensual institutional device that was widely used by many French companies up until the mid-2000s - early (and often publicly subsidised) retirement schemes.

"Training sessions were organised, but it was too complicated for some workers [...] We had to re-allocate some workers to other tasks. But we also intensively used early retirement schemes. [...] [in the department of design] about one half of the staff has changed within 3 years [...]" (R&T Manager, FR-PARTS 2).

Whereas in SW-PLANE, more emphasis was placed on training. This can likely be explained by the employment protection law in place in Sweden that is quite protective for workers with seniority, and early retirement schemes are less commonly used than they are in France. In this respect, the national institutional context seems to have played an important role here in accounting for the differences in outcomes.

Another consequence of the new CAD-CAM chain, as designs are more directly translated into instructions, some intermediate white-collar work consisted of translating 'designs' into work instructions for manufacturing and assembling has since disappeared. For instance, this was the case in a division in FR-PLANE where tablets were introduced to replace the paper-based work instructions of operators (engineer, R&T, FR-PLANE).

Overall, was there a negative impact on total employment? It is very difficult to determine because the level of employment is influenced by a wide range of factors. There is no doubt the shift to 3D CAD (and the associated computer aided manufacturing, see section 4.2. below) led to a large increase in productivity. In SW-PLANE, for instance, lead times were improved by around 50 percent, the costs of manufacturing were brought down by about the same amount, and the costs of development and maintenance were brought down by around 40 percent.

3.2 From computer-aided manufacturing to automated processes: How has this impacted blue-collar workers?

3.2.1 The use of 3D devices at the operator level

In SW-PLANE, a recent large change is that 3D model-based definition is now used at operator level for their work instructions (Ahlstrand, 2017a). Exact instructions for their tasks are now given to the operators in 3D models with assembly instructions appearing on computer screens. They now have the ability to twist and turn the components in 3D to see how to assemble them along with other components. After a period of adaptation, it was thought to greatly facilitate the work they do. The quality of the work has also improved as using 3D modelling now results in smaller margins of error because of more accurate drawings:

"[in the old-fashioned organisation], the whole bench was full of drawings and assembly instructions and a terrible load of paper editions. Now, building the new aircraft, it's fantastic. Beside each aircraft, you have a computer... It's without paper drawings, all the way [...] The risk of mistakes is minimised enormously, and you never work with an old instruction because changes are immediately recorded in the database. Drawings are never outdated. Before, you had to constantly check that you had the latest version. You don't have to think about that anymore. Everything is in the computer." (trade union representative and blue-collar worker, SW-PLANE).

On the one hand, operators have become more autonomous, in the sense they have to rely less on manufacturing engineers in order to understand exactly what tasks they have to do:

"We simplified the jobs, it's the same job, but it's done in less time and creates fewer questions. That's the way it is, they sort out more things on their own." (production leader, SW-PLANE).

On the other hand, the implementation of MBD working methods has simplified the job and shortened the time it takes to complete the same tasks. As a result, the variety of work has decreased with operators pointing to the risk of more monotonous jobs:

"Now, some operators have said that this is not as much fun anymore: [...] But others think it's fantastic because the job goes fast. So, there are different opinions." (operator, SW-PLANE).

Particularly in FR-PLANE and SW-PLANE, experimentation with virtual reality (VR, a step further than 3D modelling) is just beginning. For instance in the former, operators assembling electrical wires in the fuselage have been given VR glasses that simulate the entire wiring lay out plan, so operators no longer have to consult paper-based or tablet-based complex 2D drawings. Another area where VR has had a large and potentially positive impact in terms of JQ concerns the simulation of workstations before they are installed so as to optimise efficiency in terms of positions and gestures at the same time as improving the physical working conditions. *FACT 1* of FR-PLANE had developed a virtual reality lab in the framework of the R&T centre of the local cluster it belongs to. Operators that will work on the workstation are involved in simulations in this lab.

3.2.2 The use of CNC machines

In firms in of our sample that manufacture parts (FR-PARTS 1, FR-PARTS 2, SW-PARTS and UK-PARTS), CNC machines have been introduced, more or less recently. CAM and the introduction of CNC machines have impacted operators. These machines are sophisticated (from 2 axis to up to 5 axis now) and are used to make complex parts.

The impact of these changes on JQ is quite ambiguous. On the one hand, CNC machines have reduced manual handling. According to one manager *"it was a huge gain for operators in terms of work comfort"* (R&T manager, FR-PARTS 2). At the same time, this new technology has led to obsolescence of former technical skills. It has also displaced a more 'informal' human capital acquired by on-the job training. It may be considered as another illustration of the transfer mentioned above from 'embrained knowledge' to 'encoded knowledge' (i.e. in the machine) – but 'embrained knowledge' in this case refers not only to conceptualised knowledge but also to more tacit dimensions.

Several workers interviewed both in France and Sweden lamented the loss of the ‘craft’ dimension of their work activity that existed with the traditional turning and milling machine (while it was not the case in UK-PARTS, where the craft dimension mostly remains):

“In my generation, we started with manual turning. With this, you had a bit more feeling. You came closer to the material, you could see what was good and what was not. Youngsters, who only use CNN machines, they don’t get that feeling. People older than me, they are phenomenal to turn manually. This competence disappears; it’s a craft that disappears here.” (operator and team leader, SW-PARTS).

As the process has now increasingly become more automated, the work in itself may have become less interesting. As one manager points out:

“Frankly, I don't understand how they don't get bored. [...] [before the CNC machines], the turner and milling machine operators acquired real know-how. They were proud of their work, and it was legitimate; they also had to do some adjustments, in addition to turning and milling.” (engineer, FR-PARTS 2).

As pointed out by an industry level trade union delegate (expert interview, France) it seems paradoxical that while higher formal qualifications are now required (see also below) the work might have lost some interest. This sentiment was expressed by a number of (senior) workers (Gautié, 2017c).

According to a programmer of CNC machines who works closely with operators (technician, programmer, FR-PARTS 2), a distinction has to be made between two kinds of manufacturing operations, depending also on the stage in terms of the maturity of the piece / component to be manufactured. During the first steps (for the prototype and the first exemplars), the work of the operator remained crucial. For example, he/she has to make some adjustments (such as controlling the speed of the machine) that require a high level of expertise (*“the operator, in contrast to the programmer, has the sensitiveness (“sensibilité”) of the machine”* (technician, programmer, FR-PARTS 2) and this can be quite stressful. Once the prototype has been perfected, the process is stabilised so the operator's work becomes more standardised (*‘push-button activity’*) (idem). At this stage, the opportunity for problem-solving lessens and there is an increased risk of boredom, albeit the work is less stressful.

In some firms, such as FR-PARTS 1 and SW-PARTS, job rotation has been introduced, primarily to increase functional flexibility with the aim of reducing costs (Gautié, 2017b; Ahlstrand, 2017b). As pointed out by operators in both firms, such rotation was made easier by the standardisation (through codified knowledge). In this respect, job rotation could be one way to counteract the risk of boredom. But it could also create more distance between the operator and their tasks, with potential negative impact on motivation and subsequently, on productivity (Team leader, FR-PARTS 1). This appears to be particularly true for senior workers who have higher attachment to their craft.

3.2.3 Towards full automation?

As noted in section 2.2 above, more automated processes such as the use of robots and cobots was less widespread in AeS firms than in other sectors of manufacturing (such as automotive). According to a number of experts and managers this was not because tasks were technically too complicated for automation; rather it is purely based on economics - small batches and the high cost of automation meant that fully automating processes in aerospace were simply not always cost effective.

FR-PARTS 1 recently made a significant investment in associated with automation of processes with discourse within the firm about it being "a factory of the future". According to the director of one of the two units of productions, robots were introduced to increase the scale of production to bring about a reduction in unit costs. It is not anticipated that automation will deliver any significant improvement in terms of quality. In anticipation of automation, the company hired a large pool of temporary agency workers so it could (and did) easily reduce its workforce once the robots were installed (i.e. numerical flexibility). According to the unions, the increase in productivity was lower than expected and one unintended consequence has been an increase in the workload for remaining employees; which has negatively impacted on JQ (Gautié, 2017b).

In FR-PLANE, some robots were recently installed in one division to do the 'sewing' of different segments of the fuselage (that were previously manually riveted). According to a manager who is also a trade union delegate, the impact was very positive in terms of JQ: the robots replaced tasks that were physically harmful and the operators who used to perform the riveting work have been reallocated to support tasks (such as control and maintenance). To date there has been no job loss, however the deployment of robots has so far been quite limited and there is some uncertainty around future job security, should widespread adoption of robots occur (Gautié, 2017a).

Brainstorming was underway in FR-PLANE about automation - robots being the most recent development in this area. The HR Manager of *FACT 1* identified a clear link between the company's long term trend of automation and the decrease in the share of blue-collar workers - even if this reduction in some divisions was also due to new forms of organisation (discussed further in section 4 below). According to the HR Manager, the trend of automation had hit its natural limit whereby management of *FACT 1* was now more interested in 'light' rather than 'full' automation:

"For blue-collar workers, we reached the limit of the decrease in their numbers [...] you lose in terms of innovative capacity if you automate too much [...] overall, the aim is not to replace completely the humans [...]" (HR manager of FACT 1, FR-PLANE).

In UK-PARTS, the managing director was initially opposed to automation because he did not want to compromise the company's values and pride in handmade, high quality parts in order to save costs. While the number of parts the company makes for its suppliers is generally very low (i.e. 10 to 20 per order), AeS volumes are increasing, so the company began exploring ways to automate some – but importantly, not all - stages of the production process. Initially, the company purchased a small CNC machine to test whether it was viable to automate specific stages of the production process. The owner decided that two early stages of the process could be automated with precision hand working retained in the other stages of production. This decision was only reached once the owner was satisfied that quality would not be comprised and the highly specialised skills of the workforce would continue to be used. He recently purchased a large CNC machine at a cost of Euro 220,000 (representing a large investment for a small company) (Wright and Green, 2017).

Pushing too far with automation was witnessed by an engineer (in charge of technical and organisational changes in Division B, FR-PLANE) when he visited another firm. Managers at this firm were overwhelmed by data (provided by the robots), but they acknowledged they had lost some comprehension of the process, which used to be provided by the operators, and that was useful in terms of incremental innovation. In other words, too much automation may be incompatible with the *Doing-Using-Interacting* mode of innovation (Jensen et al., 2007), to which we will return in section 4 below.

3.2.4 Overall is there a race between technological change and skill upgrading? And what is the impact on social inclusion?

Most technological changes are considered to be ‘skill-biased’ - i.e. requiring higher skills, as simple, routine tasks that were formerly performed by workers (particularly blue-collar workers) are substituted with machines and automated processes which need higher skilled workers to be monitored. As identified above, the majority of operators in the AeS (in contrast to the majority of automotive workers) were already reasonably highly skilled. Did the process innovation outlined in the previous sections bring about an increase in skill requirements of aerospace jobs? And what, if any, impact did automation have on (the type and level of) employment?

Increased skill requirements were witnessed in both of the Swedish cases. In our sample, it was where the most highly-trained operators were found. In SW-PLANE, with the adoption of the so-called 3D Model-Based-Definition methods described above (section 2.2) it was no longer enough to recruit blue-collar production workers with only secondary-level education or previous work experience from another industry. They are now required to complete the company’s internal 26 week full-time training course including training in 3D drawing) in addition to successful completion of an ability test (Ahlstrand, 2017a). In SW-PARTS, nearly all of the operators have graduated from secondary school. Both Swedish firms complained about skill shortages. In the case of SW-PLANE, the number of recent new recruits (engineers, in particular) was very high and there are concerns about the firm’s ability to recruit suitable operators in the future. As for SW-PARTS, as an SME in a rather tight labour market, it experienced serious problems in recruiting welders, technicians and CNC machine operators (Ahlstrand, 2017b). Consequently, the firm has started to collaborate with a technical upper secondary school and one of Sweden’s leading companies in adult education with vocational focus (Lernia). Overall, in both Swedish cases, secondary educational or upper-secondary school training are now a minimum educational requirement. There has been almost no recruitment during recent years of people from socially excluded groups (such as unskilled youth, long term unemployed, or migrants).

This also seemed to be the case in FR-PARTS 2 (Gautié, 2017c). Operators appear to now require higher formal qualifications whereby most of the new recruits have either an upper secondary school education or a vocational training diploma (*baccalaureat professionnel*). Sometimes they even hold a tertiary vocational training diploma (*BTS*, two years of technical college after high school). In contrast, during previous generations, operators required (at most) a secondary school vocational diploma (*CAP*); even for skilled operators.

In UK-PARTS, it was quite different. The craft-based work requires high skills that continue to be acquired on-the-job (Wright and Green, 2017). The firm does not require a minimum level of educational attainment. The company used to enrol its new recruits in a course at a local vocational college, where the workers would combine formal ‘off-the-job’ with ‘on-the-job’ training. It was found that the students got to use only a very small amount of what they learnt at college, so the company now does all of its training internally. Operators are primarily recruited on the basis of their manual dexterity and a basic grasp of mathematics (measurement). The company has tended to employ blue-collar workers straight from high school (i.e. around 16 years of age) but the company has recruited older workers. *Prima facie*, no formal educational requirements means that UK-PARTS can be more socially inclusive in its hiring practices. In fact, the company has shown a willingness and commitment to recruiting people from socially disadvantaged backgrounds. For example, the company recently employed an older worker from a socially disadvantaged background. “*We employ on aptitude. I don’t care what you look like, sound like or how*

many GCSEs you've got. It's irrelevant" (Business owner, UK-PARTS). The company would like to have a more diverse workforce, in particular hire more women, but women do not apply when vacancies are advertised. In terms of ethnic diversity, there are restrictions on hiring workers from certain countries due to the security-sensitive nature of AeS (i.e. military applications). It is not anticipated that introducing CNC machines into the production process will lead to any significant change in skill requirements. A Quality Manager was recently recruited and the person who was appointed to this position is the only degree-qualified employee (although it was ambiguous whether a relevant degree was necessary to actually do the job). If the firm continues to grow, there will likely to be need to recruit into more specialist team leader and managerial positions, some of whom may hold or require tertiary qualifications.

Both FR-PLANE and FR-PARTS 1 complained about skill shortages. When what the interviewees said was unpacked, their concerns seemed to be more related to the need to rapidly recruit more workers, as opposed to problems with the skill level of the workers. This can be evidenced by the fact that on the supply-side of the market, the number of entrants with educational training in aeronautics has not increased. In FR-PLANE, this skill shortage was partially plugged by increasing the number of apprentices. But it was still not enough.

In recent years, *FACT 1* and *FACT 2* have both recruited a lot of middle-aged workers, including women with no previous experience in aeronautics (either in terms of education or work experience). To do so, the factories collaborated with the local branch of the French public employment service (*Pôle Emploi*) and with local temporary employment agencies (Gautié, 2017a). All job seekers are tested on their abilities followed by completion of a three month training course. They are then hired by a temporary employment agency on an apprenticeship contract (*contrat professionnel intérimaire*) for seven months, during which time they work in FR-PLANE. At the end of the 10 month period, they receive a qualification certificate (CQPM). They then join the pool of temporary workers which FR-PLANE can select from when new permanent workers are needed. Overall, as compared to the two Swedish firms, and even to FR-PARTS 2, the recruitment in FR-PLANE is more socially inclusive; evidenced by the fact that middle-aged, low skilled workers have joined the firm.

In FR-PLANE, another concern among French unions was whether de-skilling would negatively impact on upward mobility of operators. In contrast, upward mobility was already high in both Swedish cases

To conclude, there was no evidence to support the theory of deterministic skilled-based technological change. Organisational features seemed to play a key role - this will be studied in depth in section 4.

3.3 Using the digital tools to organise and monitor work activity: what motivations and what consequences?

As in many companies, we found evidence in our case study firms of the wide usage of digital tools to organise - in a broad sense - work activity, from simple communication (with internet or platforms), to the management of human resources, and the monitoring of the production chain. We set out some illustrations below.

3.3.1 Digitalisation and the monitoring of the work process

'Big data' (i.e. the gathering and treatment of information on a large scale) was identified by several experts and interviewees as the next big future innovation. It may well turn out to be just as radical as the introduction of 3D CAD fifteen years ago, according to an engineer at FR-PLANE. One application is the monitoring of the production process, the so-called "*manufacturing execution system*" (MES) (i.e. the

control system for managing and monitoring work-in-process on the shop floor). MES keeps track of all manufacturing information in real time, receiving up-to-the-minute data from robots, machine monitors and reporting by employees. The goal of MES is to improve productivity and reduce lead time, by detecting system dysfunction and time wastage in the production process.

One illustration of potential consequences of digitalisation and the monitoring of the work process was found in UK-PARTS (Wright and Green, 2017). The company uses the latest industry software to design and make its parts. The software tracks all shop floor processes and operations. All orders, processes and operations are bar coded. The company has customised the industry software so that it captures in 'real time' work allocation, scrap and not right first time. The company uses the performance data to continuously improve processes and for allocation of tasks to employees.

Another illustration of potential consequences for work activity that is associated with JQ was provided by Division B in FR-PLANE, where a "digitalisation plan" has been implemented (Gautié, 2017a). Tablets have been given to operators which contain their work instructions (i.e. no paper instructions anymore) and they now report very precisely and in real-time, the tasks they complete. Previously, reporting was done only once or twice a day, written down on paper and reporting was considerably less detailed. With the new system, it is much easier to measure precisely the time it takes to complete each task. It also helps in identifying where problems exist in the actual production process. For instance, they discovered that, for a given operation, operators frequently had to stop work to go in another room to look for a piece they required. Each time this was done, it took an average of 15 minutes. Under the previous mode, operators did not report this stoppage, however the new digitalised system records and measures these stoppages.

There is a potential for the wealth of data that are now collected from digitalised reporting systems to lead to 'management by indicators' because it gives managers a powerful monitoring tool that they could use measure the precise performance of every individual operator in real-time. This has the potential to be consequential to workers' autonomy and work intensity – two important dimensions of JQ. In this case, the Director of Division B said that the company had deliberately decided not to go down the path of individual performance monitoring:

"You know, it is not the technological tool in itself that is important, it is what you do with it [...] the process cannot work without the engagement and the competencies of workers; If you use the tool just to monitor and to prescribe, you will lose the trust of employees, and their engagement; and they will find ways to manipulate the system, to meet the targets set by the indicators, but without doing what you really expected them to do [...] I chose not to use the system to calculate individual performances [...] some uses of this tool could be catastrophic, like 'big brother'! [...]" (director of division B, FACT 1, FR-PLANE).

So managerial and organisational choice one again appear to be key mediators influencing any potential consequences resulting from technical change.

3.3.2 Digitalisation, collaborative work and human resource management

Beyond the simple transmission of information, communication is also about how the different employees collaborate with one another. From this perspective, digitalisation, depending on the way it is used, may have contrasting effects. In FR-PARTS 2, for instance, as in many companies, employees at all levels (except maybe operators) felt they were drowning in the quantity of information. And this had turned out to be inefficient.

“We’ve been through a stage where all internal communication was done through the computers, and everybody was drowned by the quantity of information [...] everybody does not look systematically to his/her emails [...] So we had to go back to ‘visual management’, i.e. physical meetings with a paper board [...] It’s important that people meet [...] before this, we used to communicate only with emails.” (engineer, director of one division).

This “visual management” with paper boards had already been (re-)introduced at the workshop level about ten years ago - but more in connection to “lean” organisational principles - see section 4 below.

The firm had also recently put in place a sort of internal Facebook system in order to facilitate the communication among groups working on the same projects. Improving this cross-functional collaborative dimension of work and a more collective dimension of knowledge acquisition and sharing (already mentioned in section 3.1.2) was seen as a priority in FR-PARTS 2 (Gautié, 2017c). A new system of internal “calls” for innovation was recently launched. It is much more horizontal than the previous system because of its reliance on the digitalised, collaborative platform. For instance, when a problem is submitted, everybody in the firm can now participate in the process of converting an idea into an innovation. *“This kind of collaborative platform gives you in a few weeks a result that you would need 6 months to obtain in the traditional system”* (Director of Innovation and Industrial Performance, FR-PARTS 2). Beyond this specific tool, digitalisation was seen as facilitating a more innovative workplace - a key challenge, as we will discuss in section 4 below. But organisational change, beginning with management practices was seen as a key condition:

“Digitalisation will transform deeply the way we work, but this will be conditioned by a good change management, the role of the manager will be crucial in this process.” (director of innovation and industrial performance, FR-PARTS 2).

Another illustration of strong interlinkages between digitalisation and organisational change was provided by FR-PLANE, at group level (Gautié, 2017a). At the time of the study, they had just launched an ambitious “digitalisation plan”. In reality, it was mainly about transforming the HR function and to a lesser extent, the internal market functioning. The use of digital tools had already spread to the training function (i.e. where they provide a growing number of e-learning tools). This digitalisation of training has further individualised the training process and it has raised issues for older workers, who are less at ease with these tools; preferred face-to-face methods of training with trainers. The new plan was more ambitious, as it encompassed the whole sphere of career management. All employees’ personal and professional data were registered in a central data base and this data are used to facilitate internal recruitment and re-allocation. Employees can more readily access details about internal vacancies. But the explicit objectives motivating this new data collection was wider than just facilitating mobility: it was clearly going to impact *“competence management, performance management, development management and learning management”* (internal website). Beyond the technical dimension, the “digitalisation” also relied on a new conception of how employees should manage their own career (‘risk shift’). While these new tools had the stated intention of facilitating the “empowerment” of employees, there was an underlying philosophy that strongly encouraged employees to take more responsibility for their own training and career development. This was also connected to the new role expected from managers, where they are increasingly expected to become “coaches” in addition to managers. In summary, while “digitalisation” innovation was presented as a technological innovation, the way it was being used appeared to be more about organisational change.

4 Organisational changes, JQ and the making of innovative workplaces

Organisational concerns emerged as central to understanding the technological changes outlined in the previous section; either because organisational factors mediated the impact of these changes, or because the changes were highly interlinked with organisational ones.

There were indeed a lot of work organisational changes underway across the firms in our sample. In addition to process, product and marketing innovations, the Oslo Manual identifies a fourth type of innovation: Organisational innovation (OECD, 2005). When organisational changes are considered sufficiently important, they might be classified as this separate type of innovation however, as pointed out by Eurofound (2017: 16) "it is often not easy to clearly distinguish whether (work) organisational innovation is a condition for innovation, an objective of its own, or a consequence of the other types of innovation".

As we have seen in section 3, process innovations have induced organisational changes by impacting on the technical division of labour – i.e. the content and allocation of tasks between occupational groups in the workplace. However, the most important organisational changes that we observed were mainly driven by 'objectives of their own' such as reducing cost and improving the quality of products. These organisational changes were often considered even more important than technological innovations. For instance, one manager of FR-PARTS 2 noted:

"If we do not change our way of thinking in terms of organisation, no new technology will help us to decrease significantly our costs [...] Today, I see no new technology able to decrease our costs without changing the way we work." (director, Innovation and Industrial Performance, of FR-PARTS 2).

However, some of these changes were also driven by the view that some types of work organisation may be more favourable to innovations (of any kind) than others. That is, organisational change can, in some instances, be seen as "*a condition of innovation*", and even more, a *pre-condition*.

We will first map out of the diversity of work organisations underway in our sample (section 4.1), before turning, by adopting a more dynamic perspective, to the analysis of these particular organisational changes.

One important change was in fact 'an objective on its own': the implementation of 'lean' principles. Importantly, the way 'lean' was implemented was quite different across the different cases, with different consequences in terms of JQ. In some cases, more recent organisational changes have tried to countervail some of the potentially negative effects. In these instances, (better) work organisation was identified as 'a condition for innovation'. More precisely a key determinant of an innovative workplace can be defined here as "a work environment that provides a fertile ground for innovations" (OECD, 2010: 11) (section 4.2). These experiences call to attention to potentially important contextual factors, whether institutional or more connected to economic constraints (section 4.3).

4.1 The diversity of work organisation in our sample: an overview

4.1.1 A classification

In order to assess the differences in work organisation, one can refer to the distinction introduced by Lorenz and Valeyre (2005) between the "learning / lean / Taylorist / simple traditional" forms of work

organisations. In particular, the "lean" type can be contrasted with the "learning" type: "the dichotomous distinction between Taylorism and the lean or high-performance model is inadequate for capturing the organisational variety that exists across European nations. [...] our evidence points to the existence of two models with strong learning dynamics: a relatively decentralised model associated with substantial employee autonomy in setting work methods and work pace (referred to as the 'learning model'), and a more hierarchical model, which places emphasis on regulating individual or group work pace by setting tight quantitative production norms and precise quality standards (referred to as the 'lean' model)." (Lorenz and Valeyre, 2005: 425). As indicated, the lean organisation, in this classification, differs from the "learning" type due to its lower degree of workers' autonomy. Even if Lorenz and Valeyre consider both "lean" and "learning" as "high performance" work systems, they differ in terms of employee involvement, as we will see more in depth below.

At the time of conducting our research, the current state of the dominant features of the work organisations of the cases of our sample can be summarised as in Table 2:

Table 2: A typology of the dominant features of work organisation in our sample

| | High workers' autonomy / involvement | Low workers' autonomy / involvement |
|------------------------|---|---|
| Individual work | <i>Craft / professional: UK-PARTS</i> | <i>Taylorist: Division C of FR-PLANE</i> |
| Team work | <i>'Learning' organisation: SW-PLANE; SW-PARTS; two Divisions of FR-PLANE</i> | <i>'Lean' organisation: other Divisions of FR-PLANE; FR-PARTS 1; FR-PARTS 2</i> |

Typology inspired by Lorenz and Valeyre (2005) and Marsden (2017)

4.1.2 Introducing more complexity

The classification appearing in Table 2 is useful at first glance. Nevertheless it is an over-simplification for two main reasons. First must be noted that, as is often the case with 2 x 2 typologies, none of the cases fit neatly into the 'ideal-types'. Several of the cases straddle two or even three types, in the sense that they combine elements from several types. The type in which they appear in Table 2 was the one identified as dominant at the time of the study. Secondly, this classification is static whereas organisational change was occurring in some of our cases, with potential moves from one cell to another in the typology.

In UK-PARTS, a very small firm (less than 50 employees), the work of operators is based on complex manual tasks – i.e. craft-like work activity; the family / paternalistic type of management also favoured relatively high involvement of the workers; lean principles and tools (such as SC21 supply-chain certification) are increasingly used to help meet industry requirements for production and quality however this has not (yet) resulted in full automation of the production process that would necessitate a total re-organisation of the labour process. UK-PARTS represents fairly good illustration of the simple / traditional work organisation, but there are some elements of both 'Taylorism' and 'Lean' present in the production process even though small batches of each part are made. The way work is organised does not fit well in terms the typology's simple dichotomy between high and low autonomy. Despite the craft-like nature of their work, the operators do not have a high degree of autonomy because they have to make very precise parts in accordance with extremely detailed (albeit paper-based) 'made-to-print' drawings that are supplied by clients and the 'lean' software is used to monitor and continuously improve the production process.

The Taylorist type of organisation can be illustrated by Division C of FR-PLANE (Gautié, 2017a). As in the rest of the company, strong lean procedures have been implemented (see also below section 4.1.2). But the specificity was that an assembly line was also introduced, to cope with the increase in production. It consists of a flow-line (a moving assembly-line called ‘pulse line’) to cope with the production ramp up (i.e. a shift from smaller batches to more mass-production), and also to increase the monitoring of quality. In the new system, workers are assigned to a work station so they no longer have to move around between different segments of the aircraft. The segments of fuselage are now moved automatically to their work station where, for instance, every 6 hours the segment is moved from one workstation to another). Each workstation corresponds to a given operation. According to the employees and trade union delegates interviewed, this new system had led to reduced job discretion, more repetitive tasks and some work intensification - the usual outcomes of Taylorisation.

SW-PLANE offers a good illustration of the learning type organisation where all of the stakeholders interviewed (managers, employees, trade union representative) claimed that participating in innovation activities in terms of continuous improvement work was crucial, and that, as expressed by one blue-collar trade union representative it was part of the daily work:

“The company want continuous improvements to be a normal part of the daily work that you have a discussion in the team, and all the time come up with ideas. Then, some are really good to invent and test different issues.” (operator and trade union delegate, SW-PLANE).

Employees, and in particular operators, have a high degree of autonomy, they were well listened to by management; "agile lean" is used without any negative impact on workers' autonomy and involvement which is high.

SW-PARTS falls more in between the ‘learning’ and ‘lean type’. Some lean tools and procedures have been introduced recently but in a more rigid way than in SW-PLANE. Despite this, workers have managed to maintain a relatively high degree of autonomy, and in order to avoid a higher of centralisation of decision-taking, management has been willing to maintain the innovative capacity of workers.

Divisions A and B of FR-PLANE recently moved (and changes were still going-on) from a ‘lean’ to a more ‘learning’ type of organisation – with important changes in order to promote workers' autonomy and involvement, and to foster innovative capacity. Both other Divisions of FR-PLANE, and both FR-PARTS 1 and FR-PARTS 2 still exhibit the main features of the ‘lean’ type of organisation even if some nuances have been introduced, as FR-PARTS 2, for instance, was closer to the learning type than FR-PARTS 1. Still, a striking fact was that in all of these cases, there were a lot of criticisms (including from managers) about the organisation itself.

4.2 From lean to learning? In search of innovative workplaces

Overall, two interesting features that came out from the overview presented in the previous section deserve a closer look. First, ‘lean’ elements were present in all the cases; but the way it was implemented, and the correlative outcomes in terms of JQ, seemed to differ significantly across cases (section 4.2.1). Second, the most ‘rigid’ forms of lean organisation seemed to have negative consequences in terms of JQ, and therefore involvement (section 4.2.2). As a result, attempts were made in some cases to move from ‘lean’ to ‘learning’ type of organisation (4.2.3).

4.2.1 Diversity in lean implementation

'Lean' refers to both general principles such as optimisation by reduction in wastes and 'continuous improvements' – as well as a series of tools and procedures, such as Kanban, team organisation, 5S, value stream mapping, visual management, quality control process charts etc. Lean manufacturing consists of optimising the whole supply-chain inside the company but also with suppliers, in order to reduce cost by wastes elimination, and to monitor quality with formal standards and procedures and also to be more reactive to the customers' demand. Lean concepts were first introduced in AeS during the 2000s even if its basic idea (continuous improvement) was already referenced before then. Managers who came from the automotive industry were hired to import the 'lean' culture – in particular, in the three French cases in our sample. This coincided also with the increase in the scale of production in many OEMs: *"as soon as the scale of production becomes important, you have to introduce lean reasoning"* (Engineer, FR-PARTS 2). It was increasingly been adopted down the supply-chain, as suppliers in lower tiers have been forced to adapt to the quality and other standards placed on them by their higher-tier clients.

In terms of impact on work organisation, in all the three French cases, lean was implemented in a quite technocratic-top down way, mainly focusing on the standardisation and formalisation of procedures.

In FR-PLANE, when it was introduced at the end of the 2000s, 'lean' was initially presented by top management as a big organisational innovation (Gautié, 2017a).

Subsequently, 'lean' was adapted to the company specificities, in a less standardised way than in the automotive industry. Still, the processes remain highly standardised (even formalised) and centralised. This was also the case in FR-PARTS 1 and FR-PARTS 2. This led to what can be referred to as the 'management by indicators'. For example in FR-PLANE, the director of one Division estimated that he had to monitor around 200 indicators and metrification of his work had increased reporting requirements. One consequence has been an inflation of the hierarchy.

"Before, you just had one boss [i.e. manager] and 50 persons who worked. Nowadays, you have just one person who works, and 50 persons doing reporting!" (technician and trade union delegate, FR-PARTS 2).

As a consequence, first-level managers *"are more and more in their office checking indicators, and less and less in the shop floor"* (new director of Division C, FR-PLANE).

At the shop floor level, the implementation of lean has also led to a number of significant impacts on how work is organised. A Visual Management System was first introduced into the assembly lines of OEMs, having been imported in Europe from Boeing (Alfalla-Luque et al., 2013). It was highly connected to the 'computer integrated' system mentioned in section 2.1.2 above: production-related information regarding quality, plant engineering and logistics is processed in real-time and projected onto screens in order so operators could react immediately to any problems or stoppages. A simple application was the "fire-light" visual system (green, orange and red) was implemented in FR-PLANE and FR-PARTS 1. In the three French cases, visual management was also used in the daily morning team kick-off meetings, however paper boards as opposed to screens were used in FR-PARTS 2. These meetings consist mainly of running through a formal check-list to detect any problems that have occurred so adjustments or changes can be made as quickly as possible. In FR-PLANE and FR-PARTS 1, this process was formalised by using the "SQCDP" board where the 5 key issues of Safety (S), Quality (Q), Costs (C), Delivery (D) and People (P) (in particular absenteeism). These meetings were complemented by multi-functional meetings (i.e. production,

maintenance, logistics, etc.) aimed at facilitating coordination between services and promoting suggestions from employees. Yet in the French cases, the workers complained that these morning meetings were mainly reduced to list checking and top-down transmission of information, and/or that only team leaders (such as in FR-PARTS 1) participated to multi-functional meetings.

In the Swedish and UK cases, while lean was also implemented, its implementation appears to be less technocratic and less formal.

In UK-PARTS (as mentioned above in section 3.3.2) visual management monitors have been used to display production data for a number of years. When the screens were first introduced, the owner displayed a large number of quantitative indicators. However upon advice from an external manufacturing technology consultant, the owner realised that although all of the other indicators were necessary for the business, it was better to reduce the number of real-time indicators displayed on the boards in the shop floor down to those that were directly relevant to operators (Wright and Green, 2017).

In SW-PLANE, the way lean was implemented during the 2000s contrasted highly with the rigid / technocratic way evident in the French cases. It was characterised as consisting in “lean principles with an agile approach” which is based on the idea that an individual worker has a lot of autonomy and discretion as long as it is exercised within the frame of the group (Ahlstrand, 2017a). This approach permeated the implementation and were part of the explanation for why these employees have been able to retain a high degree of autonomy. In SW-PARTS, lean was recently implemented with the help of a consulting firm. The implementation was made within the framework of a national and public supported development program (“the Production Leap”) (Ahlstrand, 2017b). At the shop floor, teams have morning meetings using whiteboards where they highlight production results, goals and staffing. Kanban systems and principles of orderliness (5S) are also discussed. Following on from the morning meetings, the SW-PARTS team leaders participate in daily steering meetings (in the lean-room) with the production manager and technicians. Overall, the aim was to introduce more standardised procedures in order to better comply with the requirements of clients both in volume and quality. At the shop floor, there were apparently strong similarities with the system implemented in the French cases. Yet, in SW-PARTS, there was no evidence of an excessive increase of formalised indicators and the corresponding inflation in reporting. Also in contrast to the French cases, the decision making in SW-PARTS was initially very centralised but this was soon decentralised to better facilitate problem solving and improvement activities. In particular, weekly 45 minutes brainstorming-improvement meetings with all workers were introduced to foster the bottom-up suggestions and initiatives.

Beyond these formal differences, it was also maybe in the effective daily practice there was a contrast between the Swedish, UK and French cases. A more in-depth observatory sociological study would be needed to delve further. But an anecdote told by team-leader from FR-PARTS 1 could illustrate how similar tools could be used quite differently in different work environments (Gautié, 2017b). He once visited a factory very similar to FR-PARTS 1 in the Netherlands, which also had introduced the SQCDP visual management tool (see above). The light was red for the P (i.e. “personnel”) criterion. He asked why and was told that it was because operators were unhappy about a lack of consultation for a decision that had been taken. He was astonished because in France this criterion was only used to indicate a staffing problem (due to absenteeism). So the same signal was used very differently in the two companies: as a communication tool fostering workers' involvement in the Netherlands, just as an informative tool on the production process in France.

Contrasts in the way ‘lean’ was implemented concerned not only the outcomes in terms of organisation (in a static way), but also (in a more dynamic perspective) the process of organisational changes resulted in the respective organisations. To refer to a classical distinction (see for instance Elg et al., 2015), the ‘planning and control’ model of organisational change was dominant in the French and UK firms, whereas the Swedish adopted of lean has placed a greater emphasis on the ‘process and learning mode’, based on “continuous learning and ongoing evaluation” - as stated by Elg et al., (op. cit.: 3) - whereby change is conceived more as an open process of learning and mutual adoption between different actors and from different perspectives.

4.2.2 The consequences of lean on JQ

A number of the implications arising from implementation of lean seemed similar in France, the UK and Sweden. It induced some stress, particularly when first introduced. In Sweden (SW-PARTS) and the UK (UK-PARTS), it was not only about lean, but more globally about all the security and quality requirements because the companies were now sub-contracting for an OEM and the parts they were manufacturing were safety critical because they were going into aircraft. While in France, it was also due to the coercive way lean was implemented.

In France and Sweden, workers experienced an increase in stress because they felt they had become more dependent upon one another, for better or worse. The interdependence of team-working could be characterised as having induced what can be labelled a “weak link’ syndrome. That is, worries about failure at the level of the individual worker because if the worker does not meet their deadlines, they know this will disrupt the entire production process. However Swedish workers seemed to receive a greater level of support from their team and/or manager than it seemed in France (Gautié, 2017c):

“Nowadays, the failure is seen as the responsibility of individuals, whereas before the responsibility was taken at a collective level [...] you could receive more support and help from your team, but much less now, also because of the lack of time. [...] even worst, when your colleague fails you may feel a bit relieved (‘it’s not me, it’s him!’), and you may benefit from it because the resulting delay alleviates your own time pressure.” (technician and trade union delegate, FR-PARTS 2).

While there was no evidence of work intensification in UK-PARTS, it was felt in both France and Sweden, but once again ostensibly to a lesser extent in Sweden.

“Work intensification is not only due to the decrease in staff [in particular but not only in support functions]. It is also a consequence of the tightening of the deadlines [...] The main objective is not technical anymore, it is just the deadline you have to meet [...], with the correlative risks in terms of quality and clients’ dissatisfaction [...]. Nowadays, the deadlines are so short, that the worker often says ‘OK, I sacrifice this or this in order to be able to meet the deadlines [...]. And the workers are not happy with this.” (technician, trade union delegate, FR-PARTS 2).

Outwardly, the way lean has been implemented in France does not appear very different from the Taylorist form, which, in a way, may appear as a specific form of such a lean. This was expressed by an operator in Division C of FR-PLANE, where the so-called “pulse” assembly line had been introduced:

“It even happens that operators say ‘I am doing shit’.... More often: ‘I don’t have time enough to make good work’; this feeling of not doing their work properly [“selon les règles de l’art”,

literal translation: "according to the craft rules"] is spreading. But management does not care: 'we do not need 'over-quality', as long as quality targets are met [according to the indicators].'
" (operator and trade union delegate in Division C of FR-PLANE).

In the UK, any decreases in job discretion and autonomy resultant from the monitoring and standardisation process associated with lean was mitigated by the small size of the company and the fact that the company had minimised automation in order to retain the craft-like, hand-made production process. That is, while the output was carefully monitored, the actual work tasks themselves remain highly skilled.

In France, the monitoring and standardisation process associated with lean was thought to have led to decreases in job discretion and autonomy at all levels and for all occupations. For managers, the new work organisation seemed to have resulted in contradictory requirements. On the one hand, because of the increasing workload associated with reporting activity, managers now spend less time with their team. The inflation of indicators has partially crowded out the 'interactive' monitoring role of managers (i.e. the human interactions with their subordinates) with some evidence of a de-humanising effect on work organisation:

"Before [the new 'lean' based organisation] we did not have all these formalised tools; we interacted more directly with the managers, the human dimension was much more important." (Team Leader, FR-PARTS 1).

There is a contradiction here, as at the same time, managers are increasingly expected to improve their leadership by improving their social/soft skills. As pointed out by a French trade union delegate *"To become a manager, what is required now, is leadership"* (engineer; trade union delegate at company level, FR-PLANE). To get promoted into a managerial position, workers have to progress through an increasingly formalised assessment process. Acquisition of new 'leadership' competencies now deemed necessary for internal promotion are difficult for operators or technicians to acquire on-the-job. Internal promotion is frustrated further because AeS firms are looking to the automotive industry as an external source of managers who have 'lean' technical competencies.

Here again, there is a contrast with the Swedish cases, where no complaints emerged about the role of managers. Quite the contrary, as managers, team-leaders and operators all seemed satisfied with the new organisation in terms of hierarchical relations and associated coordinated outcomes. In SW-PARTS, employees, in particular, were satisfied with the implementation of the team leader position (filled with former operators) (Ahlstrand, 2017b). For instance, an operator and blue-collar trade union representative noted that the existence of team leaders made it:

"...easier to find the person that can answer your questions. Before, it was just one person [the production leader] for all of us. Now, you can get hold of the team leader, fast, and he can take your question further, if you don't have time to chase somebody responsible for the thing you want to ask about. It's really good, I think." (operator, SW-PARTS).

In UK-PARTS, 'lean' was used in combination with continuous improvement in the labour process to improve delivery of contracts on time without any missing articles (Wright and Green, 2017). Prior to re-organising the layout of the shop floor arranged around a new model of training/mentoring, the company had a relatively serious problem with meeting delivery of contracts, where on time in full delivery (OTIF) was at around 80 percent. When an external consultant with experience in advanced automotive

manufacturing was brought in, it very quickly became apparent that improving OTIF and defect rates (non-conforming parts) was going to be less about technological innovation (via 'lean') and more about looking at ways to improve the way work was organised. The company moved closer shifted more of a 'learning organisation':

"So because it was such a manual operation [...] I can't tweak a machine or turn something ... you have to try and manage people [...] There were lots of screens about [...] I was trying to pick out what the right data was and what it was telling me [...] So I felt that there was an over-focus on maybe, the IT side of things showing things on screens when what was needed was communicating with the people." (senior consultant, Manufacturing Technology Centre, UK-PARTS).

Overall, the impact of lean on JQ (in terms of work intensity, stress, job discretion, autonomy, involvement and overall job satisfaction) seemed more negative in France than in Sweden and the UK. As pointed out above, even if lean elements were present in all the cases, the Swedish cases and the UK case were closer respectively to the 'learning' and the 'simple/traditional' forms of organisation. The lower JQ in France is coherent with the results of Lorenz et al. (2004), who found that 'lean' dominant types of organisations were correlated with a lower level job satisfaction than the 'learning' and the 'simple/traditional' types⁷. This may be reinforced by the particular form of lean that tends to be implemented in France: in a way (even if it is much worse in many other companies, and other sectors), the three French cases illustrated, with more or less accuracy what Daniellou (2015) labelled as the "*lean à la française*" - what we called the "technocratic lean": "The background is centralism, deeply rooted Taylorism, poor and conflictual social dialogue, little listening to the workers' opinion, scarce worker participation to the design processes, little concern about working conditions [...] While filling in the tables, the management is not in the field to listen, understand and solve problems. Reality is considered to be what indicators describe [...]" (Daniellou, 2015: 18-19). This echoes with a remark of the former director of Division A in FR-PLANE (who introduced the "liberated company" experiment – see below), that too often in France, lean was implemented forgetting one key dimension of the initial Japanese model – i.e. the workers' involvement. In contrast, this dimension seems to have been taken into account considerably more in the Swedish form of lean. The empirical evidence from the two Swedish cases of our sample were coherent with other empirical findings. For example, based on a large sample of Swedish manufacturing firms, Eklund et al. (2015) found that there were some significant variations in the implementation of lean, but that on average, while there was some evidence greater stress and repetitive work, there was also evidence of improved working conditions in terms of participation, learning and development. This is in line with most of the studies on lean pointing out both positive and negative effects by lean for the employees (Brännmark and Eklund, 2013). Here, it should also be said the implementation of lean has raised fewer criticisms in Sweden than in other countries. It seems that the main reason is the Scandinavian way of implementing lean, based on a tradition of collaboration with (strong) trade unions and an interest in the socio-technical aspects of work organisation (c.f. Sederblad, 2013, Brännmark and Eklund, 2013; Eklund et al., 2015).

⁷ In particular job stress ("Work to an intense pace", "Working to sharp delays", "Insufficient time to complete job") is more widespread in "lean organisations" than in "learning" and "simple" organisations (Lorenz et al., 2004: 20, table 8).

4.2.3 In search of innovative workplaces

A key problem with the ‘technocratic’ form of lean is that it has a negative impact on the innovative capacity of organisations. More precisely, this form may be coherent with the ‘*Science, Technology, and Innovation*’ mode of innovation (STI-mode), according to the distinction made by Jensen et al. (2007), that gives main emphasis to promoting R&D and creating access to explicit codified knowledge. But it is much less compatible with the other innovation strategy labelled the ‘*Doing, Using, and Interacting*, (DUI)’ mode. The DUI-mode is more decentralised and greater emphasis is placed on the role played by informal communication and communities of practice as mechanisms for mobilising tacit knowledge when problem-solving and learning. This ‘learning’ type of organisation is much more compatible with the DUI-mode.

Jensen et al. (2007) found that firms using mixed strategies combining both modes of innovation excelled in product innovation. For the AeS industry, in a context where no radical innovation in products had occurred in the two past decades – and none was expected in a near future (see section 2.2.1 above) incremental innovations in *products* and *processes* have become a key challenge. Moreover, organisational change appears to be a necessary pre-requisite for firms that do not currently have a system of work organisation that is compatible with the DUI-mode. In other words, ‘Taylorist’ and ‘technocratic lean’ firms need to move towards becoming more ‘learning’ types of organisations. In doing so, they will be better able to build *innovative workplaces*.

The DUI-mode may be seen merely concerned with fostering ‘participative innovation’ - making innovation everyone's business. One apparent paradox was that instruments to foster innovation from the bottom-up – such as suggestion boxes, contests and awards for the best innovation (of any kind) – were widespread in the three French cases yet absent in the two Swedish ones⁸. These instruments, even if ‘bottom-up’ were formal and vertical, coherent with the ‘technocratic lean’ mode organisation (even if most of them existed before lean was implemented) and with the ‘STI-mode’ (as innovations had to be validated and codified at central level). They did not correspond to the DUI-mode of innovation – which does not rely on such formal devices, as illustrated by the more informal discussions based “*innovation as part of the daily work*” that was evident in the Swedish cases. The instruments were formal, not only in the sense they were bureaucratic procedures, but also because they equated to pure formalism in some case – evidencing the gap between managerial models and rhetoric and the reality of work activity; something commonly found in the ‘technocratic’ form of lean (Daniellou, 2015). This was well illustrated by FR-PARTS 1: there were forms to fill-in to make suggestions, and employees were required, in their annual assessment, to have made at least two suggestions a year. So they filled the forms, even if they lacked real valuable ideas, and even if they knew it was pointless, as they rarely received feedback from management (team leader, FR-PARTS 1) (Gautié, 2017b). In FR-PARTS 2, ‘participative innovation’, as it was labelled by the firm, seemed to work better, at least at white-collar level (Gautié, 2017c). As pointed out by an engineer, who had worked in other companies before joining FR-PARTS 2, “*there is real promotion of innovation in this company, it is not the simple ‘suggestion-box’ system with very few implementations as in some companies*”. The promotion of bottom-up innovation was seen as important because “*innovation does not come necessarily from the top, from the big heads (“têtes pensantes”), it may come also from the workshop level, where very good ideas can emerge to solve problems and improve processes*” (idem). Still, in the same company, a tension remained between the STI-mode and the DUI-

⁸ It is worth noting that In SW-Plane, an attempt to introduce suggestion- boxes had occurred several years ago, but their importance had faded away according to an interview with a blue-collar trade union representative.

mode of innovation. The former was illustrated by the fact that management greatly encouraged patent creation every time an innovation could be formalised. Beyond this kind of formalisation, the label of "innovator" was attributed to those who had found a solution to a big and well identified problem, while the informal, daily problem-solving activity (i.e. the DUI mode) was understood merely as normal improvement. As pointed out by a technician, *"in this system, you value more those who solve problems once they have appeared, than those who make a great job in anticipating problems, and who intervene before the problems have emerged"* (technician, FR-PARTS 2). Overall, even if FR-PARTS 2 seemed much closer to an innovative workplace than FR-PARTS 1, the Director of innovation and industrial performance was convinced that deep organisational changes were required.

One problem was that organisational changes were still often considered just a necessary way of increasing *static* efficiency by cutting costs. This may explain why the 'waste hunting' brought by 'lean' (as it was mainly interpreted) was popular in the French cases. This is consistent with the short-term, cost-cutting oriented notion of innovation (of any kind) that was dominant in the 'suggestion box' systems in FR-PARTS 1 and FR-PARTS 2. For instance, workers had to indicate how many Euros they thought their idea could bring to the firm. Still, an increasing number of workers, trade union representatives, and managers had become more and more conscious of the challenge of changing organisation for increasing the *dynamic* efficiency through innovation – even if not expressed in the terminology we use here – in other words, to make an innovative workplace. At least at management level, the rhetoric about the endeavour to increase worker autonomy and their innovative capacity was not rare – with even sometimes an explicit reference to the English term of 'empowerment', for instance by the Director of one production unit of FR-PARTS 1 (Gautié, 2017b). It is striking to observe how the management discourse sharply contrasted with workers' opinion about effective participation.⁹ In FR-PARTS 1, a technician complained bitterly:

"Even us [technicians] are often not consulted. The message seems clear: we are not intelligent enough to understand, and we are unable to bring anything to the firm." (technician and trade union delegate, FR-PARTS 1).

Beyond the issue of participation through effective consultation, workers' involvement was also negatively impacted by work organisational factors. At shop floor level, the process of standardisation had eliminated some of the 'craft' dimensions of the job - i.e. autonomy and job discretion, based on the mobilisation of experience accumulated with on-the-job training, often tacit knowledge, and the capacity of solving problems by 'do-it-yourself' methods ("*bricoler*", in French). The new forms of mobilising the operators' suggestions via formalised 'meetings' or with formalised tools (e.g. suggestion boxes) was supposed, in the managers' view to replace the daily on-the-job creativity by more effective procedures. But it was not the case according to the workers: this informal daily-creativity was still necessary, but, lamentably, was displaced by standardisation and work intensification.

⁹ Note that this situation was very similar to the one found by Danford et al. (2004), in a big AeS British firm. High performance work systems (HPWS) practices had been introduced with a strong emphasis on "workplace partnership", with weekly team briefing sessions, groups of employees attending monthly business communications sessions with unit directors, and employees (indirect) participation on a company council. Still, there was a sharp contrast in this firm between the management's rhetoric and the formal procedures on the one hand, and the widespread workers' feeling of not being really consulted on the other hand. Like in our French cases, the HPWS implemented was closely articulated to lean procedures part of the "cost-cutting regime" (Danford et al., 2004: 17) adopted by the firm.

"There is a loss of innovation [...] you don't have to think, you just have to follow the instructions [...] the autonomy of workers has reduced, and correlatively, their capacity to innovate. It's those who make the product who can contribute to ameliorate it. It's the entire chain of competencies which is important, from the engineer to the operator [...] To compensate, monthly meetings have been introduced, and suggestion boxes [...] but it does not replace the good way: making improvements by mobilising the workers' intelligence on his job [...] [the new process] is Taylorisation [...] But they are mistaking: here [in aeronautics], it is not like the car industry. You need the know-how [savoir-faire] of workers." (operator and trade union delegate, FR-PLANE).

Moving beyond the managerial rhetoric, some effective organisational changes have taken place very recently (starting the year before our study), such as in two Divisions of *FACT 1* of FR-PLANE (Gautié, 2017a). Senior management at both the company and factory level were conscious that the current work organisation was not satisfactory; that it was negatively impacting job satisfaction and that it was an obstacle to the emergence of an innovative workplace (even if this phrase was not used). The results from 'engagement' surveys and 'job satisfaction' surveys that had been carried out at both company and factory levels had highlighted these problems.

"The engagement surveys [at company level] were carried out during three successive years, from 2012 to 2014. The results were not very good [...] Employees had the feeling they were not sufficiently listened to, that their innovative capacity, in a way, was not sufficiently taken into account [...] the feeling of being a bit overwhelmed by bureaucracy [...] Some responses traumatised top management, such as, if I make it short, 'I don't always understand what I do, but I am asked to do it.'" (manager and trade union delegate at company Level, FR-PLANE).

In *FACT 1*, working groups on 'quality of life at work' were put in place after the first wave of the survey, and some small changes had been carried out. But two years later, in a new wave of the survey, job satisfaction had not increased. The management realised changes had to be more profound. This coincided, more or less, with a 'learning journey' organised by the local cluster in the Silicon Valley, in which the director of *FACT 1* participated. He was really impressed by what he had seen and when he came back, "he told us "we are completely cheesy! We definitely have to innovate" (paraphrased by HR Manager, *FACT 1*, FR-PLANE). The initiative clearly came from the top. The director of Division A at that time was a key actor. The surprising thing is that apparently he did not have the characteristics of a radical organisational innovator: he had worked in the firm for more than 20 years, and was a very good illustration of the traditional manager – very authoritarian with a top-down style of management. But his legitimacy was high because of his technical competencies. And he was conscious of the limitations of existing organisations and the associated way they were managed. In particular, he was convinced that, according to his own words, "social innovation is as important as technological innovation", and even more that "social innovation pre-conditions technological innovation". He was impressed by experiments implementing the "liberated company" concept¹⁰. The basic idea was that a high degree of

¹⁰ The concept was put forward by Isaac Geetz, a professor of management based in France. According to Geetz "A 'liberated company' is one in which the majority of employees have complete freedom and responsibility to take actions that they – not their superiors or procedures – decide are best for the company's vision. Unlike architects who define a bridge by its function of allowing passage over an obstacle rather than by a set of its features, managers often struggle to conceive of an organisation by its function rather than by a model. The first lesson from companies in which employees enjoy freedom and responsibility of action is that workers really do their best for their firm [...] The second lesson from liberated companies is that employees embrace freedom and

decentralisation and strong empowerment of employees could impact very positively on job satisfaction, involvement, and therefore the innovative capacity of workers. But to implement this, it was necessary to "*blow-up the codes*" - i.e. to change radically the work organisation.

Beginning in 2015, working groups of operators and other employees - without any managers - were put in charge of making proposals. After this, big changes were introduced in Division A. The number of managers was drastically reduced from 18 to 7, and the remaining 1st tier of management was elected by the employees. The Division was divided, according to the different stages the assembly process. The result was seven "mini-factories", each with its own support functions (quality, logistics, etc.). Previously production and support functions were separated into different divisions. Each "mini-factory" had their own budget and profit and loss account and they were afforded a high degree of autonomy in decision-making (concerning purchases, work and working time organisation, etc.), with democratic procedures (such as how workers are consulted) (Team leader, Division A). A "workshop for the operator" was been put in place to provide a forum where they could make suggestions that were then directly tested and implemented. Along the same lines, changes were also introduced in another Division (Division B). Concerning autonomy, participation in decision making, and the changing role of managers, the daily 'kick-off' meeting SQCDP (see above) was now managed by the operators themselves, where it was previously the (top-down) responsibility of the managers. The new organisation was also based on greater multi-tasking and multi-skilling, and this shift was facilitated by an increase in training. A number of functions that used to separate under the old structure were merged into multi-functional teams to facilitate the co-ordination. Taken altogether, these changes in the two Divisions could be classified in terms of a shift from a classical 'lean' to more of a 'learning' type of organisation (as defined above).

As these changes were very recent (and remained on-going) their impact was not easy to assess. According to the managers in the Divisions where these changes are underway, the first results have been promising. In Division A – according to its director at that time, during the first year of implementation, productivity increased by 10 per cent and the number of employee initiatives increased five-fold. In both Divisions, the rate of absenteeism decreased drastically (down to 1.1% in Division B). This decrease in absenteeism was also linked to an increase in monitoring of fake sick leave. On the employee side, job satisfaction seemed to increase for many because they felt more autonomous and recognised: "*Before, we just executed; now, we think to make* (Operator, in Division A of FR-PLANE, interviewed in the video internal to the company, on the 'liberated company' experiment). It must be said that some of the union delegates were more critical. According to them, some workers felt 'lost' in the new organisation. All in all, in their view, the 'liberated company' experiment was construed as just a new way to cut costs evidenced by a reduction in the number of managers, intensifying work through requiring more engagement and through fostering peer pressure in autonomous teams.

4.3 The role of contextual factors in the making of innovative workplaces

4.3.1 Accounting for differences between workplaces: the role of economic factors

Other factors may impact on the capacity to transform in innovative workplace, and in particular to establish a positive interplay between organisational innovation and JQ.

responsibility of action because their psychological needs are met. These needs are: respect, trust, self-realisation, and self-direction." (Isaac Geetz, "What can 'liberated companies' teach HR?", blog, December 16, 2016).

As highlighted in section 2.3 above, our method for selecting case studies was based on an underlying assumption that a firm's position in the supply-chain was likely to matter. This revealed itself to be true. The margin of manoeuvrability appeared higher in big OEMs (such as FR-PLANE and SW-PLANE), as well as in strategic suppliers as UK-PARTS and, to a lesser extent in FR-PARTS 2, who also specialised in making very specific parts. The competitive pressure appeared to be somewhat higher in FR-PARTS 1 and SW-PARTS that had to cope with big pressure from their respective OEMs, with less bargaining power than UK-PARTS and FR-PARTS 2.

FR-PARTS 1 was particularly illustrative of the difficulty, maybe aggravated in the French context of poorer social dialogue, to move towards a work environment based on higher worker involvement and better job satisfaction (Gautié, 2017b). As we noted above, though, management was conscious of the need to move forward from the discourse and management rhetoric around autonomy and 'empowerment'. Still there was a sizeable gap between management rhetoric and the reality experienced by workers, in particular the frustration of not being listened to. The trade union delegates themselves acknowledged that part of the problem was that the firm was under immense pressure from its client (starting with FR-PLANE) and uncertain demand for its products. Hence the short-term focus on cost reduction. This pressure has resulted in a very restrictive wage policy where there have been very few increases in recent years. This has contributed to high labour turnover and a corresponding hiring of a lot of temporary workers (up to 45% of the workforce). Another strategy that has been employed to cope with current pressures has been the adoption of new technologies that were meant to bring about a significant improvement in productivity; as rather than to foster incremental innovations. Beyond the constraints induced by a particular competitive environment, this raises a more general issue addressed by Danford et al. (2004): when the main objective of organisational innovation such as the implementation of high performance work systems (HPWS) practices is cost-cutting, 'workplace participation'- meaning effective consultation and associated higher worker's involvement and commitment - may remain just a rhetoric.¹¹ Note that this echoes with one union delegate's remark in FR-PLANE – "*what they call organisational innovation, we call it cost-cutting plans*" –, according to whom the promotion of worker's involvement was just a way of eliciting more productivity and increasing work intensity.

Conversely, less pressure on the demand-side may allow the space for organisational innovation promoting innovative workplace based on effective participation. The Division of *FACT 1* of FR-PLANE where the 'liberated company' experiment first took place had specific features including very long lead times between when the client's order are first placed to final delivery, and stagnating productivity combined with stagnating production levels. These features made it easier to try radical innovation, as the demand-side pressure was lower than in other divisions that were faced with a rapid ramp-up in production. Another important feature was that the aircraft for which Division A produced segments was a mature product. This meant that no major product and process innovation would occur at this stage of the product lifecycle. Most innovation typically occurs in the early stages of the product life cycle. We therefore can assume that while the STI mode of innovation (i.e. based on R&D) is very important during early stages of the product life-cycle, the DUI mode becomes progressively important as the product matures. Under this scenario, incremental innovations by way of continuous improvement are the main (only) way to increase productivity and quality, therefore providing a strong incentive to make organisational innovations.

¹¹ In the British AeS firm studied by Danford et al. (2004), HPWS practices were introduced in a context of downsizing.

Other production constraints may have also played a role. Across all countries and cases, workers (in particular, operators) often referred to the automotive industry as a (negative) benchmark in terms of JQ, in particular, working conditions. Production in AeS involves much smaller batches and the work is more craft-like. This contrasts to mass production and Taylorisation; both of which are prevalent in the automotive industry. For instance, in SW-PLANE, the cycle times for individual tasks varies from 2 hours to about 60 days compared to an average 2 minutes in a standard automotive assembly line (Ahlstrand, 2017a). In UK-PARTS, the workers hand-make around 50 parts a day, while CNC machines can produce 240 parts per minute (Wright and Green, 2017). Because the number of parts UK-PARTS makes for its suppliers is generally very low (i.e. 10 or 20 parts per order) and because they need to be made to very high specifications, some of the potentially negative impacts on JQ (such as work intensification and reduced variety of tasks) have not – and may never – fully come into play. Even so we saw that with the increase in the scale of production, certain forms of Taylorisation could also become viable in AeS companies (Division C in FR-PLANE). Taylorisation may also be seen as an extreme case of process standardisation as observed in both UK-PARTS and SW-PARTS.

4.3.2 Accounting for differences between countries: the role of cultural background

We emphasised in the introduction of this chapter that the aim of our study was not to carry out a systematic comparative study. Still, some country specific features have surfaced, in particular when comparing the French and Swedish cases – e.g. in the different ways both how lean and organisational change were implemented. Before addressing important institutional factors such as the role of unions (next section), some background characteristics, that also contribute to shape country specific institutions, may be referred to as general ‘cultural factors’ – defined here as deeply rooted patterns of feeling, thinking and behaving shared by members of a given country.

Comparative cultural studies have pointed out that France, among advanced industrial countries, is one of the countries where hierarchy and social status play the largest role, in particular in work relations within organisations (see for instance Hofstede, 1991). D'Iribarne (1998) has highlighted cultural differences between France and Sweden when studying the interactions between negotiating teams from two companies (one French, the other Swedish) where they intended to merge but eventually did not. In France, vertical coordination was central, and the manager was the boss when taking the final decision. His legitimacy was derived not only from his status but also from higher technical skills. This element appeared to be a very important element on the French side. During meetings, the French team drew upon a large body of documents with formalised information (figures, graphs, etc). In contrast, there was a much more horizontal, decentralised and informal approach on the Swedish side. The manager played more of a facilitator role to bring about a common vision within the team and where possible, consensus decision-making was preferred. For this purpose, personal experience was more important than technical skills and the mobilisation of formalised data. But according to the Swedes, this cooperative mode of functioning was not adopted by the French: *“French don't cooperate. Cooperation in France only means working on the same issue, but not sharing and helping one another”* (D'Iribarne 1998: 96). These features are quite consistent with our findings. In the French cases there was a greater emphasis on the ‘technocratic’ approach and this seemed to articulate well with the domination of the STI-mode of innovation. In contrast, in Sweden, the balance was more in favour of more decentralised and informal approach that articulated well with the DUI mode of innovation.

These features may be of particular relevance to our cases because of some specific characteristics of the AeS industry. In France, at least in the large companies of the sector, an elite class of engineers, graduates

from the most prestigious *Grandes Ecoles* (Polytechnique, Centrale, Supaéro) used to play a key role, from R&D to top management positions, including CEOs, with scientific and technological skills being the key elements of legitimacy of power and hierarchy within the organisation. This has contributed to the ‘technocratic’ way of functioning – for better or worse. In the recent years, economic constraints and organisational concerns have led to increasing differentiation between technical expertise and managerial skills. At this point in time, the functioning of these companies remains highly influenced by the culture that has been adopted by this specific group of elite engineers.

4.3.3 Social dialogue makes a difference

One important variation across the countries in our sample relates to social dialogue. We could expect differences, as the three countries, as mentioned in the introduction of this chapter, were chosen as illustrative of three varieties of capitalism where there are noticeable differences in terms of industrial relations. The liberal UK and the coordinated Sweden are the two extreme and opposite cases - both in terms of union density and coverage by collective agreements. France is somewhere in between, with low unionisation in the private sector (about 5%, i.e. even lower than in the UK), but high collective agreement coverage (more than 90%, as in Sweden), but with strong specificity too, concerning the key role of the State in labour relations. The AeS industry has some specificities though, as it tends to be more unionised than the average in the private sector in both France and the UK also because they are many big companies. Still, in the UK case (UK-PARTS), there was no union representation with small firm size being a key factor (although there is some union participation at the level of the regional aerospace alliance). Unions were present in all of the French and Swedish cases, at both company and establishment level (even if more recently in SW-PARTS, see below). This provided an opportunity to analyse their role in the organisation in any organisational changes, both in terms of potential facilitators of (or barriers to) innovation and potential mediating factors in terms of JQ outcomes.

Once again, there were some similarities between the French and Swedish cases. In terms of institutional background first: in the two countries, rules and/or institutions give some power of control to the unions in terms of working conditions and organisational changes that may impact on them. In France, two bi-partite committees play an important role at company level (in companies of 50 employees or more). In the event of the introduction of new technologies, the *Work Council* needs to be informed and consulted beforehand if these changes are likely to impact on employment, skills, wages, training or working conditions. But there is also a specific committee, the *Health and safety and Working Conditions committee* (*Comité d’hygiène, de santé et des conditions de travail*, CHSCT) which deals with health and safety issues. This committee must be informed prior to any decision likely to alter working conditions or safety - either technological or organisational change. In Sweden, in cases of organisational change, the bi-partite relationship between an employer and the trade unions is regulated by the Co-determination Act, in particular concerning information employers are obliged to provide to trade unions. The Act stipulates that employers bound by collective agreements have to inform and consult trade unions on any important change in the company that will impact on employees. It is also mandatory for establish a health and safety committee in all companies with more than 50 employees. The committee is comprised of representatives from local trade unions/the employees and the employer, plus locally appointed safety officers. Some similarities were also due to our specific cases: FR-PLANE (*FACT 1*) had an estimated unionisation rate of about 80 per cent with relatively good social dialogue - i.e. features that are much more common in Sweden; conversely, up to very recently, SW-PARTS had no union representation - which is more common in France. Still, there were key differences in social dialogue practices that affected the role played by the union during organisational change.

A key feature of the French system of social dialogue – well illustrated by the three cases of our sample - is its high degree of formalism – as both the process and content of collective bargaining is highly institutionalised by legal rules. This prevents informal interactions between management and unions. Another associated feature is that unions are divided, with different ideological backgrounds, and compete for members and support at professional elections as they represent all occupations, except one which has only white-collar members. In the three French cases, for instance, there were at least four unions represented at establishment level (5 in *FACT 1* of FR-PLANE). As a consequence, unions' behaviour tend to be strategic, some adopting radical positions to appear as the best defenders of workers' interests. Social dialogue may sometimes transform in a pure role-playing game, which is closely connected to its formalism. A defensive stance of unions can help explain the often low quality of social dialogue. And a vicious cycle can emerge whereby managers try to by-pass unions because they anticipate negative attitudes. This only reinforces the technocratic management approach that is typified in France. The defensive union attitudes can also leave with the sense that unions are opposed to all change, and therefore, that they have a negative impact on innovation.

All these features were well illustrated by the 'liberated company' experiment in FR-PLANE (see above). The HRM of *FACT 1* acknowledged that she had not consulted the trade union delegates before launching the experiment, but also that it had been probably a mistake (Gautié, 2017a).

"When I look back, my main regret is that we did not consult the unions enough in the early stage of the experiment. But it was difficult to do so, because our system of consultation [i.e. with the Works Council and the Health, Safety and Working Conditions committee – CHSCT] is highly formal. Our innovation was radical, and we did not know exactly where we were going [...] for many questions raised by the unions we did not have the answers during the early stages [...] But this was maybe a mistake, because several unions felt very suspicious, and even opposed the process, as they were not really part of it [...]" (HR manager of FACT 1, FR-PLANE).

Trade union delegates refused to participate in the working groups put in place to launch changes in the organisation including refusing to attend weekly employee debriefing meetings that were put in place to inform the employees in the early stage of the experiment.

The context seemed different in the Swedish cases. Unions were not divided (even though there are separate unions for blue- and white-collar workers), and both formal and informal social dialogue was more consensual, such as in SW-PLANE. In this company, there were some complaints (Ahlstrand, 2017a). Trade union representatives said they would like to "get into discussions on change processes earlier" even if they seemed to be unsure of how to do this:

"We've never tried to run this upwards. We've just emphasised, and said that we want to be involved. It's of course due to ourselves, we have not chosen to fight, and so. The company manages and distributes work, and we need to have respect for that, but perhaps we are selling us too cheaply." (trade union representative, SW-PLANE).

Beyond the numerous official meetings, the union representatives took part in many decisions and discussions on production questions at firm level. A lot of production questions were settled informally. For example, managers and trade union representatives were actively involved in jointly adapting the implementation of 'lean' to the firm specificities.

In SW-PARTS, both blue-collar and white-collar workers felt the need to have input into the new working environment, in particular with regard to implementation of the new work organisation (also connected to lean - see above) (Ahlstrand, 2017b). In 2016, blue-collar workers started an IF Metall club (union density: 80 per cent), and in 2017, white-collar workers similarly formed a trade union club (union density: 75 per cent). The reasons prompting establishment of local union clubs were put down to the increased workload and deterioration of the psycho-social working environment:

"At times, it can be extremely stressful. The psychosocial environment is very tough, I think. I know that some, here, are very stressed. It's something we have to work with". (technician, former operator, SW-PARTS).

Strategies for dealing with the working environment were under way. For instance, the trade union clubs, with support from the company, were planning to get their safety officers to do inspections with focus on the psychosocial working environment. Another area was work life balance, as employees had difficulties relaxing outside of work because of the pressure being placed on them from management and work intensification. Overall, company expansion and organisational change has altered relations between the employees and the company, with it becoming more formalised. Interestingly though, management was pleased about the establishment of the trade union clubs as they saw them as a mechanism to facilitate employee participation in production issues and an as additional communication channel. This is further evidence of the facilitating role played by Swedish unions during the adoption of changes, and their potential power to help to move from what could be a 'lean' organisation to a more 'learning' one.

To summarize, it seems that in France, unions adapted to the top-down 'planning and control' mode of organisational change by intervening *ex ante* often by opposing plans and *ex post* by denouncing in formal arenas any decisions as dysfunctional. In Sweden, both informally and informally, unions were more part of the 'process and learning' mode of organisational change - see section 4.2.1 above. Formally, in accordance with the law, trade union representatives were informed and consulted on any important change in the company that could impact the employees. Informally, the representatives took part in many decisions and discussions about production questions at the firm level.

5 Concluding remarks: some lessons for the understanding of the Innovation-JQ-Employment nexus

Our findings shed some light on the potential consequences of technological changes (mainly innovations of process).

- Some of these changes impacted significantly white-collar workers, such as the implementation of 3D Computer-Aided-Design. The introduction of 3D CAD was a good illustration of 'age-biased' technological changes, as it required not so much 'higher' competencies than rather 'new' ones, where these new competencies were more likely to be held by newer entrants to the labour market. The consequences on employment were mediated by managerial choices - the renewal of generation implying a decrease in the share of older workers was more rapid in the French cases than in Swedish ones – also influenced by institutional context - e.g. the use of early retirement schemes in France. The implementation of 3D CAD also had consequences in terms of reallocation of tasks within the chain from R&D and design to manufacturing and assembling, with a squeeze on some intermediary functions. It also contributed to the reinforcement of the interdependence between the different

functions and stages in the chain, with some work intensification and stress, maybe higher in France than in Sweden and the UK.

- Computer Aided Manufacturing and automated processes - covering many kinds of devices, from CNC machines to robots - impacted blue-collar workers. The use of CNC machines had ambiguous effects in terms of JQ, as it increased the quality of the work done and required new skills, but also because it transformed the work activity by putting more emphasis on ‘controlling’ and less on ‘making’, with negative impact on the ‘craft’ dimension of the job. This raised issues in terms of interest for the work, and overall job satisfaction.
- In terms of employment, our results shed light on the debate about the potential effects of automation (see in particular Frey and Osborne, 2013, and Arntz et al., 2016). In line with Arntz et al., op.cit., we confirm that in a given occupation (i.e. skilled operator in the AeS sector) there can be an important variation in the bundle of tasks associated with corresponding jobs. It depends on technico-economic characteristics (e.g. small batches of complex parts vs big batches of more standardised components), but also on organisational choices. The automatability of jobs was not only limited by the nature of tasks (i.e. too complex tasks to be automated with current existing technologies). The spread of robots had also been limited so far in many AeS firms for economic reasons, but also because too much automation could have negative consequences on the capacity for incremental innovations through the ‘*Doing, Using, and Interacting* (DUI)’ mode of innovation, which relies on human learning that cannot be replaced by data processing. Still, we have some evidence in our sample that automation seems to have impacted negatively on the share of blue-collar workers.
- In terms of social inclusion, the automation (robots being the last step) have not been systematically ‘skill-biased’. In some firms, new processes have clearly increased the requirements in terms of skills (educational credentials and/or experience), but it was less the case in others. This may have consequences in terms of the distribution of the ‘4 S jobs (see Warhurst et al. 2016)’ – i.e. ‘*stepping stones*’ jobs (that offer entry into paid work); ‘*sticky*’ jobs (that offer sustainable employment); ‘*springboard*’ jobs (that offer routes to better jobs either within internal or external labour markets); ‘*stretchy*’ jobs (that offer work and employment that extends working life). Firms where technology has increased requirements were already employing highly skilled operators; in these firms, there were few ‘stepping stones’ for vulnerable groups such as unskilled youth, long term unemployed or (im)migrants; meanwhile increased skills had probably reinforced the ‘*sticky*’ aspect of jobs. Firms where requirements in terms of skills had not increased were more open in terms of recruitment. But they were also using more temporary agency workers (i.e. less ‘sticky jobs’). There were also concerns in these firms about a potential decrease in the capacity of upward mobility (i.e. less ‘springboard’ jobs), because of some deskilling, also induced by organisational choices (standardisation and even in some cases some form of Taylorisation)
- Digitalisation may also offer very powerful tools to change human resource management and the monitoring of work activity; empirical evidence from our sample highlights that managerial and organisation choices are key factors that mediate the potential impact on JQ. In particular, new tools cannot be used to monitor work activity very tightly, with potentially negative consequences in terms of job discretion, work autonomy and workers’ involvement.

Another important series of results concern work organisation, associated JQ, and the innovative capacity of workplaces. There was great variation in work organisation, as well as many organisational changes, recent or still ongoing at the time of our study.

- The four typical forms of organisation were present on our sample ('tradition-simple / Taylorist / Lean / Learning'); 'lean elements' were witnessed in all our cases, sometimes introduced by recent organisational changes; still there were significant differences between the way 'lean' had been implemented and was impacting on organisations. A more 'technocratic' form of lean, in particular in our French cases, also coherent with a more centralised form of organisation, with top-down 'planning and control' organisational changes, and the domination of the STI mode of innovation, contrasted with the more 'agile' form more, compatible with the more decentralised 'learning' type of organisation, the 'process and learning' organisational change, and the DUI mode of innovation, that were better illustrated by the Swedish cases and present, although to a lesser extent, in the UK case. This resulted in differences in JQ outcomes, in particular in terms of autonomy, involvement, and overall job satisfaction.
- But in some French firms, management was conscious of the limits of the technocratic form of lean organisation, because of its negative impact on job satisfaction, and, more important in the eyes of management, because it was an obstacle to the making of an 'innovative workplace'. Some organisational innovations (quite radical in some cases) were introduced to promote the latter, with attempts to move, in a way, from a 'lean' to more 'learning' type of organisation. Improving job satisfaction, and therefore JQ had been identified as a key condition for such a transformation. These organisational changes promoted worker's autonomy and involvement. Such social innovations were clearly seen as a precondition for the emergence of an innovative workplace. Even if these experiments were quite recent at the time of our study, the first results seemed encouraging.
- The nature and the role of social dialogue played an important role in accounting for differences in the making of innovative workplaces. While in the French cases, unions took on more of a defensive strategy – also in line with the more hierarchical 'top-down' organisation – , their Swedish union counterparts were playing a more informal role where they contribute to the 'process and learning' type of organisational changes. In the UK, the small size of the company helped explain why the company was not unionised, however unions play a role at the regional and industry levels, albeit less influential than is the case in France or Sweden.

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7 List of Case Study Reports and Industry Profiles

| Case studies | |
|--------------------------|---|
| SW-PLANE | Ahlstrand, R. (2017a). <i>SW-PLANE</i> . Case study report for WP6 of the QuInnE project. Unpublished manuscript. |
| SW-PARTS | Ahlstrand, R. (2017b). <i>SW-PARTS</i> . Case study report for WP6 of the QuInnE project. Unpublished manuscript. |
| FR-PLANE | Gautié, J. (2017a). <i>FR-PLANE</i> . Case study report for WP6 of the QuInnE project. Unpublished manuscript. |
| FR-PARTS 1 | Gautié, J. (2017b). <i>FR-PARTS 1</i> . Case study report for WP6 of the QuInnE project. Unpublished Manuscript.. |
| FR-PARTS 2 | Gautié, J. (2017c). <i>FR-PARTS 2</i> . Case study report for WP6 of the QuInnE project. Unpublished manuscript. |
| UK-PARTS | Wright, S. and Green, A. (2017). <i>UK-PARTS</i> . Case study report for WP6 of the QuInnE project. Unpublished manuscript. |
| Industry Profiles | |
| Sweden | Ahlstrand R. (2016). <i>Industry Profile: Aerospace Industry – Sweden</i> . Report for WP6 of the QuInnE project. Unpublished manuscript. |
| France | Gautié, J. (2016). <i>Industry Profile: Aerospace Industry – France</i> . Report for WP6 of the QuInnE project. Unpublished manuscript. |
| United Kingdom | Wright, S. (2016). <i>Industry Profile: Aerospace Industry – UK</i> . Report for WP6 of the QuInnE project. Unpublished manuscript. |

8 Annex – Summaries of Case Studies

FR-PLANE (Gautié, 2017a)

Brief characteristics of the company structure and business strategy

FR-PLANE is a big OEMs which manufactures aircrafts. The company has undergone important restructuring concerning the organisation of its production in the past 10-15 years. There was a big move towards modularisation and outsourcing of work packages. The final product (the aircraft) is now conceived as the integration of several sub-systems ("modules") that are more and more outsourced to external suppliers, as "workpackages". There has been also a tendency to reduce the number of Tier 1 subcontractors, to reduce transaction costs. In the recent years, the pressure to reduce costs and to increase profitability has been increasing. Maximising shareholders value has become clearly a priority.

Important innovations in recent past

FR-PLANE provides an illustration of the whole range of technological process innovations (often intertwined with organisational innovations). *3D Computer-aided design (CAD)* was a major innovation that took place in the late 1990s, beginning of the 2000s, which impacted mainly engineers and technicians - from the design bureau to manufacturing. It facilitated the adoption of another major innovation *concurrent engineering* (also end of the 1990s beginning of the 2000s), which led to a decrease of about 30% in the lead time of the whole production cycle, by replacing the more traditional sequential design flow. The new generation of innovation is connected to digitalisation. Digitalisation gives a boost to the gathering and treatment of information on the production process, and facilitates the "*manufacturing execution system*" (MES) - i.e. the control system for managing and monitoring work-in-process on the shop floor. Some robots have been also put in place (but few). The introduction of lean principles has also been an important innovation.

Key findings on interrelationships between innovation and job quality, employment and inclusiveness

At shopfloor level, the new processes did not induce job enrichment and higher requirements in terms of skills for operators. Many of them have the feeling of loosing skills and job discretion. The share of temp agency work is really high in FR-PLANE (more than 20% among operators), with no decreasing trend, even when order books are full for the coming years. A more positive consequence, in terms of social inclusion, is that the firm is able to hire (after an adapted training process) people with low credentials, and no background in the manufacturing sector. The standardisation of the work process has impacted all the occupations, in particular through an implementation of a quite rigid form of lean (that can be labelled "technocratic lean", inducing a "management by indicators"), which goes hand in hand with a rather "top-down / technical / one best way-no alternative" mode of innovation. Workers (even some in engineer occupations) are rather passive, and feel overwhelmed by highly formalised procedures, with a loss of meaning of their work, and the resulting decrease in engagement, as "engagement" and "job satisfaction" surveys highlighted at both company and factory levels. But (at least some) managers realised the limits of the system, and the need to move towards a more "learning type" of organisation, based on individual and collective engagement, to foster the emergence of an "innovative workplace". New forms of organisations were "experimented" at the time of the study, with promising results, both in terms of job satisfaction and innovations according to management - whereas some union delegates were more critical. The way digitalisation was implemented in one Department where this new form of organisation was introduced illustrates the fact that there is no deterministic impact of technological change on JQ, and that there are organisational and managerial choices that can make the difference. Instead of reinforcing the "management by indicators" (i.e. control and monitoring, with negative consequences on workers' autonomy), it was more used as an empowerment tool.

FR-PARTS I (Gautié, 2017b)**Brief characteristics of the company structure and business strategy**

FR-PARTS 1 is mainly Tier 1 and Tier 2 sub-contractor in the aerospace supply chain. It manufactures different types of parts and small segments, in metal or composite material. It has undergone an important development in the past two decades, to increase its size and become a key actor in the sector. Its growth was both internal and external - as FR-PARTS 1 bought several smaller firms. This was also encouraged by the big OEMs that are its main clients, beginning with airplane manufacturers that had outsourced part of their activity by selling factories to subcontractors such as FR-PARTS 1. But FR-PARTS 1 is not a "strategic partner" (as it has been labeled in this chapter - see Figure 1). The competitive pressure is high, as FR-PARTS 1 has to apply for tenders issued by the big OEMs every 3 to 5 years. If the quality of the product is important, cost is also a key issue. And OEMs put a very big pressure on FR-PARTS 1 to increase productivity and reduce sale prices. FR-PARTS 1 operates also factories in low wage countries, and the threat of offshoring is used to put pressure on its plants located in France.

Important innovations in recent past

The plant of FR-PARTS 1 on which we focused our case study has been publicised (also in the medias) as an illustration of the "factory of the future". It is indeed quite advanced in terms of last generation CNC machines, and has also introduced some robots. Concerning organisational innovations, management has been quite active in implementing lean principles. This factory was therefore quite illustrative of the main innovations witnessed in the aerospace sector.

Key findings on interrelationships between innovation and job quality, employment and inclusiveness

FR-PARTS 1 offers a good illustration of the ambiguous consequences, in terms of JQ, of the introduction of CNC machines. Some senior workers who had worked with the previous traditional mechanical machines complained about the lost of the craft dimension of their job. Some job rotation has been introduced, primarily to increase functional flexibility with the aim of reducing costs. But such rotation was made easier by the standardisation (through codified knowledge) correlative to the introduction of CNC machines and other automated processes. In this respect, job rotation could be one way to countervail the risk of boredom expressed in particular by senior workers. But it could also create more distance between the operator and their tasks, with potential negative impact on motivation and subsequently, on productivity (this was explicitly expressed by a team leader). Standardisation that made the substitutability between workers easier was also a permissive cause of the very high rate of temporary workers in the factory (25% at the time of the study, as production had decreased recently, but up to almost 40-45% among blue collars few years ago). For some unions and workers, this is a symptom of some deskilling induced by the new processes. One important reason of the intensive use of temp workers is the uncertainty concerning the volume of sales, but also the cost concern. Wages are rather low, and as a consequence, labour turnover is high, and standardisation can also be seen as a response to this situation (i.e. circular causality).

The second interesting result is that FR-PARTS 1 is also quite illustrative of the "technocratic" form of lean organisation - which is also about standardisation - and its limits, at least in terms of job satisfaction. Among the three French cases, it is the one where there was the biggest gap between management's discourse (one top manager we interviewed insisted a lot on the "empowerment" and "autonomy" of the workers) and the feeling expressed by the workers. The latter complained about the fact they were not consulted and taken into consideration. Overall job satisfaction was low, and the rate of absenteeism was rather high. But unions acknowledged that the firm had a very reduced margin of manoeuvre to introduce social innovations (or to increase wage), as the pressure from OEMs was really strong. Management was mainly focused on reducing costs, and on monitoring the production process as strictly as possible, in a top-down manner.

FR-PARTS II (Gautié, 2017c)**Brief characteristics of the company structure and business strategy**

FR-PARTS 2 is a mainly first-tier subcontractor, working for big OEMS in the aerospace industry (both civil and military), not only in France but also abroad. It is an innovation leader in composite materials and specific pieces. As compared to FR-PARTS 1, it is therefore a "strategic partner" of big OEMS. It used to be mainly state-owned 20 years ago, working mainly for the military sector, and the budgetary constraint was at that time rather low. Following increasing privatisation and the decrease in military budgets, it had to diversify its activities, and to become more competitive. Several interviewees mentioned the strong impact of changes in governance and the business model, and the increased pressure due to increased financial objectives. Priority to cost reduction, and the shortening of deadlines were the most obvious symptoms.

Important innovations in recent past

FR-PARTS 2 is a leader in the conception and the manufacturing of pieces and components in composite materials (carbon, ceramics), about which it files about 25 patents per year. These materials are more complex to handle than the metal (aluminium for instance); and their cost is much higher. Like in FR-PLANE in particular, *Computer-aided design (CAD)*. CAD was a major innovation, that appeared in the 1990s (radical innovation, but only incremental since then). A big jump was the adoption of 3D CAD (beginning of the 2000s). *Computer-aided manufacturing (CAM)* is also closely related to the same new technologies. Operators work on CNC machines, with programs which replace the implementation of written instructions. Eventually, the implementation of lean principles was also an important innovation.

Key findings on interrelationships between innovation and job quality, employment and inclusiveness

The technological change (CAD-CAM in particular) turned out to be "skill biased" i.e. requiring at least new skills (for engineers and technicians) and higher ones (for operators working on CNC machines, because they make less standardised products than in FR-PARTS 1). It was also 'age biased', as it impacted negatively older workers. The way FR-PARTS 2 reacted was influenced by both its own characteristics (high share of older workers), and the institutional context (the availability of public funded early retirement schemes). The consequence was the decrease in the number of older workers, even if other measures (training, reallocation to other services in the company) were also implemented. In terms of JQ, these changes may have had mixed impacts. Operators, in particular, are more skilled, have benefited from some task enrichment (control of quality), but may have lost at the same time in terms of autonomy, and interest in work (some lost in the "craft" dimension of the job, such as in FR-PARTS 1). Organisational changes such as "lean manufacturing" implemented since the mid-2000s - were as much important as technological ones in terms of impact on JQ. These changes were driven mainly by cost-cutting strategies, in a context where the governance of the company, as well as its competitive environment had changed. These organisational changes translated in the shortening of deadlines and in the higher integration of the supply-chain within the company, but also with its suppliers. There is a feeling of work intensification, with a correlative feeling (at least for some of the employees) of a degradation of the quality of the work done. The interdependence between workers at the different supply chain has increased, which, associated with stronger time pressure, induces higher stress, all the more that (at least some) workers consider the collective support they can receive from their work environment has decreased. Overall, FR-PARTS 2 offers also an illustration of a quite "technocratic" form of lean organisation ('management by indicators') - even if maybe less rigid than in FR-PARTS 1. But it is worth noting that management was conscious of these limits, and that a reflexion was going on about adopting new forms or organisations, relying more on workers initiatives and innovative capacities. Changing the role of managers (less technical skills, more leadership capacity) was seen as a key condition.

SW-PLANE (Ahlstrand, 2017a)**Brief characteristics of the company structure and business strategy**

SW-PLANE is an OEM of aircraft and a sub-contractor making segments for other aircraft manufacturers, and has a high degree of R&D activity. The business strategy includes the ambition to maintain a strong local presence to develop strong relationships with the customers (i.e. governments, authorities and corporations, mainly with long-term contracts), and focus on product innovation and strategic acquisitions. The entity has more than 2,500 employees, of which 30 percent are blue-collar workers. Nearly all employees are affiliated to a trade union; where union membership is 90 percent among the blue-collar workers and 85 percent among the white-collar workers. Since the end of the 1990s, the company has undergone considerable restructuring resulting in substantial redundancies having been made up until the 2010s. In particular, the company had to cope with reduced orders from the State (defence activity), and to find new clients abroad. Now, the number of employees has begun to increase in parallel with new orders. Hundreds of civil engineers have been recruited in the past four years. In the near future, the number of operators is also expected to increase.

Important innovations in recent past

SW-PLANE is highly involved in several research and innovation programmes and has introduced numerous innovations concerning technology, processes and products. In recent years, the most important innovations have been connected to the development of model based, MBD, working methods (i.e. the use of 3D digital data within 3D Computer Aided Design software to provide specifications for individual components and product assemblies instead of using 2D-drawings). The development was triggered by a management decision that large cost reductions were required, and this led to an increased focus on training. For instance, as training levels became more important, a strategic training council was set up, internal courses were developed, and workshop teachers started a new 26 week introduction course for new operators.

Key findings on interrelationships between innovation and job quality, employment and inclusiveness

The development of MBD working methods in the organisation meant innovations in working processes - facilitated by lean principles as team work and continuous improvement work - but also enabled by a production layout with long cycle times, well-developed learning opportunities, highly skilled and relatively autonomous operators. Thus, not only were the designers and the manufacturing engineers now using MBD working methods, these practices had also extended to the operators on the shop floor. The result was a change in job quality: the designer jobs became more stressful due to a lot more feedback from the manufacturing engineers on the 3D models. The manufacturing engineering jobs changed through on-the-job training in the direction of increased mental variation and greater autonomy in relation to designers and operators. Consequently, they could do computer simulations (i.e. a task that previously was meant for only designers), dig deeper into the understanding of the designer drawings and contribute more to the development of the designing work, which made it easier to develop the usability of the work instructions for the operators. In addition, the operators' job content changed. Hitherto, their jobs had been guided by 2D paper drawings in Swedish. While now, they carry out their work through computer based 3D models and detailed information in English on drilling and assembling. On the one hand, they obtained greater autonomy due to greater understanding of what they were supposed to do and because they are now less dependent on production leaders, production technicians and manufacturing engineers. On the other hand, they also became more controlled: the designing process and the 3D work instructions are more exact; the fit between different parts has become more precise, and their jobs now offer less variation due to reduced problem solving. This development did not make the company more socially inclusive of vulnerable labour market groups. In fact, the varied job content, relatively high degree of autonomy, quite specific criteria for educational qualifications, interest in young employees experienced with computers and requirements for Swedish citizenship placed obstacles in the way for recruitment of people from more vulnerable social groups.

SW-PARTS (Ahlstrand, 2017b)**Brief characteristics of the company structure and business strategy**

SW-PARTS is a family-owned company with less than 200 employees manufacturing metal parts and components for OEMs and sub-contractors in the supply-chain. The business aims to be the first choice when companies select a partner for developing new processes in the production of high technology products, and to establish long term relationships with customers, supporting them through all phases of the development and production process. SW-PARTS consists of 70 percent blue-collar workers, among which 80 percent are unionised, and 30 percent white-collar workers; where 75 percent of workers are unionised. All employees work full-time hours; 95 percent are permanently employed and less than 5 percent are temporarily employed. Concerning the education of the workforce, nearly everyone has graduated from an industrial upper secondary school. Only one employee is university-qualified. Almost all white-collar workers started out working in blue-collar jobs.

Important innovations in recent past

For a long time, the company was highly dependent on one large OEM operating in markets outside the aerospace industry. The company also had a network of smaller customers, also from outside the aerospace industry. This reliance on one large OEM and a number of smaller clients was deemed too risky. Therefore, management decided to increase its aerospace activity to further diversify its client base and production. A big step in this direction happened when it became a Tier 1 sub-contractor to a large OEM in the aerospace industry (the SW-PLANE). Since then, the company has rapidly expanded its activities and its workforce. It also began to collaborate with researchers and companies in one of the national public supported programmes for R&D and innovation, and to take part in research and training carried out by universities. This collaboration was an important reason for the decision to make large investments in CNC machines and to join The Production Leap (a comprehensive national program for implementing lean production principles in the Swedish industry). Henceforth, innovations in the labour process occurred in parallel with organisational innovations; eventually leading to a shift from a more hierarchical organisation towards a team-based organisation. Changes included the introduction of daily morning and daily steering meetings as well as creation of new team leader positions; where operators internally progressed into the team leader roles. Moreover, management systems for continuous improvement were introduced, 45 minutes once a week was dedicated to improvement activities and two new managers were appointed: an improvement manager and an R&D manager.

Key findings on interrelationships between innovation and job quality, employment and inclusiveness

In recent years, as the new innovations were introduced and the business expanded into high tech aerospace, the extraordinary high-quality demands of the new aerospace clients has seen some of the jobs become more challenging in terms of handling new software programs, implementation of simulation methods, new CNC machines, increased variation of products, but also in terms of increased participation in daily problem solving and continuous improvement work. While some of the jobs became more interesting, for operators, a contradictory picture emerged. Occurring over a longer period of time, turning and milling jobs changed from more of craft-type work into control and surveillance of the CNC machines, with operators not finding these latter jobs very demanding. Taken together, both blue- and white-collar jobs became more stressful. Consequently, the employees formed local trade union clubs to address health and safety issues as well as challenges with work life balance. Recent expansion has also meant there was a need to recruit more employees, especially welders, technicians and CNC operators.

SW-PARTS (continued)

However, these roles have been difficult to fill. Common recruitment sources such as industrial upper secondary schools, social networks, job sites and public job centres have not been sufficient. Also without success, the company tried to recruit long-term unemployed younger and older people, and migrants (i.e. people for which employers get financial compensation) from public job centres. Now, SW-PARTS collaborates with a technical upper secondary school and the state owned Lernia (i.e. one of Sweden's leading companies in adult education with vocational focus) in the hope of being able to recruit more people.

UK-PARTS (Wright and Green, 2017)**Brief characteristics of structure and business strategy**

UK-PARTS is a family-owned company with less than 50 employees. The company manufactures small batch, safety critical ‘flying parts’ for around 20 OEMs or Tier 1 companies in the aerospace industry. The company operates from a single site that sits in the supply-chain of one of the UK’s three main regional aerospace clusters. In contrast to highly automated production methods such as the use of CNC machines, products are mostly hand-made. The company uses the latest software to design and make parts. In terms of the overall picture of job quality relative to its competitors, UK-PARTS aims to be an attractive employer. Staff are paid rates that are considerably higher than the UK legislated minimum rates of pay. All staff are employed on permanent contracts and are paid ‘time and a half’ for working overtime. Workers are not employed on the basis of formal qualifications, where the company can be described as ‘making’ rather than ‘buying’ skills through on-the-job training. Because every part must be made according to very detailed technical specifications, there is limited autonomy in how the work is undertaken. Workloads are allocated and tracked via software. There was no evidence to suggest a culture of long working hours or work intensification. There was no union presence, being a small, family-owned business saw workers consulted and involved in collaborative activities.

Important innovations in recent past

While the owner does not see the business as particularly innovative, UK-PARTS has recently implemented three innovations aimed at improving the quality of its products and so that it can source new clients.

The **first innovation** can be classified as a product innovation, where UK-PARTS led a collaborative technology exploitation project to significantly improve the industry software used to design parts. Collaboration with another supplier, a specialist research institute and large end users (all members of a UK regional aerospace cluster) received a small amount of funding under an aerospace regional technology exploitation programme. Improving the software was extremely valuable, as UK-PARTS is now the only company in the world able to make fatigue predictions for these types of parts. In terms of tangible benefits, the company has increased its business orders and increased its number clients.

The **second innovation** can be classified as a process innovation. Although initially resistant to automation, cost pressures led UK-PARTS to explore whether any discrete parts of the production process could be automated. Introducing automation (CNC machines) into two of the stages in the production process will reduce production costs (albeit purchase of the CNC machine required a large initial outlay of capital) but it will not impact on quality of the existing handmade products. Furthermore, this partial automation has meant workers can retain their highly specialised skills.

The **third innovation** can be classified as a non-technological, organisational or workplace innovation. UK-PARTS has made a number of incremental changes to the labour process in order to meet industry requirements for timely delivery and quality of safety critical parts. An external consultant was brought in to look at ways to improve the production process (i.e. technological innovations). It was soon realised the problems were less related to technology and more about people. A new organisational structure was brought in along with a ‘buddy system’ on the shop floor to better facilitate skills transfer. This incremental innovation did not cost the company very much in financial terms however it resulted in a significant improvement in the company’s ability to meet industry requirements for on-time delivery and zero defects.

UK-PARTS (continued)

The incremental workplace innovation has not resulted in any major changes to the content of jobs, more of a change in the way the work is managed and how skills are transferred from more experienced to less experienced staff on the shop floor.

Key findings on interrelationships between innovation and job quality, employment and inclusiveness

UK-PARTS, led by the owner, is involved in a constant process of problem solving and continuous process improvement. Innovation is driven by an ongoing push from OEMs higher up the supply chain. Involvement in a regional technology exploitation programme demonstrates how small companies lower in the supply-chain can make significant technological advances by teaming up with research bodies, end users and external advisors. By carefully considering which parts of the production process can be automated without compromising quality, this niche manufacturer illustrated how a 'middle way' is possible that does not have a negative impact on skills or job quality. Introducing a new layer of management and changing the layout of workers on the shop floor may not seem radical, but this case study highlights how these kinds of workplace innovations are often necessary precursors for other, more radical innovations. Moreover, that workplace innovations can be just as beneficial to a company as more costly technological innovations. Careful attention was paid to retention of skills, so the innovations did not negatively impact on job quality or staffing levels. In particular, the high intrinsic quality of the skilled, craft-like work was not jeopardised through use of 'lean' principles or with partial automation. UK-PARTS provides on-the-job training and the company has shown both a willingness and commitment to recruiting workers from traditionally 'socially excluded' groups.

CHAPTER 3 – The relationship between employment, job quality and innovation in the Automotive Industry: a nexus of changing dynamics along the value chain. Evidence from Hungary and Germany.

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1 Introduction. Global Value Chain Approach and Knowledge Mobilisation

Since the last decades of the 20th century, large corporations have been speeding up the delocalisation of various business functions – both in manufacturing and service sectors – from the developed market economies characterised by higher-wages and tighter environmental controls to the developing world of Asia and the former state-socialist countries of Central and Eastern Europe (CEE) and Russia, including the former Soviet republics. Even as the positive and negative aspects of globalisation are debated in communities of academics and politicians – in reality it is extremely difficult to stop the very complex and advanced process of delocalisation of business functions driven by several mega-trends. The second section of this chapter focuses on some of these trends, namely on (1) the globalisation of labour market (i.e. Great Doubling (Freeman, 2007)), (2) ICT revolution (digitisation, automation/robotisation), and (3) modularisation of large corporations.

As a result of the advanced state of the globalisation process in various business functions, practically almost all departments/divisions of a given corporation can now be delocalised. Already at the beginning of the 21st century, this process produced an impressive result measured in terms of global spending (billion USD).

The intensification of the delocalisation process of various business functions has resulted in an “...increasing fluidity of corporation structures that has resulted from these continuous and rapid change processes has led some commentators to question whether the individual enterprises or corporation or ‘firm’ (located conventionally, in the economic statistics, within a ‘sector’) is the best unit of analysis for understanding these restructuring processes” (Huws and Ramioul, 2006:18). They conclude that an “exclusive focus on the company runs the risk of missing the most important changes which takes place...”

A recent example for this phenomenon is the rise of the so-called contract logistical services. Currently, many large OEMs tend to outsource not only those logistical services that are not directly linked to the production processes (transportation, customs services, etc.) but also those services that are provided within the factory’s premises. It often happens that the works tasks are performed by the former employees of the company, and even the tools necessary to perform the job are rented by the OEM. This has far-reaching consequences not only in terms of working and employment conditions (which are usually significantly poorer in the outsourced firms than in the OEMs) but also with regards to the statistical measurement of the sector as these activities are most typically categorised under the NACE-code 5229, that is ‘other transportation support services’.

It is therefore obvious for us to choose value chain perspective as a general theoretical framework to analyse and interpret case study experiences. In this first introductory section we will briefly present the main pillars of this framework and to overview some consequences of the globalisation of value chains on two dimensions particularly important from the standpoint of the QulnnE project: labour relations and the internal and external knowledge use of the firms.

1.1 Global Value Chains and their restructuring

Relying on the Global Value Chain (GVC) approach we may avoid the risks of misunderstanding important enabling or inhibiting factors shaping the complex phenomena of innovation and its influence on quality of job and employment in the automotive sector. What is a value chain and its globalised version in this context? The notion of value chain describes the full ranges of activities that firms and workers do to bring

a product from its conception (design-planning) to its end use and beyond. This includes activities such as exploiting new materials, design, procurement, production, marketing, distribution and after sales support services.

In a previous large international research project (carried out by a consortium of universities and research institutes from 15 countries and supported by the EU's 6th Framework Programme¹²) aimed to measure the impact of globalisation on work, we used and operationalised the following definition of the GVC: "The value chain is a phrase used to describe each step in the process required to produce a final product and service. The word 'value' in the phrase 'value chain' refers to added value. Each step in the value chain involves receiving inputs, processing them, and then passing them on the next unit in the chain, with value being added in the process. Separate units of the value chain may be within the same company (in-house) or in different ones (outsourced). Similarly they may be on the same site or in another location" (Huws and Ramioul, 2006: 19).

Using the concept of GVC, it is necessary to make a distinction between different versions of it. One should especially distinguish 'producer-driven' (e.g. automotive sector) versus 'buyer-driven' (food industry) GVC. In the first case the entry barrier is rather high because of the need for large-scale high-tech in the production involving heavy investment. In contrast, in the case of the 'buyer-driven' GVC the entry barrier is relatively low.

In the mainstream literature of the GVC, a special focus is paid on the mechanisms and processes of acquiring additional business function(s) in the production and service provision along the value chain in order to benefit from activities with higher value-added. In relation to the various forms of movement in the value chain, Smith and Pickles (2015:322) make distinction on the product, process, functional and chain upgrading: "Product and process upgrading involve firms retaining their position in a chain by enhancing productivity gains through adopting new production processes or new configuration of product mix. Functional upgrading involves a movement 'up' the chain into new, higher value added activity, such as full package and own design/own brand manufacturing (...) chain upgrading involves a movement to new activity, which may also imply higher skills and capital requirements and value added"

In preparing the theoretical framework for our analysis of the company case studies on innovation carried out in the automotive industry, we will especially rely on the GVC approach, focusing on the governance structures and the institutional environment.

Gereffi, Humphrey and Sturgeon (2005) identify three variables that play a decisive role in determining how global value chains are governed and changed:

- (1) Complexity of transactions.
- (2) Ability to codify transactions.
- (3) Capabilities in the supply-base.

The authors distinguish five ideal types of global value chain governance which range from high to low levels of explicit coordination and power asymmetry (see Figure 1). This typology is "based on the combination of three important variables: the complexity of transactions (related to asset specificity, to requirements of complex coordination and opportunistic behaviour control mechanisms), the ability to

¹² WORKS project: Work Organisation and Restructuring in the Knowledge Society (2005-2009) (www.worksproject.be)

codify transactions and the capabilities in the supply-base (the latter concept, firm capabilities mainly refers to the importance of generation and retention competences that distinguish firms from their competitors)... this means that governance models are not only 'market' or 'hierarchy' but that different forms of co-ordination can be observed: 'hierarchy', 'capture', 'relational', 'modular' and 'market'" (Huws and Ramioul, 2006:22).

This typology also helps to explain why some value chain activities could be more easily relocated than others (Sturgeon, 2008). According to this classification there are five ideal types of the governance on the scale from market to hierarchal forms of governance (power and control):

- *simple market linkages* are governed by price – in this case the complexity of transactions is low, but the ability to codify transactions and the capabilities in the supply-base are high;
- *modular linkages*, where complex information regarding the transaction is codified and often digitised before being passed to highly competent suppliers;
- *relational linkages*, where tacit information is exchanged between buyers and highly competent suppliers;
- *captive linkages*, where less competent suppliers are provided with detailed instructions;
- *hierarchical linkages* within the same firm, governed by management hierarchy.

Figure 1: The Global Value Chains Framework

| Key Variable | Complexity of transactions | Ability to codify transactions | Capabilities in the supply-base | Degree of explicit coordination and power asymmetry |
|--------------|----------------------------|--------------------------------|---------------------------------|---|
| Market | Low | High | High | |
| Modular | High | High | High | |
| Relational | High | Low | High | |
| Captive | High | High | Low | |
| Hierarchy | High | Low | Low | |

Note: There are eight possible combinations of the three variables. Five of them generate global value chain types. The combination of low complexity of transactions and low ability to codify is unlikely to occur. This excludes two combinations. If the complexity of the transaction is low and the ability to codify is high, then low supplier capability would lead to exclusion from the value chain. While this is an important outcome, it does not generate a governance type *per se*.

Source: Sturgeon 2008, based on Gereffi et al. 2005 and Dicken 2007

It is worth noting that, in contrast to the producer-driven and buyer-driven dichotomy, the governance, power and control approach of the GVC is more complex than an industry-neutral framework. What is

more, this framework offers some predictability in the analysis of the cross-border linkages that could be a useful tool to understand the complexity of the corporate restructuring on a global scale.

This theoretical concept fits quite well for an interpretation of ongoing changes in the automotive industry. According to recent findings (Schwarz-Kocher et al., 2017), it is no more only the OEMs' strategies alone which determine the position and profitability of the companies. We will emphasise in following sections that the position of the companies in the automotive value chain can be strategically influenced, and this depends on their strategic ability and resources to get into higher value aspects of design, production preparation, and production. Furthermore, we will use Gereffi et al.'s categories to classify our cases and provide a basic orientation on companies' efforts in that respect (c.f. Chap. 3.2).

1.2 Labour relations going global along the value chain

The role of institutional context (e.g. impact of the labour relations system, government policy on minimum wages, global ethical conduct regulation framework (ILO), etc.) has been growing during the last decade in both the global and European industry, especially in the manufacturing/automotive industry under the growing influence of the labour shortage of almost all categories of employees. Therefore, there is an urgent need "... to consider a wider range of agents – other than firm trajectories (other than upgrading) in the process of restructuring within global production. This included a consideration of workers in the establishment of competitive conditions within which firm- and regional-level trajectories played out" (Smith and Pickles, 2015:323).

In relation with the influence of the wider range of stakeholders, it is worth noting the currently increasing internationalisation of labour relations in the automotive industry. An outstanding example of this very recent trend is the initiative of the largest German sectoral trade union, IG Metall. In the framework of its Transnational Partnership Initiative (TPI), the German trade union aims to collaborate with local trade unions' representatives in order to improve wages and working conditions and to root German-style labour relations based on the principle of co-determination and cooperation (Fichter, 2017) in German-owned plants operating outside Germany as well as at their suppliers. TPI offices have been opened in Hungary and in the US. The first office in Hungary was opened in 2014 in Győr-city in the proximity of the plant of Audi. Since then a second office was also opened in Kecskemét-city in 2016, where Mercedes Benz operates.

The core aim of this international network initiative – in cooperating with the Hungarian metal workers trade unions (Vasas) – is to advocate for higher wages and better working and employment conditions. The full time member of the IG Metall Executive Committee, Wolfgang Lemb said, "If we want to maintain and expand our strengths, we have to look beyond the horizon of the company where we are employed ... if we overcome the wedge between employees working at different sites within and outside of Germany and develop our joint strategies that we can prevent employers from succeeding with their strategy of playing off workforces against each other... we need close cross-border cooperation, especially at the company level" (quoted after Rüb, 2016: 3-4) Despite the rather short time of existence of IG Metall offices and activities, some positive outcomes are visible, such as the Hungarian Metal Workers Union, a cooperating partner of the IG Metall, which succeeded to increase the trade union membership by 1.500 new entrants. Its presence is clearly visible through the stronger bargaining position, with more frequent warning strike activities of the Hungarian metal workers union operating in this sector. It is not by chance that "The first strike to happen at the Audi plant in Győr, northern Hungary, in its 23 years of existence

was announced by the trade union organisation there in early 2016 and aimed at achieving a significant general wage increase and improvements in working conditions” (Galgóczi, 2017:13).

IG Metall thus recognised that in order to safeguard German high labour standard jobs it is necessary to act globally. TPI offices seem to be an efficient way to avoid potential blackmailing by the threat of closing down German workplaces by delocalising them into lower cost countries. One of the most important competitive advantages of such Foreign Direct Investment (FDI) in a location such as Hungary is clearly the low costs and low wages, but it is questionable to what extent delocalisation in Central and Eastern European (CEE) countries represents a real threat for the workplaces in the home country.

Table 1: Total labour cost per hour (Euro). Manufacturing of motor vehicles, trailers and semi-trailers

| Country | 2000 | 2004 | 2008 | 2012 |
|----------------|--------------|--------------|--------------|--------------|
| Belgium | 28.38 | 34.29 | 32.97 | 44.90 |
| Czech Republic | 4.37 | 6.52 | 10.08 | 11.38 |
| France | 24.84 | 33.24 | 33.38 | 38.51 |
| Germany | 37.78 | 41.39 | 43.14 | 47.91 |
| Hungary | 4.62 | 7.08 | 8.86 | 9.41 |
| Italy | 20.45 | 23.08 | 25.50 | 30.11 |
| Poland | - | 4.70 | 7.52 | 8.09 |
| Romania | - | 2.16 | 3.90 | 4.82 |
| Slovakia | 2.72 | 3.77 | 7.77 | 8.09 |
| Slovenia | - | - | 12.73 | 13.74 |
| Spain | 18.63 | 20.34 | 23.66 | 25.39 |
| U.K. | 25.81 | 24.99 | 23.82 | 24.17 |

Source: *Áleaz-Aller et al. 2015, p. 160*

The mainstream view on the drivers behind the wage increase in the CEE countries stresses the impact of the outward immigration and the influence of the FDI. However, the impact of FDI on the wage increase is not automatic but is shaped by such social institutions as the strengthening bargaining power of trade unions conditioned by the tight labour market, the increasing influence of the transnational network initiative (partnership) of the IG Metall trade union, especially in Hungary, and other EU-supported initiatives to support social dialogue in CEE countries (Karnite, 2016); and last but not least the recent Hungarian government initiative (2016) to increase the level of minimum wage.

Table 2: Gross value added per employee and the share of personnel costs in production (2014)

| | Gross Value Added per Employee | | | % of personnel costs in production | | |
|----------------|--------------------------------|----------|----------|------------------------------------|----------|----------|
| | MF | NACE C29 | NACE C30 | MF | NACE C29 | NACE C30 |
| Belgium | 106,3 | 77,1 | 117,4 | 12,2 | 13,7 | 23,4 |
| Bulgaria | 10,3 | 10,7 | 12,8 | 10,1 | 11,6 | 11,1 |
| Czech Republic | 31,2 | 44,3 | 32,3 | 11,7 | 7,7 | 17,0 |
| Denmark | 84,8 | 64,1 | 62,4 | 18,8 | 22,7 | 26,1 |
| Germany | 73,3 | 106,9 | 92,3 | 21,1 | 17,8 | 23,0 |
| Estonia | 24,9 | 24,9 | 34,1 | 15,2 | 19,7 | 18,9 |
| Ireland | 201,3 | 74,7 | 66,4 | 8,3 | 18,5 | 24,6 |
| Greece | 40,3 | 23,8 | 33,9 | 11,3 | 24,3 | 43,8 |
| Spain | 60,5 | 73,3 | 78,3 | 14,0 | 10,9 | 20,2 |

| | | | | | | |
|----------------|------|-------|-------|------|------|------|
| France | 69,2 | 65,1 | 99,8 | 19,8 | 18,1 | 20,9 |
| Croatia | 19,0 | 16,8 | 10,8 | 19,6 | 21,7 | 29,2 |
| Italy | 64,8 | 59,2 | 73,2 | 15,4 | 13,9 | 17,5 |
| Cyprus | 31,5 | 24,3 | 31,9 | 20,7 | 27,4 | 19,3 |
| Latvia | 16,4 | 27,6 | 14,6 | 14,5 | 16,3 | 27,9 |
| Lithuania | 16,4 | 15,7 | 15,0 | 10,6 | 14,6 | 14,6 |
| Luxembourg | 76,1 | : | : | 20,5 | : | : |
| Hungary | 30,4 | 45,3 | 37,3 | 10,1 | 6,4 | 13,8 |
| Malta | : | : | 40,8 | : | : | 10,7 |
| Netherlands | 92,4 | 89,2 | 90,4 | 12,2 | 15,3 | 14,6 |
| Austria | 81,9 | 105,0 | 106,8 | 19,7 | 13,5 | 19,5 |
| Poland | 25,9 | 32,2 | 29,6 | 10,9 | 9,3 | 16,2 |
| Portugal | 28,2 | 35,8 | 22,9 | 14,0 | 10,5 | 22,9 |
| Romania | 13,6 | 17,0 | 14,7 | 12,6 | 12,1 | 21,1 |
| Slovenia | 38,9 | 38,7 | : | 18,6 | 12,9 | : |
| Slovakia | 28,5 | 39,9 | 21,1 | 9,9 | 5,7 | 18,0 |
| Finland | 73,5 | 57,0 | 50,7 | 16,3 | 21,0 | 22,7 |
| Sweden | 93,4 | 80,5 | 93,6 | 19,5 | 18,6 | 31,0 |
| United Kingdom | 77,2 | 144,8 | 71,0 | 16,8 | 11,7 | 19,2 |

Source: Eurostat online database

Note: MF: manufacturing, NACE C29 - Manufacture of motor vehicles, trailers and semi-trailers, NACE C30 - Manufacture of other transport equipment.

No doubt, the difference in the total labour costs is a key factor of delocalisation of business functions (e.g. manufacturing activities) in the CEE region. According to recent findings, in the automotive sector, it is less a 'follow the customer'-strategy but the pressure on prices due to lower wages in many CEE countries (compared e.g. to Western European Countries or Germany) what drives re-/delocalisation (Schwarz-Kocher et al., 2017:7). The available statistical data on total hourly wages in manufacturing motor vehicles, trailers and semi-trailers clearly indicates the attractiveness of the CEE region countries for further delocalisation in the automotive industry.¹³ (See Table 1!) But the creation of new manufacturing capacities in the CEE countries represents a real threat for other peripheral, low cost countries in Europe. The following assessment illustrates well the consequences of the recent changes in the European automotive sector in the CEE region: "... Spain's main competitors for small vehicle assembly operator have tended to be CEE countries. As a result, automotive plants in Spain might be expected to be among those hardest hit by the opening of new plants in CEE countries." (Aleaz-Aller et al., 2015:155)

Based on the data above (Table 2), however, it seems that the low cost competition strategy has its own limits when it comes to attract further, more value-added activities along the value chain. Low wages go hand in hand with low value added leading to asymmetric power relations between various types of suppliers (i.e. 1st, 2nd and 3rd tier) and OEM. These countries representing low-value added product or services in the GVC are more vulnerable for such changes as further delocalisation or automation/robotisation. Competition strategy based on low costs may thus lead to lock-in of the countries' development paths. In order to be able to unlock these paths and to create new high-road of

¹³ In the future, digitisation-automation (robotisation) represents the other important future driver in the location (position) in the automotive value chain, the second section focuses on this issues.

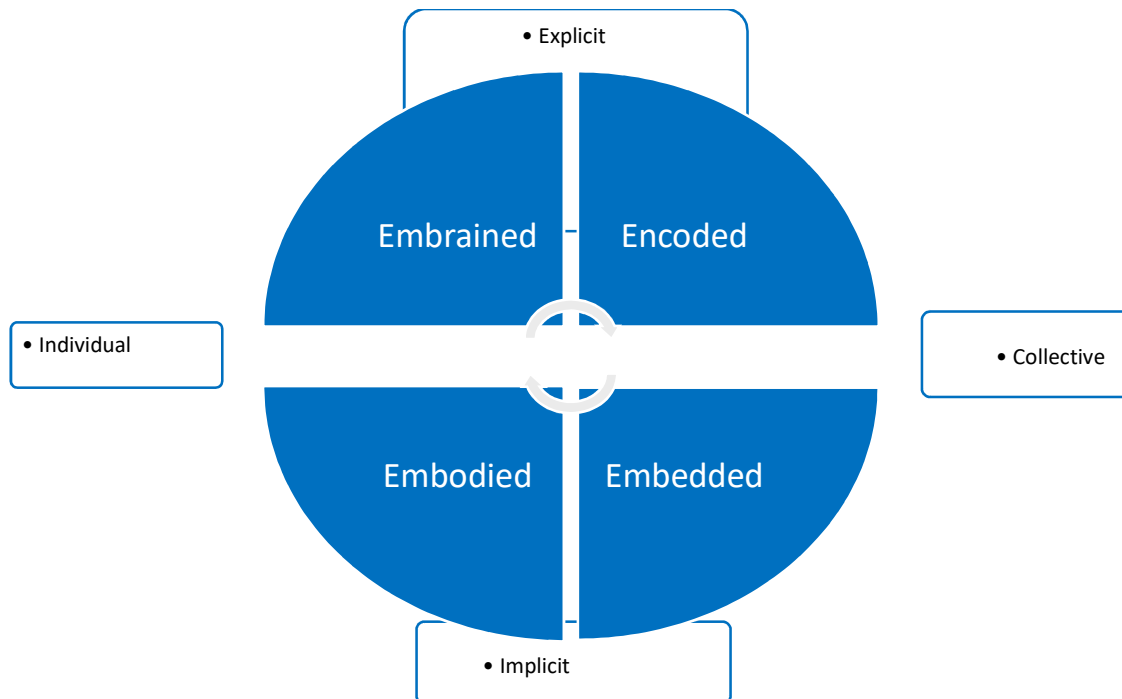
development, it is necessary to move up in the value chain (Makó and Illéssy, 2016). This leads us to focus on the crucial role of knowledge and knowledge mobilisation in the labour process within the GVC.

1.3 Knowledge as a key resource shaping power relations in the value chains

In addition to the governance, power and control oriented approach of the GVC in our analysis we intend to stress the importance of the knowledge mobilisation and learning process in the innovations surveyed by the company case studies. The prerequisite for moving up in the value chain – generating higher value added – is to develop and combine different types of knowledge. To understand the opportunities and limits of this learning process it is worth making distinctions between various types of knowledge and their forms of development. This short overview on forms of knowledge and learning is also helpful in interpreting our case study findings.

Knowledge in organisations is typically categorised as being either explicit (relatively easy to acquire, transfer and maintain its value) or tacit (difficult to code and document without losing from its value which is the so-called “epistemological dimension” of the knowledge). It is also important whether knowledge is possessed by an individual employee or by larger group of employees. Lam (1998) called the first axe of knowledge classification (explicit vs. implicit) the epistemological dimension of knowledge, while the second axe of the matrix (individual vs. collective) was labelled as the ontological dimension. This combination of explicit-tacit and individual-collective dimensions of knowledge (first mentioned by Collins, 1993; cited by Lam, 1998) results in the below presented four types of knowledge.

- a. *Embrained knowledge* (individual-explicit) is formal, abstract, theoretical, standardised, easily acquirable and transferable, it can be used and applied in various heterogeneous situation and can be incorporated through formal education and training (learning-by-studying).
- b. *Embodied knowledge* (tacit-individual) is based on practical experiences of the individuals, it can be used in specific context, emergent, fluid and individual-bounded. Embodied knowledge can only be acquired in practice, through personal experiences (learning-by-doing).
- c. *Encoded knowledge* (collective-explicit) is codified in signs and symbols and stored in blueprints and recipes of written rules and procedures. It has a collective and public character and transferable almost independently from the knowing subject for a wider audience.
- d. *Embedded knowledge* (collective-tacit) resides in organisational practices, routines and shared norms. It is heavily context-dependent, deeply rooted in specific work practices and socio-organisational structures. It can be transferred through relation-specific informal channels where communication, coordination and organisational identity play crucial role. It is often referred to social skill or social knowledge.

Figure 2: Types of knowledge in the organisation: epistemological and ontological perspectives

Source: Lam, 1998: 491

Obviously, all learning starts with the embodied knowledge that is with knowledge acquired individually and tacitly. It is of prominent importance for all firms to initiate a learning process during which knowledge first becomes explicit (transferable) and then spread over the firm by sharing and collectivizing it. This process is very similar to what Nonaka and Takeuchi called Socialisation, Externalisation, Combination and Internalisation in their famous model of SECI-spiral (Nonaka and Takeuchi, 1995).

Most of the innovations analysed in the case studies reflect this ambition of the companies investigated to mobilise, develop and share the knowledge – especially the tacit one – of their employees. The core aim of this innovation is to transform a group of co-workers into a so-called ‘community of practice’ in which the employees do not only share their individual knowledge and experiences but are also related to each other by shared motivation and interest based common use of knowledge. Those who are not members of the community do not have access to the ‘community of practice’. The final social product of this briefly presented process mobilisation and transfer is the social capital reflected in the shared norms and values of all members of the community, which may facilitate access to the tacit dimension of knowledge.

There is a commonly shared view in the recently growing literature of digitisation and robotisation (Chui et al., 2016, Brynjolfsson and McAfee, 2014) that the use of ICT can dramatically boost the opportunities of knowledge management in formalising and coding knowledge. This approach can be proved to be an effective strategy in a stable and slowly changing economic and social environment. However, in the past decades a radically new environment was created for corporations by mega trends, including globalising product, service and labour markets, together with organisational and managerial innovations such as modularisation, eliminating the bureaucratic ‘silos’ in the organisation through project work. In such an environment, the sources of long-term success for organisations are their high learning and adaptation capabilities using and mobilising the tacit (practical) knowledge. This is even more important if there will

be a shift in products (e.g. towards electro-mobility) or towards an approach to sell “mobility as a service” instead of cars as a product.

Overall, we can see that there are changing conceptual orientations visible along the automotive value chain. E.g. the sharing of knowledge is no more limited to a single company, but the scope of the ‘community of practice’ is at least partly extended into the value chain: it is obviously useful for OEMs and 1st tier suppliers to increasingly integrate the knowledge and competencies of suppliers for solving complex problems in design, pilot runs, and regular production as well as over the whole product life cycle. In this sense, there is an increasing amount of research (e.g. Blöcker et al, 2009) on the shift from an OEM-centered approach in innovation towards an innovation network concept thus integrating different forms of knowledge of different companies – in an at least partly contradictory manner (cooperating vs. being integrated in a fixed logistic and financial frame).

The innovations studied by the method of the company case studies in the automotive industry – without exceptions – illustrate a need for various forms of knowledge mobilisation and learning, and their impact on the quality of job and employment in the perspective of value chain perspective.

The next section of this chapter is focusing on the mega-trends driving the changes in the automotive sector. The third section presents the dynamic relations between quality of job, innovation and employment using the empirical evidences from the company case studies carried out in automotive plants in Hungary and Germany. The concluding section summarizes the major findings on the interplay between of innovation-learning and quality of job and employment in the perspective of GVC.

2 The automation challenge and how it affects value chain power relations

Undoubtedly, one of the main challenges the automotive sector has to currently confront is a series of disruptive technological innovation that may fundamentally change the automotive industry. Additive manufacturing, the “Internet of Things”, Industry 4.0, Big Data, Smart factories are some of the most commonly used buzzwords of this socio-technical transition, and techno-economic paradigm shift. Although there is no consent in the scientific community either on the number of employees, or on the exact jobs affected by these technological changes, it seems that almost everyone agrees on one thing: we are currently witnessing revolutionary changes in manufacturing processes. Instead of giving a detailed overview, in this chapter we intend to assess the potential impacts of this mega-trend on both job quality and employment.

2.1 What is automation and should we be afraid of it?

One of the most encompassing phenomena of the present decade is the process of automatisisation and digitisation. By the former we mean the replacement of labour input by machine input for same type of tasks, while digitisation refers to the phenomenon of the use of sensors and rendering devices to translate parts of production (and distribution) into the digital domain. Both phenomena fundamentally transform the way how we produce products and services to such an extent that an entire new branch of the literature has emerged to map its future consequences on the employment. There is an abundant body of literature examining the well-known “automation anxiety” caused by concern over the decline in the employment rates in certain sectors or even the disappearance of entire professions. For example, according to Frey and Osborne (2015), the work of almost half of the employees will be replaced by

computers in 1-2 decades. Bowles (2014) estimates that 45-60% of the European workplaces will be automatised. Brezski and Burk arrive at similar conclusions concerning the German economy, in which 57% of the workplaces are threatened by the risk of automatisation. It is also worth noting that in this literature the unit of analysis is dynamically changing: professions, occupations and jobs often appear as interchangeable concepts.

2.2 Impacts of automation on employment: American and European experiences

A more balanced analysis of the potential impact of automatisation can be found at Autor's article (Autor, 2014) aimed to map the impact of automatisation on employment. Instead of focusing on professions or occupations, he uses a task-based analysis of different jobs. The starting point is the so-called Polanyi's paradox, according to which "We know more than we can tell". This refers to the fact that a large part of our knowledge is tacit and therefore hard to codify. In contrast, explicit knowledge is easy to codify and transfer.

Based on the tacit and explicit knowledge elements of different work tasks, Autor differentiates three main types of jobs: manual-intensive, routine-intensive and abstract-intensive. These jobs are exposed to the threat of automatisation to different degree. His analysis of the US employment trends since 1979 clearly show a process of 'hollowing out' in the middle of the employment structure. This means that in the past nearly four decades most loss has been registered in the middle-skilled white collar and middle- and low-skilled blue collar jobs. A similar trend is observable in Europe as well. According to Autor, this is at least partly due to the automation and digitalisation.

However, the effects of automation are far more widespread and complex than it is usually suggested. Autor calls attention to the fact that while computerisation may substitute human labour in some cases, it can complement it in almost every economic activity: 'The fact that a task cannot be computerised does not imply that computerisation has no effect on that task. On the contrary: tasks that cannot be substituted by computerisation are generally complemented by it. This point is as fundamental as it is overlooked.' (Autor, 2014:136). In these cases the automation does not lead to technological unemployment, instead it increases labour productivity.

In a recent Eurofound publication (Eurofound, 2016), Fernández-Macías and co-authors analysed the potential impacts of automation on the European employment structure. Analysing the literature on technological development-driven employment changes, the authors distinguish two main approaches: the skill-biased technological change (SBTC) and the routine-biased technological change (RBTC). Overall, the first strand of literature interprets the main employment patterns of the past few decades in an upgrading narrative, while the second uses the polarisation argument and interprets data according to this narrative. (Eurofound, 2016:11)

In order to give a more nuanced picture of post-crisis employment trends in Europe, the authors combine the occupation-based approach with the sector-level analysis, that is, their unit of analysis is occupations in a given sector. They regrouped these occupations into quintiles on the basis of the average wages and analysed the employment changes before, during and after the global economic crisis. We will highlight only three facts that are relevant for this chapter.

First, albeit recent employment trends are less supportive to the upgrading argument than those before the crisis, a clear downgrading process has been taking place in only two countries: "Over the four-year period 2011–2015, Hungary and Italy both experienced an obvious downgrading pattern of employment

shift. In each of these countries, employment growth was strongest in the lowest-paid jobs and weaker in higher-paid jobs (...) At aggregate EU level over 2011–2015, there was upgrading with some polarisation – relatively faster growth in the bottom than in the middle.” (Eurofound, 2016:13)

Second, at sectoral level, while the biggest employment growth was registered in the service sector, the automotive industry is one of the manufacturing sectors that recent employment gains come from, together with food production. With respect to the automotive sector, Schwarz-Kocher et al. (2017:18) recently stated that, since the 2008/2009 crisis, nearly the entire growth of production in European automotive industry is realised in CEE countries (with respect to production value). What is even more important, this employment growth has taken place in the higher-paid jobs.

It is quite obvious to interpret these changes along with the aforementioned shift in automotive industry: at least for a part of the production sites in CEE countries, there seems to be an upgrading of production from commodity parts towards higher value and more complex products which is presumably based on their increasing experience in production. This is driven by company strategies coping with the challenges in this market in order to be highly productive on the one hand, and an innovative and a high-quality producer at the same time. What we might have is a coexistence of contradictory trends in different companies and production units. We will come back to that aspect in the analysis of the case studies. (cf. Chap. 3.2)

Third, the general employment patterns in Europe have been always a combination of upgrading and polarisation but with a changing emphasis between the two: “The pre-crisis employment expansion in the EU was mainly upgrading but with some polarisation. The crisis itself has been clearly polarising but with some upgrading (the top quintile continued to grow). The most recent pattern (2013 Q2–2015 Q2) is one of balanced growth with only a very mild upgrading skew. There is, as yet, no indication of actual downgrading in the aggregate EU data, though recent employment shifts are clearly less upgrading than those observed in the pre-crisis period.” (Eurofound, 2016:12)

Looking at recent data available for the automotive sector – i.e. a comparison of employment quality in CEE countries and Germany (Schwarz-Kocher et al., 2017:14ff., based on Krzywdzinski et al., 2016) –, there is a great difference in employment stability e.g. in fluctuation rates (in CEE three times as high as in Germany), in contract work (Germany 5%, CEE 11% of employees), and fixed-term work contracts (Germany 6%, CEE 11% of the employees). This is indicating that – at least in automotive industry – the polarisation mentioned has to do with company strategies in the framework of employment regulation in the different countries: not only multinational companies or foreign direct investments obviously react on opportunities to apply labour regulations in order to optimize their position in the automotive value chain.

2.3 Automation, Job Quality, Organisation and the Value Chain perspective

Makó et al. (2017) analyse the changes and trends of work task characteristics of European employees. Their aim is to investigate the relation between entrepreneurship and creativity. The authors argue that countries in which more employees are working in knowledge-intensive jobs with high level of autonomy offer a more valuable reserve pool of future opportunity entrepreneurs¹⁴. In other words, in countries

¹⁴ In the literature, ‘opportunity entrepreneurs’ are often distinguished from ‘necessity entrepreneurs’. In the case of the former the ‘... main motif is the desire for independence and desire to work for themselves’, in the other case, the so-called ‘necessity’ entrepreneurs are pushed into entrepreneurship because they have no other employment options.’ (Mascherini and Bisello, 2015:13)

where the share of creative workers is higher, we will find more new entrepreneurs with higher probability of future success. Using the model of Lorenz and Lundvall (2011) and the database of the Eurofound's European Working Conditions Survey (EWCS-2005, 2010), the authors distinguished three types of workers on the basis of their work tasks' characteristics.

The sample consisted of salaried employees working in organisations with at least 10 employees in non-agricultural sectors such as industry and services, excluding public administration and social security; education; health and social work; household activities; as well as agriculture and fishing. They measured creativity according to six variables reflecting knowledge-intensity and autonomy of different jobs at work task-level: (1) whether the work requires the mobilisation of problem solving capabilities; (2) using individuals' own ideas; (3) whether it involves learning new things; (4) executing complex task, and whether the employees have autonomy; (5) in choosing the working methods; and/or (6) in choosing the order of tasks.

Three groups of employees were distinguished: (1) creative workers are characterised by highly knowledge-intensive jobs and high degree of autonomy, (2) constrained problem-solvers are employed in similarly highly knowledge-intensive jobs but they enjoy significantly less autonomy, while in the case of (3) Taylorised workers the level of knowledge-intensity and autonomy of jobs are relatively low.

Table 3: Characteristics of the three employee clusters

| | Creative workers | Constrained problem-solvers | Taylorised workers |
|---------------------|------------------|-----------------------------|--------------------|
| Knowledge-intensity | high | high | low |
| Autonomy | high | low | low |

Source: Makó et al. 2017

This analysis is also useful to assess the effects of automatisisation. In this regard, the share of different types of employees can be seen as a proxy-indicator for assessing the number of employees who can be hit by the automation either by complementing or by substituting these jobs. In theory, we assume that highly knowledge-intensive and autonomous jobs are unlikely or difficult to be replaced or complemented by machines. To a lesser extent, the same is considered true for constraint problem-solvers, whose tasks usually require high cognitive capacity but with lower level of autonomy. Jobs with low level of autonomy and low knowledge-intensity (i.e. Taylorised workers) are exposed the most for automation. It is worth adding however, that – as Autor rightly noted – the assessment of the real effects cannot be separated from some external factors such as the elasticity of both labour demand and supply.

Table 4: The share of different employee clusters in European country groups (EWCS-2010)

| Country groups ¹⁵ | Creative | Constr. Problem-Solvers | Taylorised |
|-----------------------------------|-----------|-------------------------|------------|
| Nordic | 71 | 15 | 12 |
| Continental | 49 | 25 | 26 |
| Anglo-Saxon | 49 | 24 | 27 |
| Mediterranean | 46 | 29 | 35 |
| Central and Eastern Europe | 41 | 29 | 30 |
| EU-27 average | 48 | 24 | 28 |

Source: Makó et al. (2017)

If we compare the distribution of each employee group in 2005 and in 2010 at European aggregate level, we do not see significant differences. During this period, the share of creative workers decreased by 2 percentage point (50% vs 48%), the share of Taylorised workers increased at the same rate (26% vs 28%), while the share of constrained problem-solvers remained the same (24%). However, this apparent stability overshadows important differences. First and foremost, there are significant variations across the main country groups within the EU-27.

As it can be seen from the table above, the share of the creative workers is the highest in the Nordic countries, followed by the Continental and the Anglo-Saxon country groups, while Mediterranean and CEE countries are lagging behind. In contrast, the share of Taylorised workers is the highest in Mediterranean and CEE countries, while their percentage in the workforce is far less in the Nordic country. Anglo-Saxon and Continental countries can be found between them.¹⁶

These country group differences are important not only from the point of view of ‘automation anxiety’ but also from what has been said in the previous section about the differences in the value-added per employee. As we can see from these data, creative and high value-added jobs are not distributed evenly geographically in Europe. This is not at all surprising. Sturgeon and Florida have introduced the distinctions between cost-cutting and market-seeking investment motives of the large automotive companies. The investment motive is determining the limits of these newly established plants for any kind of value chain upgrading: “Based on the key distinction between cost-cutting and market seeking investment locations, the study developed a hypothesis that many plant attributes too could be predicted by type of location,

¹⁵ The country groups include the following Member States:

1. Nordic countries Sweden, Finland, Denmark,
2. Anglo-Saxon countries: the United Kingdom and Ireland.
3. Continental countries: Germany, Netherlands, Austria, Luxembourg, France and Belgium.
4. Mediterranean countries: Spain, Portugal, Italy, Greece.
5. Central and Eastern European (CEE) countries: Estonia, Latvia, Lithuania, Poland, Czech Republic, Slovakia, Hungary, Slovenia, Romania, Bulgaria.

¹⁶ In fact, according to the preliminary calculation of the authors, the differences between the Continental and Anglo-Saxon countries on the one hand, and Mediterranean and CEE countries on the other hand, are much more striking in both 2005 and 2015 but these data has not been yet published. This bias may be due to the short-term effects of the global economic crisis which temporarily reduced the real differences.

including plant size, degree of integration, level of automation, share of parts sourced from the local supply-base, etc.” (Sturgeon and Florida, 2000:12)

After conducting interviews with some 45 managers worldwide and gathering quantitative data from more than 2000 plants, the authors set up the following typology of production location: 1) Large existing markets (e.g. United States, northern Europe, Japan) – when the plant is established in the same country where the headquarter of the firm is located; 2) Large existing markets – when the plant is established in a well-developed country other than that of the firm’s headquarter base; 3) Peripheries of the large existing markets (e.g. Mexico, Canada, Spain, Portugal, and East Europe); and 4) Big emerging markets (e.g. China, India, Vietnam, Brazil). Albeit this typology was created almost two decades ago and thus needs some refinement, it still proves to be relevant from a value chain upgrading perspective.

Table 5: Attributes of different types of automotive investment

| | Type 4 | Type 2 | Type 3 | Type 1 |
|--------------------------------|----------------|-------------------------------|---------------|-------------------------------|
| Strategic intent | Market seeking | Market and capability seeking | Cost cutting | Market and capability seeking |
| Capacity | Low | High | High | High |
| Wages | Low | High | Low | High |
| Application of lean principles | High | Low ¹ | High | Low ¹ |
| Vehicle development | No | In some cases | No | Yes |
| Level of integration | Low | High | Medium | High |
| Level of local supply | Low | Medium-to-high | Medium | High |
| Level of exports | Low | Low | High | Low ¹ |

Note: 1 = Except of Japan

Source: Sturgeon and Florida, 2000:13

Undoubtedly, in the competition to attract automotive sector’s FDI, the main advantage of such peripheral regions like Eastern Europe is still the combination of geographical proximity and low labour and production costs. The most important changes since this research was carried out can be found at the application of lean principles, the level of integration, and the level of local supply. This is mainly due to the rise of modular production networks best described by Sturgeon (2002). Inspired by the value chain restructuring in the US electronics industry, Sturgeon argued as a response of highly demand, OEMs tended to seek for ‘full-service outsourcing solutions. In this process more and more manufacturing activities were outsourced to ‘turn-key suppliers’, while the lead firms could focus on their core activities, like design, R&D, and marketing, and was less hit by an eventual industrial downturn (at least they didn’t have to face with excess manufacturing capacity). The increased volume of outsourcing was also beneficial for the 1st Tier suppliers: “I call such firms ‘turn-key’ suppliers because their deep capabilities and independent stance *vis-à-vis* their customers allow them to provide a full-range of service without a great deal of assistance from, or dependence on lead firms. Increased outsourcing has also, in many instances, vastly increased the scale of suppliers’ operations.” (Sturgeon, 2002:455)

This restructuring process has reached the automotive industry to a considerable extent and resulted in sophisticated and excessively integrated global value chains. An important precondition of such a radical transformation was what Richard Freeman (2007) called ‘the Great Doubling’. He argued that since the end of the 1980s, the labour pool globally available has increased from 1.46 billion to 2.93 billion workers,

with the entry of the former Soviet bloc countries, China and India to the world economy. The evolution of the global labour market has an immediate effect in the segment of low-skill / low-paid jobs and influenced negatively the competitive advantage of such countries like Peru, El Salvador, Mexico and South Africa. But Freeman emphasises a second, longer-term effect: the emergence of highly skilled labour population apt to fulfil jobs in technologically advanced activities.

As Freeman rightly observed: *“In 1970 approximately 30% of university enrolments worldwide were in the US, in 2000 approximately 14% of university enrolments worldwide were in the US. Similarly, at the PhD level, the US share of doctorates produced around the world has fallen from about 50% in the early 1970s to a projected level of 15% in 2010.”* (Freeman, 2007:6) The difference is even more striking today, especially in the technology-related fields. In 2016, the number of STEM (Science, Technology, Engineering and Mathematics) graduates was 4.666 million and 2.575 million in China and in India, respectively, while the US was lagging far behind with 568 thousands graduates (World Economic Forum, 2016:21). Of course, the quality of the education is not (yet) at the same level but it is also improving year by year.

Transferring this general observation to the automotive industry, we have to take into account that along with the growing standardisation (and if applicable: automatisation) of the production processes, it is a question of work organisation whether qualification and skill aspects will matter. According to Schwarz-Kocher et al. (2017:14), the impact of skills differences is decreasing, the more standardised production processes are. But they tend to gain importance when coping with production ‘crashes’ (i.e. when unforeseen or not standardised events occur), or in production maintenance, and especially in a ‘pilot run’ situation (i.e. when a new product is first produced on the dedicated production line). In these aspects, skills still matter – even the rapid availability of skills (e.g. from machine tool producers) is an important asset. Production knowledge and an increasing experience in coping with these aspects may provide a basis for companies in different parts of Europe to improve their position in the automotive value chain. (cf. for the applicable strategies Chap. 3.2)

There is another aspect to be taken into account when looking into the reasons for and patterns of delocalisation: This is logistics, transport costs, and the spatial distance from supplier to OEM. For many standardised or (comparably) simple parts, transport costs and availability are not crucial. But approx. 40% of the parts of a presently produced automobile are so called “bad shipping parts” (Schwarz-Kocher et al., 2017:17) with a higher complexity which needs to be produced close to the final production line or the OEM. The planned availability of these parts is crucial for the OEMs –especially in Just-in-Time- or Just-in-Sequence-Production–, and therefore, it is likely that they will be produced nearby the OEM in order to guarantee the continuity of production. This is a limiting factor for delocalisation that has impact on the development of supplier plants close to production sites of OEMs, e.g. new production sites in CEE countries. (cf. e.g. Chap. 3.2.1 on *HU-SUBSIDIARY* and *HU-GLOBAL PARTS SUPPLIER*)

Delocalisation patterns may turn out to be different for functions like design and product development, i.e. functions dependent on highly skilled and specialised staff. Accordingly, these changes call attention to the changing patterns of delocalising the development of higher-value added parts, products and services due e.g. to a lack of skilled workforce or higher labour costs in the core countries of OEM manufacturers. This changing pattern is well illustrated by the establishment of R& D research centres by Audi in Győr city and Knorr-Bremse in Kecskemét city, etc. Labelling this changing pattern of delocalisation of business function we may speak about ‘first’ and ‘second generation’ delocalisation process in the CEE region.

3 Interplay between innovation, job quality and employment: Lessons from the company case studies

3.1 Preliminary remarks on the case study method

Critics of qualitative research that include case studies often emphasise that the small number of cases investigated do not allow the gathering and analysis of statistically valid data and developing generalised findings. Another critical opinion is that case studies question the objectivity of researchers and they are not suitable for explanation of relations between the phenomena investigated. Without questioning the briefly outlined critics on the methodological weakness of case study method, we intend to stress the value-added character of the case study method used in the social science research in general and especially in the study of firm level innovation process and the impact on employment and working conditions.

The experiences analysed in this section are partly based on a literature review coupled with first hand company case study experiences. The case study method aims to “... understand how people interpret their experiences, how they construct their world and meanings they attribute to their experiences’ (Tomory, 2014:60). In our analysis, instead of a single-case study method we used the so-called multi-case or multi-sites case study strategy, relying on the experiences of four company case studies covering five innovations carried out in the Hungarian and German automotive industries.¹⁷

3.2 Company cases: ‘locus’ along the GVC and the drivers of innovation

Before presenting the context and the drivers of innovations investigated in the company case studies, we first intend to locate these companies along the GVC typology presented in section 1.1, i.e. by the types of governance, complexity and ability to codify transactions, supply capabilities and coordination/control in the value chain. The following table illustrates the features of company case studies carried out in the automotive sector in Hungary and Germany.

¹⁷ In practice five company case studies were carried out within the QuInnE project (two German and three Hungarian), but due to the service nature of the second German company case was omitted from the systematic case analysis: The second German case study (Kümmerling, 2017) is focusing on the rather new development of car-sharing services. In this emerging sector, even employment data are not available and due to the short-time operational period of the mobile or free-floating service, it is rather difficult to identify the impacts on employment and job quality. So, the case is added at the end of the paper to shed some light into yet un-investigated changes in the automotive sector, and to illustrate that there is –as one tendency among others– a shift towards mobility services (like car sharing) which might lead to new and different pressures for employment and working conditions. (cf. cf. ‘Excursus’, Chap. 3.2.4)

Table 6: Company case studies: Types of governance, forms of transactions, capabilities and coordination

| Types of governance | Characteristics of the company case studies |
|---------------------|---|
| Market | <p>HU-T-PLASZTIK (3rd tier supplier) (Hungary) Low complexity of transactions, High-ability to codify transactions, High capacity of supply base, High degree of explicit coordination and power asymmetry.</p> |
| Modular | <p>HU-SUBSIDIARY (OEM) (Hungary) High complexity of transactions, High ability to codify transactions, High capacity in the supply base, High degree of explicit coordination and power asymmetry</p> <p>GER-SUPPLIER (1st tier supplier and development partner for OEM) (Germany) High complexity of transactions, High ability to codify transactions, High capacity in the supply base, High degree of explicit coordination and power asymmetry</p> <p>HU-GLOBAL PARTS SUPPLIER (2nd tier supplier and development partner for OEM) (Hungary) High complexity of transactions, High ability to codify transactions, High capacity in the supply base, High degree of explicit coordination and power asymmetry</p> |
| Relational | - |
| Captive | - |
| Hierarchy | - |

Source: Own compilation based on case study reports (see list of reports in section 6 of this report)

Besides using the concept of the GVC to understand the incentives of innovation, we identified the following company strategies as drivers of innovation:

- a. Seeking cost efficiency
- b. Seeking knowledge efficiency
- c. Cost and knowledge efficiency mix.

Ad a: In the case of the ‘cost-efficiency’ strategy, the key motive of innovation is to find tools of competitiveness through ‘cost cutting’ or in other word to be ‘cost leader’ among competitors in the automotive sector. At the macro level, this strategy generally represents the so-called ‘low-road’ strategy of economic development based on abundance of the low wage and low skilled workforce (Makó–Illéssy, 2016). Underdeveloped institutional environment (e.g. non-existent or weak trade unions, highly deregulated or flexible labour market and lack of other regulatory tools, like international ethical code of conduct of the firm, etc.). This strategy has only short-term advantages accompanied by the risk aversion investment policy.

Ad b: Contrary to this approach, the ‘knowledge efficiency’ strategy puts the focus on the mobilisation of knowledge and sharing it within the members of the organisation. A good illustrative example for this strategy is when a firm combines technological (e.g. ICT) and organisational (e.g. Employee Driven Innovation, IDE) innovations in order to develop and share knowledge or implement various methods to improve collective learning in the organisation. In this future oriented strategy, organisational learning is the core source of the sustainable competitiveness of the firm through developing capability to

continuously produce higher value added products and services. Developed institutional regulations (e.g. presence of strong trade union, presence of the international regulation of code of conduct etc.) or high wages are functioning as a ‘positive constraints’ for the seeking ‘knowledge efficiency’.

Ad c: The combination of these strategies is based on a compromise between the short-term and long-term pressure of competitiveness. The pressure for cost-efficiency is permanent and universal, but the development of partnerships in development with the OEM, or reaching the status of the ‘turn-key supplier’ through ‘knowledge efficiency’ in combination with ‘efficiency seeking’ are the tools of the sustainable-competitiveness in the automotive sector.

The following table summarises the classification of these strategies or drivers of innovation of the firms surveyed by the organisational case study method:

Table 7 Company case studies in the automotive industry by drivers of innovation

| Drivers of innovation | Types of Innovation |
|---------------------------------|---|
| Cost efficiency | <i>‘IT-based management’</i> (HU-T-PLASZTIK, 3 rd tier supplier, Hungary) |
| Knowledge efficiency | <i>‘Integrated Project Team’</i> (GER- SUPPLIER, 1 st Tier supplier, Germany) <i>‘Ideenbörse’</i> (HU-SUBSIDIARY, OEM, Hungary) |
| Cost & knowledge efficiency mix | <i>‘Kaizen-principles’</i> (GER-SUPPLIER, 1 st Tier supplier, Germany) <i>‘Quality Circle’</i> (HU-GLOBAL PARTS SUPPLIER, 2nd Tier supplier, Hungary) |

3.2.1 The company cases

The following table summarizes the main features of the company cases carried out in the Hungarian and the German automotive industry.

Table 8: Main characteristics of the company case studies

| Pseudonym | type of company | number of employees | No. of persons interviewed |
|---------------------------------|---|--|--------------------------------|
| HU-SUBSIDIARY | OEM, Hungarian subsidiary of a German global car manufacturer | Hungarian establishment: over 2 500 | 5 (company) + 2 (other expert) |
| GER-SUPPLIER | 1 st Tier German car supplier – family owned | Company: 500-2500 worldwide, establishment: 50-500 | 3 (company) + 5 (other expert) |
| HU-GLOBAL PARTS SUPPLIER | 2 st Tier supplier, car supplier, Hungarian subsidiary of a global manufacturing company (H) | Global company: over 2 500 worldwide, Hungarian establishment: 500-2 500 | 6 (company) + 1 (other expert) |

| | | | |
|----------------------|---|-----------------------------|-------------|
| HU-T-PLASZTIK | 3 rd tier supplier, car manufacturing supplier Hungarian family owned | Company: over 250 employees | 8 (company) |
|----------------------|---|-----------------------------|-------------|

Source: Own compilation based on case study reports (see list of reports in section 6 of this chapter)

HU-SUBSIDIARY, a Hungarian subsidiary of a German global (OEM) manufacturer was founded in the early 1990s with engine manufacturing. The car manufacturing production started some five years later with a premium-market segment sport-car product. Around 2000 an engine R&D centre was inaugurated. As an extension of the operation, a tool-factory was built a few years later. In 2007 *HU-SUBSIDIARY* created the first common department with the City University, and currently they jointly operate four departments. During the present decade, a new vehicle factory and Project and Training Centre were established first, while the mass production of a new – medium/upper market segment – vehicle started a few years later. The new logistic centre opened in 2015 and this was the year when the Hungarian plant finally covered the entire range of car manufacturing. Currently, the company employs several thousand employees representing more than 10% of the total workforce employed in the Hungarian automotive sector (Borbély et al. 2017).

GER-SUPPLIER is an old company (>100 years) and it is still family owned. In 2014, the majority of the ownership share was transferred into a family foundation structure for a company holding as a radical change in the form of governance. It is a typical German ‘Mittelständler’ (family owned middle-sized company), but since 2010, no family members are involved on the business as a manager. Since 1950, the company is active in automotive sector, with several production sites in Europe since the 1990s. The Headquarters, largest production site and the engineering unit are still located in the West of Germany, Presently, there are more than 1 000 employees worldwide in **GER-SUPPLIER’s** automotive division. The entire company is presently reaching a turnover of almost 300 Million € per year. The automotive division is the largest division of the company (Latniak 2017).

HU-GLOBAL PARTS SUPPLIER is a Hungarian subsidiary of an ‘Interior Manufacturing and Assembly’ (IMA) business line in a global corporation, employing thousands of employees in more than 100 business sites in 35 countries. The predecessor of the Hungarian subsidiary was founded in 1993 by a foreign investor and this company was purchased by IMA around 10 years ago. Five years later a second factory was built, which was later complemented by a logistic centre. The turnover in the Hungarian plant increased by 85% between 2011 and 2016, and the size of the workforce nearly reached 2 000 employees. Due to the fast development of the Hungarian production sites the output was doubled in 2012. The volume of the manufacturing increased to 3.2 million and represents 3 % of the global market output. The core activity of **HU-GLOBAL PARTS SUPPLIER** is to produce internal parts of cars. As 2nd Tier supplier its main customer are the 1st Tier suppliers of the internationally well-known companies like Audi, Volkswagen, Hyundai, Kia, Toyota, Suzuki, BMW, Daimler Benz, General Motors and Ford. In the middle of 2000s, the share of medium-category car segment dominated, by the 2016 the company improved its position in the GVC and the share of premium-category cars exceeded 50% of the production (Losonci et al. 2017).

HU-T-PLASZTIK is a relatively new player in the automotive sector in comparison with the other OEM manufacturer and parts suppliers. It was created as a family business following the collapse of the state-socialist political-economic system. **HU-T-PLASZTIK** today is a 3rd tier auto-part supplier company in the industrially less developed North Great Plain region of Hungary. Beside the dominance of the agriculture, the region is well-known on the high ratio of gypsy minority in labour market. The company employs more than 300 people. It produces rubber-based products for various sectors (i.e. white good, agricultural

machines and automotive industry). The share of production for the automotive sector in the turnover is around 20%. *HU-T-PLASZTIK* is a fast growing family company, its turnover has more than tripled in the last decade and the company surpassed the medium-sized category of the firms. The family owned firm's governance structure has radically changed since the 2008 financial crisis. The family has delegated the management responsibility to the non-family members. *HU-T-PLASZTIK* developed various product portfolios (e.g. products for white goods, agriculture and automotive industry) to diminish the dependency on the seasonal fluctuation of the production. Due to the continuous growth, it was necessary to professionalize the production management system and diminish the influence of the family members in the governing structure of the company (Szentesi et al., 2017).

3.2.2 'Integrated project team' and 'Ideenbörse': tools of knowledge development and sharing

The German GER-SUPPLIER is not only 1st tier supplier but is trying to become an important and reliable development partner for German, Japanese and US OEMs in the premium car segment. The company innovation strategy has a dual nature. Firstly, it tries to win premium-market segment orders from OEMs and it intends to become a development partner by using a type of 'knowledge efficiency' strategy of innovation. This strategy is well illustrated by the creation of the '*Integrated project team*'. Secondly, due to the 'matured technology' and the dominance of unskilled workers in the workforce, GER-SUPPLIER implemented a Japanese managerial innovation (i.e. *Kaizen*) combining the motives for 'knowledge' and 'cost efficiency'. Both innovation strategies served to save and improve position in the GVC in the automotive sector (Latniak 2017).

The core driver of the 'knowledge efficiency' strategy of GER-SUPPLIER is the following: the company does not aim to become a 'cost leader', because the previous cost-cutting efforts had only short-lived results. The rationale behind the simultaneous use of 'cost' and 'knowledge' efficiency seeking is well summarised by the plant manager:

According to the plant manager at GER-SUPPLIER, there are limited innovations in the technical process (due to the matured technology). The challenge is to apply technology in a high-flexible way according to the demands of customers with 100 % delivery performance and '0' defects, etc. Shifting towards less automation and towards the use of employees' ideas to optimise production based on smart use of manual work.

The *Integrated project team* represents a company effort towards 'knowledge efficiency'. This initiative (dated back 2015) is designed to replace the slow, traditional 'stage-gate' approach by the *Integrated project team* in the process of product development:

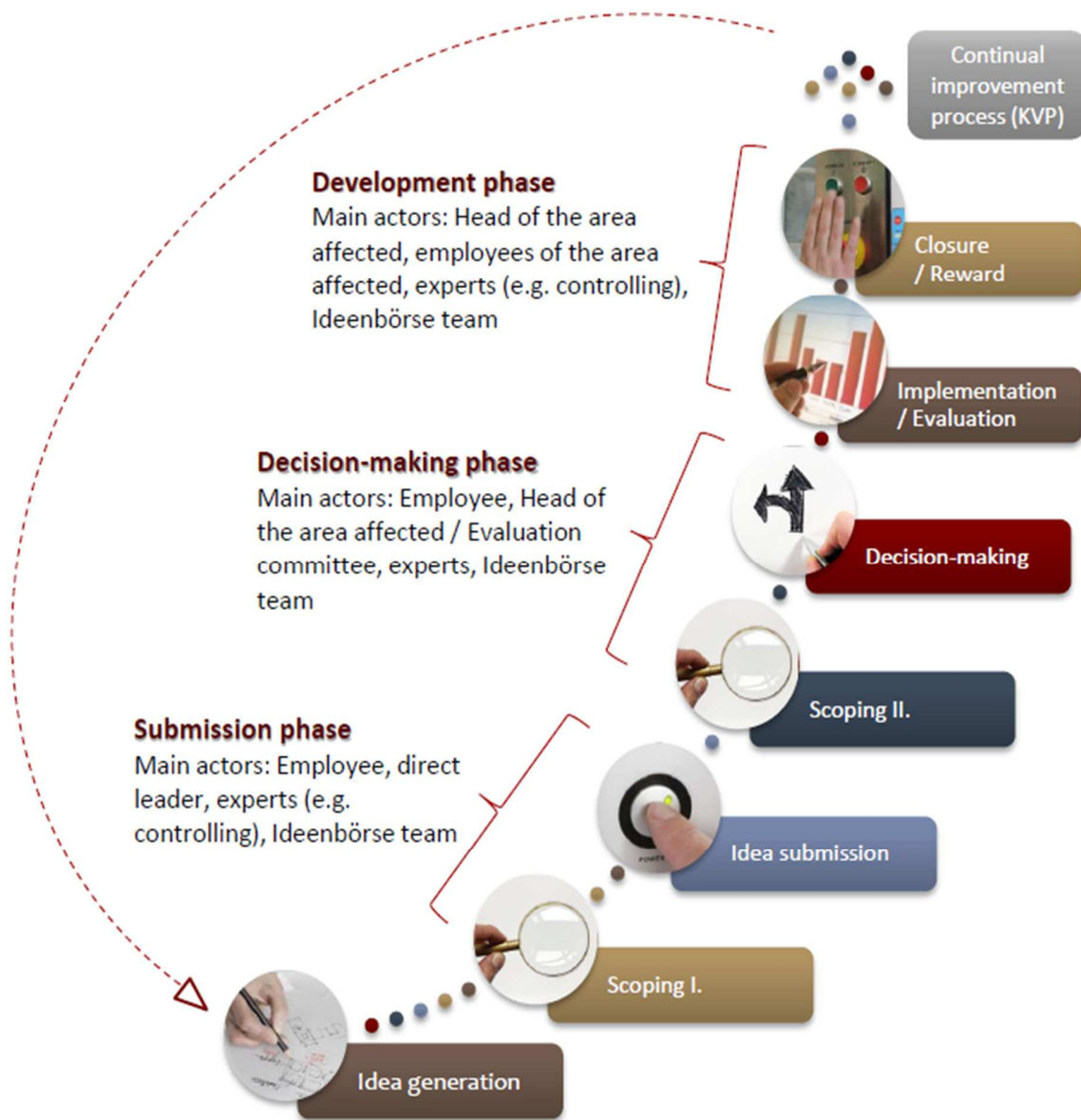
As the plant manager explains, before entering the next stage, there needs to be a positive decision by management (project clearance unblocking resources for the next step in development). Stage gate procedures tend to be fairly bureaucratic and extend functional walls, while people involved would need to closely work together and intensively communicate on development related issues instead.

Instead of dividing the product development tasks between a dozen of different functional units located in separated offices and departments (from technical process, production tools, tools purchasing to design engineering, program managing, etc.), these tasks were delegated only to two teams: 'Akquisition 1' and 'Akquisition 2'. The members of these teams work together at the same premise of the company and have to report only to the program manager and not to their functional unit head.

The *Integrated project team* – initiated originally by the sales department – is an appropriate tool of knowledge development/sharing and results in a ‘community of practice’ (source of trust relations between team members). The joint effort of the experts belonging to more than dozen organisational units guarantees to develop high quality offer within the short calling time of the OEMs’ tenders. These tenders are usually characterised by not only with the extremely short notice time for GER-SUPPLIER (3-4 weeks) but by bureaucratic guidelines containing complex and extended technical, commercial and financial calculation details. The volume of these documents often exceeds 1500 printed pages. If we intend to identify the type of the knowledge transfer, we may say that the ‘*Integrated project team*’ is an enabler to transform the individual ‘embrained’ knowledge of experts working in separated ‘functional walls’ at the company into a ‘collective embedded’ knowledge.

HU-SUBSIDIARY, the subsidiary of the German global carmaker was founded as a ‘brown-field’ investment (Foreign Direct Investment) in a city having matured industrial culture and was the centre of engine and truck production during the state-socialism. ‘*Ideenbörse*’ has been used in the German parent company for about 30-35 year and was implemented in the Hungarian subsidiary in 2004. There was no urgent cost efficiency-seeking motive to implement this suggestion system. Instead, the main driver was the favourable experiences gained by the OEM mother company with this form of employee driven innovation (EDI) system. After a decade of the operation the management intended to implement ‘*Ideenbörse*’ (2004) as a best practice in the Hungarian production site, too. The intention is to create an institution for organisational learning through strengthening the cooperation between various occupational groups (e.g. direct and non-direct production workers) and increasing the feeling of commitment (identification) with the company. The following figure is a stylised illustration of the idea generation process (Borbély et al. 2017).

Figure 2: The process of idea generation at HU-SUBSIDIARY



Source: authors' own editing

A special unit was created within the management to organise the activity of the 'Ideenbörse' and to motivate, support and evaluate the various phases of the idea generation process. Their members, called 'idea coordinators' ('spokesperson', 'extended hand'), help in the submission of new ideas and suggestions, acting as a 'care managers' (Hasu and Lehtonen, 2014).

The philosophy of the 'Ideenbörse' team is the continuous improvement and idea generation without limitation on their scope:

"We never say if something has been changed that it is optimal. There are always new aspects and other techniques as time passes. At this point the initiator can have a say in the process."

So can others. Conditions change. Let's modify it. The underlying purpose of all this is to make it better and better.” (IB Team Member, white collar, HU-SUBSIDIARY)

Several radical changes took place following the implementation of the 'Ideenbörse'. The first one was when the paper-based idea generation system was replaced by the IT interface (2013). Its advantages – compared to the earlier paper-based system – were summarised by an engineer involved:

“We used to have a paper-based system where they could write down their ideas by hand. As far as I could see it was not used much. I do not know why. Maybe it is due to lack of confidence that they are too insignificant to implement a great idea. They throw the idea into the container and nothing would happen (...). This paper-based thing is not proper any more in 2017.” (Engineer, white collar, HU-SUBSIDIARY)

During its introduction, an extremely ambitious training program was organised for both managers and employees. As an idea coordinator remembered:

“That year (2013) we met nearly 9000 people. We organised the instruction of the IB system; how the new system is run and what the most important rules are. The result is that it is known by everyone how to submit an idea and if the Ideenbörse was not known, it became familiar.” (IB Team Member, white collar, HU-SUBSIDIARY)

Another significant step was taken into the direction of increased 'inclusivity' in 2015, when an IT interface was implemented and opened offering an unlimited access to all workers, overcoming the occupational and space-related borders. The additional positive impact was the 'instant feedback' in comparison with the slow feedback that characterised the paper-based system. (Partly due to this measure, the number of idea submitters grew by 11.1 percent to 5155 by the end of 2015 and the amount of savings realised after implementing the idea of employees increased dramatically by 55 percent.)

In addition to the above mentioned short-term financial (extrinsic incentive) benefits of the involvement in the 'Ideenbörse', it is necessary to stress the long-term effect of increased creativity (intrinsic incentive). The system can be regarded as an instrument for individual self-fulfilment according to one engineer:

“It is not by all means the money that motivates. At the beginning I also had some ideas with which I started to deal to earn money. But when it comes to my 'greater idea' money has never occurred to me. It can rather be regarded as self-fulfilment: «Let me show you what I am able to». So 'Ideenbörse' is not only good for money but also for creativity and self-fulfilment.” (Engineer, white collar, HU-SUBSIDIARY)

Until recently, the advantages of the universal and unlimited online access in the idea generation process were not systematically assessed by the management of HU-SUBSIDIARY. However, according to the experiences of the idea coordinators interviewed, the universal e-access has favourable effects not only on the intensity of participation in the 'Ideenbörse' but on the social environment of the production site. As an idea-team member noticed:

“We are trying to reach everybody so that it should not be a nuisance, rather a comfortable opportunity. If they access the web interface from a mobile phone or from home, we can be contacted.” (IB team member, white collar, HU-SUBSIDIARY)

“Those who have not done it so far for some reasons (e.g. because they had a bad relationship with their managers, team coordinator or shift leader), now these colleagues can again have a sense of belonging, practically by bypassing these people they can convey their ideas directly through us to the management. These people may have felt to be outside the system and this process cannot give anything to them. By making it possible for them to submit their ideas from home, they are successfully involved in again.” (IB team member, white collar, HUSUBSIDIARY).

However, the unlimited or inclusive e-access to the ‘Ideenbörse’ could not remove barriers of participation in the real (off-line) working practice. For example, assembly line workers may overview maximum 4-5 working stations, against this, the non-direct production workers have easy access to computers and could develop a more holistic view on the various units of production and generate new idea. In other words, the source of unequal conditions of participation in the idea generation system could not be removed by the ‘virtual inclusion’ strategy, there is still a need for the possibility of ‘organisational slack’ for production workers to generate new ideas and suggestions.

3.2.3 Combining ‘cost’ and ‘knowledge’ efficiency: Kaizen philosophy and Quality Circles to transform individual tacit knowledge into collective practice

Following the 2008 crisis, GER-SUPPLIER implemented a Japanese production management system, the *Kaizen principles*¹⁸ in 2010 (Masaaki, 1997), complementing the knowledge-efficiency innovation strategy of the ‘Integrated project team’. Due to the matured technology with limited innovation possibilities in the technical process, the company adopted the approach to ‘make it simple’ or ‘smarter’. GER-SUPPLIER learned from previous failures of narrow cost-cutting programs and made a substantial shift toward less automation and increased use of employee’s practical knowledge. The introduction of the well-known *Kaizen principles* - with the help of a Japanese consultant – represented a radical turn in combining the drives for cost efficiency with employee knowledge (Latniak 2017).

To build a common understanding of managers and rank-and-file employees on the methods and functioning of the Japanese management technique, numerous workshops were launched in all company units. Workshops were organised every two weeks to monitor the progress of each project. Furthermore,

¹⁸ Kaizen”,in Japanese means “continuous improvement for the future”, the 10 Basic Kaizen Principles are the following:

1. Throw out all your old fixed ideas on how to do things.
2. No blame — treat others as you want to be treated.
3. Think positive—don’t say can’t.
4. Don’t wait for perfection. 50% improvement now is fine.
5. Correct mistakes as soon as they are found.
6. Don’t substitute money for thinking—creativity before capital.
7. Keep asking why until you get to the root cause.
8. Better the wisdom of 5 people that then the expertise of 1.
9. Base decisions on data not opinions.
10. Improvement is not made from a conference room.

a roadmap was designed for the implementation of the *Kaizen principles*. Among the tools of implementation the following were stressed during the interviews:

- (1) “Karawane” – a factory tour of plant managers to discuss and solve production problems every morning;
- (2) “Reflexplan” – a systematic planning method for controlling, planning and - if necessary - changing the production in each unit;
- (3) “SynchroMap” – a tool for creation of an optimised layout for specific production processes); and
- (4) “Just do it-room” – a meeting place for managers and other participants to supervise the advancement of on-going Kaizen projects. All projects and every new step are documented there. Every employee is free to join in if a problem occurs that can’t be solved within the organisational unit.

As a consequence of the introduction of the principles, visibility and transparency in production processes and interruptions is high:

As the plant manager at GER-SUPPLIER states, supervisors’ workplace are in the middle of the workshops (not in separate offices – in Japanese it is called ‘gemba’, which is a location in the shop floor where actual work is performed). If a problem occurs, the workers try to solve it by themselves, first, but if that fails, the signal lighting at that workplace is set to red and the process stops. This is when the supervisor comes in and have to support the employees in solving the present difficulties.

If this doesn’t work out, the next step is to join a meeting in the “just do it”-room.

With respect to the working conditions, the outcomes of the *Kaizen principles* - introduced in the production and in the assembly lines – were the increased adaptability, flexibility and higher quality of work. This production management method is focusing on the mobilisation of practical/tacit knowledge of workers and offering organisational/managerial tools how to share, formalize and use them for the competitiveness of GER-SUPPLIER. In spite of more intensive work, works council members had positive opinions about it:

As the works council member at GER-SUPPLIER explains in the interview, the crucial point is that in the Kaizen process, workers experienced that their knowledge and their experiences is respected: Management and engineers listen to them and then they can see that their ideas are implemented and their work is improved. But the overall work intensification increased in recent years and will further increase in the future.

The business practice of HU-GLOBAL PARTS SUPPLIER is oriented by such guidelines as ‘high customer satisfaction’, ‘profit enhancement’, and ‘employee development’. These values relate in part to the product themselves (e.g. product, quality and internal logistics development) and also to the development and motivation of human resources (e.g. leadership training, communication, Quality Circles (QC). Among the human resource development projects, the QC activity demonstrated well the interplay between innovation, quality of job and innovation.

QC can be interpreted as a strategy of HU-GLOBAL PARTS SUPPLIER to develop an Employee-Driven Innovation (EDI) since 2013.¹⁹ The aim of the 4-6 members working of the QC is to identify problems related with everyday practice and find solutions to improve both product and process quality and increase efficiency of the operation. While QC is not a novelty in the shop-floor practices of the automotive industry, this combined approach includes several components that distinguish this version from other small group QC activities (Losonci et al., 2017).

The main features of this QC strategy include:

1: *Selection* of the project ideas and identification of the most relevant one over a period of half a year:

“Of course, when quality people or team leader or anyone sees that there are quality problems somewhere, and there are these developers, they will decide that well, they propose that for the Quality Circle. So in this half year, topics are collected until the summer approximately.”
(mentor, white collar, HU-GLOBAL PARTS SUPPLIER)

2: *Starting* project – contrary to the traditional management or engineers initiated changes – employees design and execute the necessary, improvement related changes. To overcome the innovation inhibiting ‘silo-effects’ of the separated organisational units, QC team includes production line workers, engineers and supporting staff (e.g. HR member) but no higher-level executives. When the team is set up, its members choose a team leader from among themselves – this role may change during the project. QC has a fixed timeframe and focused on addressing the root of the problem. The project goal is to work out and implement a solution supported by facts (e.g. quantitative data). For example in the previous year (2016) the aim of the QC activity – production workers cooperating with the HR department – was to identify the source of high turnover and develop counter-measures. The groups report project progress on a weekly basis, at management meetings.

In general, the members of the QC activity are recruited on a voluntary basis, however the ‘caring role’ of management is not negligible:

“What I see is that ... it would be false to say that they are not motivated by us, because we also motivate and encourage people to take part in this ...of course, there are also other forms where they can provide feedback, but this is a problem-solving method they can feel their own all the same. This is, they invent a little something that will make their daily work easier. This is what we use for motivation, but of course they also do it for money ...” (plant manager, white collar, HU-GLOBAL PARTS SUPPLIER)

Evaluating the QC circles activities requires comparing their outcomes in the perspectives of management and rank-and-file employees, and in the perspective of QC both members and non-members. The most important advantage for management is the mobilisation of the practical knowledge of employees to solve various problems selected by management and the stronger loyalty of employees as well. However, the maintenance of the system requires significant resources in the forms of the managerial assistance (i.e. mentoring system) and further training on the methodology of the QC, etc. In the case of the participants, they may learn English (due to the globally organised network of QC) and improve their general competencies.

¹⁹ At the global corporation level this organisational-managerial innovation was implemented during the early 2000s.

With respect to the working conditions, at the end of a project, members of the QC have a holistic overview on the local operation of HU-GLOBAL PARTS SUPPLIER, since these groups are involved to solve many cross-sectional problems. Thus, the project participants have better promotion chances. On the other side, the QC membership results in higher workload in the form of the increased overtime. From perspective of the non-QC members, their workload is also higher because of the often-absent QC members from the regular-daily work. This inequality may create an increasing tension between QC and non-QC members.

3.2.4 Seeking cost-efficiency: implementing an IT based management system

The company case study (HU-T-PLASZTIK) aimed to assess the implementation of the IT based management system (2011) and its impact on quality of job and employment (Szentesi et al., 2017). HU-T-PLASZTIK is applying an IT based management system called 'Abas-ERP²⁰ System'. It represents an ambitious codification of the skills/knowledge owned by shop-floor managers and rank-and-file employees. In accordance with typology of Lam (1998), this kind of knowledge should be classified as 'embodied' and the IT based management system using the technique of 'Abas-ERP' to transfer the 'embodied' individual knowledge into an 'encoded' collective one. The second-generation owner-manager characterised the former traditional knowledge management of the firm in the following way:

"Description and record keeping etc. were completely lacking. To fulfil any order of the customer required my personal visit at the customer warehouse to identify the missing products and then to manufacture them. In a fast growing company, this 'person based recording system' did not work it was necessary to implement a formalised, IT aided record keeping system."

"Before implementing the new IT system, one of the most important challenges for the production management was reliable recording of the steady movements of stocks." (IT expert, white collar, HU-T-PLASZTIK)

Looking back to the former production management system, the description of the various processes, documentation of the customers' and suppliers needs, adaptation of documents for accounting and financial departments, and the collection of the necessary information for the managerial decision increasingly required more and more time from both managers and rank-and-file employees. This was the main motive behind the introduction of the integrated the *IT based management system*.

The implementation of the new the *IT based management system* started with a comprehensive training covering, first, managers and IT expert (i.e. the so-called key users), and then all other employees. Production workers (e.g. machine operators) were rather unhappy with the new system because the *IT based management system* has enabled management to a systematic mapping and controlling of both quantity and quality of their performance in real-time. One of the unexpected results of the new system was the intensification of the conflicts on the higher performance requirements at the shop-floor. According to the plant manager, *"An intensive fighting emerged around 1 per cent increase in the performance standard."* (plant manager, HU-T-PLASZTIK).

The new *IT based management system* had strong impact not only at the production site but on the whole organisational architecture (e.g. units responsible for quality, logistics, sales, HRM), and it contributed to a substantial increase of turnover – which almost doubled since the implementation of this IT based

²⁰ ERP = Enterprise Resource Planning.

information system. In relation with the organisational restructuring, it is necessary to mention that this system led to two major changes: First, it facilitated the further centralisation of the decision making, and second, power was transferred to the non-family professional managers.²¹ The implementation of this *IT based management system* aimed to upgrade from the 3rd tier supplier position in the GVC to a slight increase in the direction higher-value added products. The investment in a new tool design and manufacturing site support the development into direction in the form of the functional upgrading.

3.2.5 Excursus: German Car-sharing company²²

Car-Sharing is a relatively young but rapidly expanding business about which has not been robustly researched. There is little information about the situation in the businesses; in particular, little is known about the number of employees, their working and employment conditions and their qualifications and skills.

Car-sharing in Germany has emerged since the end of the 1980s: The car-sharing companies established during that period were mostly set up as clubs or associations. Profit was not initially the objective; rather, the aim was to reduce damage to the environment and save costs by sharing one car among a few households or members. The fact that many people operating car-sharing businesses have their roots in left-wing environmentalism has had effects on working and employment conditions, with self-exploitation having long been taken for granted.

In the second phase of the business' development, which started around 2005/2006, new providers, in many cases, spinoffs of the major carmakers such as Daimler and BMW emerged. The years following, the carmakers' entry into the car-sharing market are described as the traditional operators' industrialisation phase. It is likely that this professionalisation was a response to the carmakers' entry.

The case

The objective of the case study, which was conducted in a large stationary German car-sharing company, was to discover what effects the pressures for change mentioned have on working and employment conditions within the company. To what extent is the company aware of the pressure for change and to what extent is it reacting innovatively to the challenges? And what effects do these dynamics have on working and employment conditions – what are jobs in this innovative growth sector actually like?

The company is a holding (parent) company that works with one of its subsidiaries to provide local operators with all central services required by a car-sharing business. The company has a presence in more than 20 German towns and cities. The local car-sharing businesses are operated by independent companies (client companies). The owners of the holding company are for the most part customers and employees. Services, including call centre and IT services and app development, are provided by both the parent company and the subsidiary service provider company.

Around 180 people are employed in the group as a whole. In the parent company itself, there are currently 33 employees and a further 30 in the subsidiary service company, of whom 23 work in the call centre and seven in data processing. Some 60% of the employees in the partnership companies have a vocational training qualification, while 40% are university graduates. These shares have remained stable in recent

²¹ For example, a CEO of the well-known Electrolux operating in the white goods sector was hired and confined the most important top manager post at the family company.

²² This text is an excerpt of Kümmerling (2017).

years. Nevertheless, there have been changes in both the workforces. The size of the local car-sharing operators fluctuates sharply and it is impossible to obtain average figures. The number of employees in the parent company has risen continuously albeit slowly in recent years. Growth has been particularly strong in the IT department. The IT department is responsible for the development and further evolution of software solutions for car-sharing companies and company car fleets, on which it has been working for several years with external service providers.

The case-study company has had a works council for three years; it covers both the parent company and the subsidiary service company. Currently, it consists of three representatives, none of whom has been released from their duties. The local companies are not represented in the Works Council.

The company does not have a standard innovation management system. Generally speaking, decisions are made at management level and it is from there that the impulses for innovation usually originate. The general decision that the company should become active on social media was taken by the parent company.

Examples for recent innovations are

- Switch from large stations to smaller stations integrated into the streetscape – as a step closer towards the customer and become more visible
- Internet, mobile apps and social media activities - social media are regarded as very important means of communication with customers, which the company uses enthusiastically
- Rewording the customer service script - as a marketing innovation

Together with the increasing migration of the information supply to the Internet, the introduction of the mobile app in 2012 has had effects especially on call centre job quality. The mobile app has been so successful that customers now use it more frequently than the telephone. This has in fact considerably widened the range of tasks of the cc-operators, with responsibilities for dispute management and customer advice.

At the time this investigation was carried out, the company was under pressure to innovate from various angles: (1) from customers, (2) from employees and (3) from new competing providers in the market.

- Improving customer focus was the main motivation for the introduction of the mobile app, which customers can use to make bookings on the go via their smartphones. As a consequence, there are fewer telephone bookings than previously and so, the call centre's sphere of activity has changed. Newly acquired customers are relying increasingly on the Internet in order to obtain information on the company's procedures and then telephone the call centre to ask for any information that may be missing.
- The employees are no longer satisfied with the informal way in which working and employment conditions are determined and have been exerting pressure with the aim of professionalising the company. The establishment of a Works Council can also be seen as a move in this direction.
- As a direct response to the new competitors' higher visibility on the streets, the company's local car-sharing businesses are now parking their vehicles in several smaller stations that are significantly more prominent than before, when the stations were mainly located in rear courtyards. The experiments with smart cards and on-board computers can also be seen as a reaction to the free floaters, which are significantly more innovative in the implementation of new technologies than the traditional operators.

3.3 Interplay between innovation, quality of job and employment: decisive impact of the position in the GVC

The position occupied in the GVC in the supplier hierarchy and the related drivers of innovation to improve cost and/or knowledge efficiency are important factors shaping the dynamic relation between innovation, quality of job and employment. It is the objective of different strategy implementations to change the GVC position of the companies.

Here we focus on the **'knowledge efficiency seeking' strategy**, represented by the *'Integrated project team'* at GER-SUPPLIER and the *'Ideenbörse'* at HU-SUBSIDIARY. In this case study the following interplay between innovation, quality of job and employment were mapped:

At GER-SUPPLIER, a slight increase in the stability of employment was registered, and the innovation surveyed has had no direct negative effect on employment. The *'Integrated project team'* contributed to break down existing 'functional walls' between organisational units, and it has contributed to improve internal communication and coordination between various professions and units. In addition, a common perspective was created on the development and production of parts before their production started (Latniak, 2017).

At HU-SUBSIDIARY, the introduction of the *'Ideenbörse'* increased the autonomy of persons involved in the process of idea-generation, while basic work tasks remained routine. Although the IT interface increased the options to participate, inequality in working conditions, including organisational slack as necessary resource to generate new ideas, access to the IT infrastructure, and the saving of free time, inhibit the intensity of involvement of production workers compared to the non-direct production workers. Those participating in the *'Ideenbörse'* may benefit a variety of rewards. In addition, the participation in this suggestion system increases creativity of work (Bórbely et al., 2017)

The **cost and knowledge efficiency-seeking mix** obviously represents a generally used strategy of innovation by the 1st and 2nd tier suppliers. The implementation of the well-known Japanese management method, *'Kaizen'* at GER-SUPPLIER has several beneficial effects on the quality of job. It contributed to avoid polarisation of jobs, both unskilled and semi-skilled jobs are enlarged through involvement in *'Kaizen'* and employees now even have an active role in the restructuring process of the work organisation. In relation with the other core elements of the quality of job, the Works Council succeeded to negotiate a premium wage in the production unit concerned.

Quality Circle implemented by HU-GLOBAL PARTS SUPPLIER – the Hungarian subsidiary of a global automotive corporation which is located on the 2nd tier position in the GVC – produced overwhelmingly positive impact on the quality of job and employment. Involvement in the *Quality Circle* entailed a fixed-amount allowance for the employees, and it had a positive effect on the future wage increase. Furthermore, the participation offered an excellent opportunity for learning and personal development (e.g. members of QC groups master several techniques with the assistance of the coordinator). Due to the corporate wide (global) QC movement, the involvement in *Quality Circle* of HU-GLOBAL PARTS SUPPLIER has substantially contributed to increase team-cohesion and commitment of the participants. Membership does not guarantee an automatic 'lift' in the promotion system, but it has had a positive effect on the employment security. This form of participation has negative impact on the work-life balance due to the excessive amount of overtime. In addition, colleagues who are not involved in the *Quality Circle* complained on higher workload due to the absence of the QC members in the everyday work (Losonci et al., 2017).

The **Cost efficiency seeking strategy** is adopted by the introduction of the '*IT based management*' at the Hungarian family owned HU-T-PLASZTIK. Due to the fast growth and the transfer of company control to professional managers, the firm has launched radical changes in production management: The implemented *IT-based management system* (2011) is directed to transform the former personal (tacit) knowledge-based system into a standardised system independent from individuals. Due to short learning period of the reorganisation of the production information system, it is difficult to map its impact (Szentesi et al., 2017).

The *IT-based management system* has no visible impact on the wage level, but conflicts related to the wage-standard norms have increased since the implementation of the 'Abas-ERP' system. Concerning working time and employment security, no changes were reported. Similar to other Hungarian firms operating in the automotive sector, this company has to cope with the impact of a tightened labour market. In spite of the training friendly policy of HU-T-PLASZTIK, employees are eager to attend only On-the-Job training (OJT) during the working time organised in forced breaks during production. The new, *IT-based management system* has had no influence on the work-life balance. It seems to us that this cost-cutting and top-down *IT-based management system* provides advantages for the management to extensively monitor, supervise and control the information flows in real-time. However, the managerial ambition to move up in the GVC requires further changes into the direction of knowledge efficiency as well.

3.4 Impact of organisational innovations on job quality and employment

It is quite likely that in spite of the temptation of 'economic nationalism' in some countries the radical changes in the global labour market, and the impact of the global financial and economic crisis, may result in only a temporary slowdown and stronger competition and not in a reversal of the trend of delocalisation of business services. Governments in the emerging markets are designing new development and modernisation strategies aimed at moving up on the GVC and shifting from the 'low-skill' to the 'high-skill' equilibrium growth model in the CEE countries.

As mentioned, automotive industry is a core manufacturing sector, and its present and future status is of decisive importance both in employment generation and forming quality of working life. The development roads of this sector are shaped by various mega-trends, like automatisisation, digitalisation, globalisation of the labour market, and recent internationalisation drive of the trade union operating in this sector.

To understand drivers of innovation and their implications for the quality of job and employment, the analysis has to focus on the location of the firm in the GVC and its potential dynamics. The locus and the movement – stabilizing, upgrading, downgrading – within the GVC are widely influenced by strategies of innovation as e.g. cost efficiency, knowledge efficiency seeking and their combination.

The focus of the five organisational innovations we analysed by using a company case study method lay on knowledge mobilisation and transfer and on learning with an emphasis on production knowledge. Comparing the changes between the core components and their relations may help us to understand short and long-term dynamic interplay between innovation, quality of job and employment. For this purpose, we apply Schienstock's (2004) innovation matrix as an analytical tool to identify key impacts of organisational innovation. In this classification, one dimension indicates the 'core' components of an organisation, and the other refers to the changes in the 'relations' of these core components. Using these two dimensions, the matrix shown in Table 9 illustrates the possible types of organisational innovation from both a static and a dynamic perspective.

Table 9: Typology of organisational innovation*

| Relations between the core components of the organisation | Core components of the organisation | |
|---|--|--------------------------------|
| | Not changing | Changing |
| Not changing | Incremental innovation (e.g., e.g. Quality Circle, Ideenbörse, Kaizen principles, IT-based management) | Modular innovation - |
| Changing | Architectural innovation (e.g. Integrated project team) | Radical innovation - |

Source: Schienstock (2004: 18)

In this perspective, the incremental type of organisational innovation does not produce changes in the core elements and in their relations within an organisation. In other words, the incremental innovation may not change the interest- and power relations in the working practice.

For example, Quality Circle, Ideenbörse, Kaizen principles or IT based management system do not substantially change the status quo of the (social) relations at the workplace level in the entire company. However, the Kaizen principle, Quality Circles and the Ideenbörse are tools for the practical (tacit skill) knowledge mobilisation of employees. They may have an important effects on the quality of job and employment.

In case of QC, Kaizen methods and Ideenbörse, the creative character of work increased during these activities, but the basic tasks in production remained routine, not allowing for more autonomy or learning opportunities. So, in a way we can say that people perform these activities as an ‘add-on’ at work. Although it may improve creativity of employees, as one participant noticed: “... *Ideenbörse is not only good for money but also for creativity and self-fulfillment*” (engineer, white collar, HU-SUBSIDIARY).

Similar improvement in the quality of job was found in the case of Kaizen or the QC practices too: it is ‘shifting towards less automation and towards the use of employees’ idea to optimize production based on smart use of manual work’. In addition, the mobilisation of the individual practical knowledge and the transfer into collective knowledge has contributed to a holistic view and an extended network of participants which might facilitate their promotion chances. Only the implementation of the *IT-based management*, which aimed at supporting the centralised decision making system is leading to a different direction. Through formalisation of the production information system. The key drivers of this change was the ‘product’ and ‘process’ upgrading within the value chain, and this has led to a significant decrease in the autonomy of rank-and-file employee.

The architectural version of organisational innovation, such as the *Integrated project team*, has changed the relation between the core elements of an organisation but it did not modify the core components. This type of organisational innovation represents a ‘functional upgrading’ within the GVC. Organisational innovations mapped at the Hungarian and German automotive firms fall into the category of incremental and architectural innovations. However, only the *Integrated project team* is focused on cutting through the organisational ‘silos’ between functional units. The longer term perspective may result in a shift in the existing balance of interest and power relations, thereby affecting transforming of both the quality of work and employment conditions. In translating these major forms of innovation into the language of organisational learning, the incremental forms of innovations require a single-loop or first-level mode of

learning, and radical innovation represents a double-loop or second level (holistic) form of organisational learning.

Comparing the knowledge mobilisation and commercialisation practices of the four firms investigated, the following firm' capabilities could be identified (Schienstock and Hamalainen, 2001:16):

- HU-T-PLASZTIK can be characterised as a 'Reactive firm'. The implementation of an *IT based manufacturing system* indicates significant potential in knowledge application and commercialisation capabilities.
- The organisational innovations implemented at *GER-SUPPLIER*, *HU-SUBSIDIARY* and *HU-GLOBAL PARTS SUPPLIER* illustrates an impressive knowledge creation, development and sharing capabilities. These firms have the quality of the so-called 'proactive firms'.
- Finally, *GER-SUPPLIER's* implemented *Integrated project team* could be interpreted as an attempt to develop capabilities to anticipate future knowledge development. Comparing the cases this firm is fairly advanced in creating and generating human and organisational (managerial) resources to succeed as an 'entrepreneurial firm' in the future.

4 Concluding remarks

Overall, we find that although the automotive industry is one of the most globalised economic sectors characterised by enormous competition, continuous cost-cutting efforts and extensive use of technology at all levels of the GVC, the majority of the innovations investigated in the case studies contributed to improving job quality at these workplaces to different degrees. The management's interest in mobilising and sharing the knowledge of rank-and-file employees has often lead to a more inclusive and participative work organisation model in which employees may join in to improve their everyday working practices. In these cases, organisational innovation can be seen as a lever of job quality, although often at the expense of increased workload. It is even more surprising as the 'automation anxiety' is on the rise in the sector. The case of GER-SUPPLIER was especially interesting because they were seeking to gain additional competitive advantage by using the ideas of their employees and by optimizing production based on 'smart use of manual work' instead of investing large amounts of money into less flexible machinery. It seems that the increasing needs for flexibility, together with knowledge intensive character of the work may represent significant limits for automation. The cases of the Ideenbörse and the quality circles showed similar experiences. They indicate that the control of and the knowledge about production processes is still a strategically important resource to be generated. Presently, it is limited because of increasingly smaller production batches, shorter delivery times, and a sharp price based competition which continuously force automotive companies to increasingly manage contradictory objectives, and look for good solutions and compromises by applying available production knowledge.

On the other end of the scale, we found in the case of the 3rd Tier Hungarian supplier HU-T-PLASZTIK, the implementation of a new IT-based management system significantly decreased the autonomy of the employees. This is partly because standardised and widely automated work itself requires less knowledge-intensive activities regularly, and partly because the firm is a relatively new player in this sector and has a less sophisticated work organisation model. The new management system can be seen as a first step in this regard, and it seems to be a necessary precondition of further business development in the future (if the growth will go on as before). This way, it may contribute to a further growth in employment.

Finally, in relation with the impacts of digitisation it is worth stressing the recent trend of the IT companies such as Tesla and Google emerging in the car manufacturing sector as well as the move of automotive manufacturers to offer new services using IT (BMAS, 2017). This was well illustrated by the GER-CARSHARING case study, which indicates that the lines blurring between manufacturing and services and the movement of firms into new markets are driven not only by the digitisation but by the consumer preferences and the societal values too.

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6 List of Case Study Reports and Industry Profiles

| Case studies | |
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| GER-CARSHARING | Kümmerling, A. (2017): German Car-sharing company. Traditional car-sharing companies between ‘green niche’ and professionalisation. Case study report for WP6 of the QulnnE project. Unpublished Manuscript. |
| GER-SUPPLIER | Latniak, E. (2017) German Automotive Supplier. Case study report for WP6 of the QulnnE project. Unpublished Manuscript. |
| HU-T-PLASZTIK | Szentesi, I., Illéssy, M. And Makó, Cs. (2017). <i>IT-based management innovation: formalisation of production information system. The case of a family-owned auto-parts supplier.</i> Case study report for WP6 of the QulnnE project. Unpublished Manuscript. |
| HU-SUBSIDIARY | Borbély, A., Makó, Cs. and Illéssy, M. (2017). <i>Hungarian subsidiary of a global automotive company: Ideenbörse as an example for ‘Doing-Using-Interacting’ (DUI) Innovation.</i> Case study report for WP6 of the QulnnE project. Unpublished Manuscript. |
| HU-GLOBAL PARTS SUPPLIER | Losonci, D., F. Tóth, A, Makó, Cs. and Illéssy, M. (2017): Quality Circle as an example for ‘Employee-Driven-Innovation’ (EDI). A Hungarian subsidiary of a global automotive supplier group. Case study report for WP6 of the QulnnE project. Unpublished Manuscript. |
| Industry Profiles | |
| Hungary | Illéssy, M. and Makó, Cs. (2016): Industry profile: Automotive Industry – Hungary. Report for WP6 of the QulnnE project. Unpublished Manuscript. |
| Germany | Kümmerling, A. (2016): Industry profile: Automotive Industry – Germany. Report for WP6 of the QulnnE project. Unpublished Manuscript |

7 Annex – Summaries of Case Studies

GER-CARSHARING (Kümmerling 2017)

Brief characteristics of the companies' structure and business strategy

The company is a holding company that works with one of its subsidiaries to provide local operators, in a quasi-franchise arrangement, with all the central services required by a car sharing business. The case-study company has is present in more than 20 German towns and cities. The car-sharing businesses are operated locally by independent client companies, most of which are limited liability companies. Customer relations and the entire vehicle fleet are the local client companies' responsibility. The owners of the holding company are for the most part customers and employees. The decision to establish a holding company was driven by the view that this was the organisational structure that offered the local client companies the greatest possible degree of operational freedom. The clients operate locally as limited liability companies, have their own financial planning and order only very specific services from the parent company, which also supports them by providing advice. Services are provided by both the parent company and the subsidiary service provider.

Concerning HR, there are low fluctuation rates, ageing staff, and problems with working times due to unregulated 24/7-service availability needed.

Important innovations in recent past

Innovations in marketing and communication:

- Improved availability of cars: switch from large stations to smaller stations integrated into streetscape => closer to customers
- Internet, social media, mobile apps: as a reaction to extended demand for different and versatile customer information
- New 'wording': closer to customers' needs

Caused by

- Customers: less environmental background, but demand for improved services: marketing – becoming more friendly and easier
- Competitors: growing number of competitors, different car & service concepts, with large capital behind => no need for immediate profitability
- Employees: regulated working time – ageing staff vs. extended support demands from more different customers

Key findings on interrelationships between innovation and job quality, employment and inclusiveness

Presently visible:

- Tension between "green niche and professionalisation":
- Company is developing towards improved services, better communication, and a more regulated organisation due to a situation of radical change in a turbulent economic environment after a long time of stagnation: The company is rooted in left-wing environmentalism (cooperatives), but since ~2005, there are new 'entries' backed by automobile OEMs leading to an increasing professionalisation of services. There is some reluctance in staff towards these changes.

GER-SUPPLIER (Latniak 2017)**Brief characteristics of the companies' structure and business strategy**

GER-SUPPLIER is an old company (>100 years) and it still is in family ownership. In 2014, the majority of the ownership share was transferred into a family foundation structure for a company holding. It is a typical German "Mittelständler" (family owned mid-size company), but since 2010, there is no family member anymore working as a manager. Since 1950, the company is active in automotive sector, with several production sites in Europe since the 1990ies. Headquarter, largest production site and the engineering unit are located in the West of Germany, still. Presently, there are approx. 1350 of the employees worldwide in *GER-SUPPLIER*'s automotive division, the entire company is presently reaching a turnover of approx. 280 Mill. € p.a. The automotive division is the largest division of the company.

Important innovations in recent past

Emphasis on organisational innovations in a framework of new strategic orientation towards premium car OEM and efforts to become a development partner supplier:

- ‚Kaizen‘ principles consistently adapted and implemented causing visible changes for employees,
- broad participation meanwhile after some reluctance in the beginning, external feedback very positive as an indicator for success
- Introduction of new product development processes and organisation based on a strategic choices for a 'speed-up' of development processes
- implemented since 2010, after a severe financial crisis, initiated by a new management

Key findings on interrelationships between innovation and job quality, employment and inclusiveness:

Presently visible:

- Wages increased
- work quality improvement in production (restructured work places in production units) (cf. visible changes)
- reduction of temporary work - partly shift to core staff
- extended employment of engineers (for development)
- change in company culture: transparent, interactive, communicative, workers' proposals are applied

Preconditions

- 'Patient capital', strategic management choices (implemented), and a favourable market environment
- Management and employees are jointly active: both are struggling for a future perspective after long period of economic turmoil.

HU-SUBSIDIARY OEM (Borbély et al. 2017)**Brief overview of the company's structure and business strategy**

The Hungarian Company started its activities in an important larger Western Trans-Danubian industrial city at the beginning of the 1990's, as a subsidiary of a high-market segment German car manufacturer. The operation began with engine production, however the proximity of the Austrian border and the city's long-history in vehicle manufacturing facilitated to implement higher value added activities in the Global Value Chain (GVC) of the automotive sector. The first car model was assembled in the late 1990's. The Company – belonging into the OEM category - further expanded its activities with engine development, as well as with tool manufacturing in the early 2000's. Due to the continuous expansion, Company doubled the size of employees since 2008, and became one of the largest employer in the Hungarian automotive sector.

Important innovations in recent past

'Ideenbörse' is a IT supported system to boost the employees involvement in the innovation system. The Company borrowed this Employee Driven Innovation system (EDI) from its parent company in 2004. However, as the Company grew, it had become more "*necessary to find out what the colleagues had in mind*", thus Ideenbörse became more than an online suggestion scheme. From 2016, Ideenbörse is covering all employees and became an institutional tool to increase inclusivity of participation in this complex incentive system, as well as an enabler to develop an innovation oriented corporate culture.

Key findings: interplay between innovation and job quality, employment and inclusiveness

Contrary to the radical innovations, such as parking assistance or emission reduction technologies, the *Ideenbörse* as a form of incremental innovation is exploiting the practical experiences and knowledge of employees. In relation with the major impacts of this system, it is necessary to note its labour saving effects. However, due to the large size and available resources and cooperative corporate culture, the Company is able to minimise the negative impacts of this type of innovation on employment using the methods of manpower transfer in between various division operating in house. Increasing inclusivity (i.e. e-inclusivity) through the help of the web-based access guaranteed for all employees is another important impact of the *Ideenbörse*. It decreases the distance between groups of employees in the web- accessibility, but - in the everyday working practice - it has not abolished inequalities (e.g. in workload, organisational slack, etc.) related to the division of labour. For example, *Ideenbörse* participation is easier for white-collar workers than blue collar production workers, as they have an access to wider range of processes and fields than production workers, or they can more free time easier to develop and submit new suggestion. It's important to stress that although participation via *Ideenbörse* has a significant positive impact on career advancement, on-the-job training opportunities, as well as on pay, it has no effect on the daily routine or core tasks-structure of the employee. By allowing participation for all of its employees, the Company has involuntarily created a so-called „mixed working experience” which incorporates creative tasks, greater autonomy and job enrichment in addition to the unchanged and routine everyday tasks.

HU-T-PLASZTIK (Szentesi et al. 2017)**Brief characteristics of the family business and its market strategy**

The family business established in the early 1990s – operating in the Northern Great Plain Region – currently has more than 300 employees. Its main activities include rubber, plastic products manufacturing and technical and upholstery foam conversion. Its annual net revenue is over HUF 6.0 billion.

The company developed a portfolio of products which reduces seasonal fluctuations of production and guarantee survivability during times of economic up and down. Sustainable competitiveness was achieved through the implementation of quality assurance and environmental management systems and by the introduction of the new IT-based production management system.

Need to restructure managerial and organisational practice

Continuous growth in production has made necessary the increase transparency and monitoring of the business activity. Introduction of the IT-based 'Abas-ERP System' and the related organisational transformation served this goal. The previously, management and organisation practice relied on the non-coded experiences and knowledge of both managers and workers. Following the implementation of the 'Abas-ERP System', orders and their fulfilment could be monitored and correct online. The IT based production management system is covering a dozen of business function, from production to customer relation management.

The governance system needed further professionalisation, i.e. separation of family control and managing the company via hiring a non-family member CEO, too.

The Impact of the 'Abas-ERP System' on the quality of work.

The introduction of the IT-based production management had various impacts on the quality of the work which was measured by dimensions of the QuinnE theoretical framework. It has not produced measurable influence neither on the balance of quality of working and private life, as well as nor worker's interest representation. On the other dimensions an indirect impact of the IT based production system on the quality of life was found: for example, work's intensity increased together with the need for internal training. Better planning and tighter control on the labour process forced employees to higher performance increasing wages at the accompanied by conflicts aroused around setting performance requirements.

Suggestions and ideas generation to facilitate work from the various levels and functions of organisation were collected by the IT-based production management system. However, new suggestions (ideas) rarely come from machine operators, they were satisfied with identifying or exploring the production related problems. Middle and top managers were profiting the advantages of the IT use in the everyday practice, due to the increased transparency and online feedback.

HU-GLOBAL PARTS SUPPLIER (Losonci et al. 2017)**Brief overview of the company's structure and business strategy**

The direct legal predecessor of the Hungarian case unit was founded in 1993 and it was purchased by AG, a large automotive supplier group in 2006. The case unit operates in interior manufacturing and assembly industry. In 2010, a second factory was constructed on the Hungarian business site. Two years later a logistics centre was created to store the procured items and support internal material handling. The expansion is well-illustrated by the relevant figures: by 2012, the two factories managed to double the output volume of 2007 and, consequently, together they became one of the biggest product manufacturing sites in this market segment globally. The volume amounted to 3.2 million products, corresponding to around 3% of the global market output, and it has kept increasing, due mainly to supplying the automobile manufacturing capacities relocated to the region. The growth of the domestic subsidiary is witnessed by its 85% turnover increase from 2011 to 2016. The headcount of the Hungarian plants attained and then exceeded 1900.

Important innovations in recent past

Units of the division have been using the quality circle (QC) method since the early 2000s; Hungarian site took it over in 2013 and has kept developing it since then. Its aim is to have groups of 4-6 workers in the same field and this team works out projects addressing problem areas encountered in everyday work, suitable for development at their own level of responsibility. The practice strengthens team unity and it is one of the job enrichment tools. In the first half of the year, management collects project ideas for QC teams. Projects based on the selected topics start from employee level: employees can design and execute themselves. The team members include production line workers, engineers and support staff, but no higher-level executives. The QC members can only choose the latter as assistant helpers. When the QC is set up, its members choose a team leader (whose person may change during the project) from among themselves. The project goal is to work out and implement a development that can be supported by facts, by quantitative data. The groups report on the progress of the project at management meetings on a weekly basis. The effectiveness and success of QC teams are evaluated at subsidiary level (20+ team in a year). There are also European and global competitions for best QC teams from different sites.

Key findings: interplay between upgrading in the value chain and improving job quality of employees

QC's major contribution from the plant's point of view is that its members resolve process related or organisational problems highlighted by the management team. Members of QC are from lower levels of hierarchy. Participants of QC learn and/or improve several general capabilities. Furthermore, participation in QC efforts are preferred when it comes to promotion. Since QC resolve many cross functional problems, the projects have far reaching impacts on effectiveness throughout the organisation. Altogether, members of QC at the end of the project have a better overview of the local operations, are better in corporation, are more involved and have a better internal network.

Sustaining the QC system requires many resources. First of all, the vast majority of the resources is used by the about 100 employees involved directly in the QC efforts, eg., QC related tasks for all teams, and competition related tasks for the best QC teams. Managerial resources are required by continuous mentoring, assessment, and by awareness raising multi-channel communication. Furthermore, there is a mentor to support QC and there is a preparation education session about the methodology. Participation in QC goes together with many additional tasks. Members have a tighter daily schedule, so finding the right balance between daily task and QC-related task can be really challenging. This challenge resulting for example in overtime can be a selection criteria among employees, e.g., many employees are not able to take overtime for a longer period of time. In this situation, colleagues of the participants can perceive that the member of QC becomes bottleneck in daily operations.

CHAPTER 4 – Innovation, Job Quality and Employment Outcomes in the Agri-food Industry: Evidence from Hungary and Spain

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1 Introduction

The fundamental role of food in the life and health of people is a well known fact, as well as its importance in the rural environment, cultural and natural heritage, landscape and gastronomy. A good part of it is contained in what is known as the agri-industrial sector, which is defined as the subgroup of the manufacturing industry which processes raw materials and intermediate products of farming, forestry and fisheries (Henson and Cranfield, 2013). The future challenges for the sector are many and highly ambitious in an ever more populated, globalised, urban world with increasingly limited resources. Innovation and sustainability play an essential role in managing to feed the 9,700 million people who are expected to inhabit the Earth in 2050.

According to Dennis et al. (2007), the capacity of the farming and food industries to continue to meet during future decades the indisputable increase in demand will depend to a large degree on fostering application of existing technologies, as well as the use of new and innovative tools which provide improvements in the processing and products. In other words, focus on innovation may signify an increase in competitiveness, improvement in quality and, therefore, assurance of the sustainability of the agri-food industry.

This innovation is understood to be in the widest sense envisaged in the Oslo Manual: not only technological innovation or that focused on products, but also in productive and commercial processes and in services, as well as in the inherent capacity of disruptive innovation to transform businesses or even create new business models.

In the European Union, the Europe 2020 strategy establishes innovation as one of its cornerstones. This same tool is the one which has contributed towards minimising the strong impact of the financial crisis and austerity measures implemented in Europe after 2008, with special effect on the Mediterranean countries.

At the same time, renovation of the sector is a need in view of a growth model which has proved its lack of sustainability and its limitations in ensuring sufficient and quality employment in recent years (Domingo et al., 2015).

Nevertheless, following the technological advances of the 20th century, we find ourselves in an era of digital transformation which some authors ensure will entail a considerable increase in productivity and which could, in turn, signify adverse effects on workers with medium/low qualification (Brynjolfsson and McAfee, 2007). The debate on the effects of digitalisation on labour markets and job quality is intense (Berger and Frey, 2016). Since the eighties, there seems to be an increasingly direct relationship between the technological change which has come about and the improvement for relatively qualified workers. Furthermore, new professions have appeared linked to this digital transformation. However, not all changes, such as salary variations across the distribution of skills, can be clearly explained (Berger and Frey, 2016).

The agri-food industry, specifically, is a sector which has been technologically stagnant in the past. In addition, traditionally certain groups of workers have had poor job quality. Despite this, even if digital technologies have been able to create only a few jobs directly, they have already had a substantial impact on qualification requirements of the new profiles created in the agri-food industry. For example, around 42% of OECD workers in all sectors are employed in companies that have introduced new technologies which have already changed work routines or skill requirements in the last 4 years (OECD, 2013).

The analysis focuses here on the interplay between innovation and job quality, and the associated employment outcomes in the agri-food industry. In this context, the **goal** of this chapter is to conduct an analysis of the existing interrelation between innovation and job quality in the agri-food sector based on research carried out, endeavouring to link, to the greatest possible degree, the main conclusions with those of specialised literature, thus allowing a generalisation of the results.

For such purposes, the **methodology** used follows three essential lines:

- Fieldwork (analysis on selected case studies in European Union countries in which the agri-food industry is of particular economic importance - Hungary and Spain) and the similar and different strategies which allow (based on cases of different sizes, activities within the agri-food industry and legal structure) identification of common aspects which influence on innovation management and job quality and the nexuses between both factors.
- The national industry reports elaborated by the two organisations that have developed the case studies. In addition, we have conducted interviews with industry experts. Those experts were interviewed to have a comprehensive view of the evolution of the industry and the main innovations it had undergone.
- Bibliographical analysis and review of statistical sources and studies which permit, together with support data from fieldwork, comparison of the main conclusions reached in specialised literature. The idea is to provide robustness to the conclusions and allow us to discuss which trends and interactions can be assumed to be typical for the agri-food industry in the two countries, and, possibly, in other European countries too.

The **limitations of the analysis** are basically associated to the scant specialised literature which combines the three concepts of the study; namely, innovation, job quality and agri-food industry, and also the restriction of case studies in a field of activity characterised by notable heterogeneity. These elements hinder the attainment of global conclusions at macroeconomic level for the European Union as a whole.

The text is articulated in four parts. After the introduction, the second section analyses the sector together with its job quality, within a regulatory and contextual framework, and describes the common aspects detected which have a direct influence on business management and model and, furthermore, in innovation and job quality strategies. A third section shows the motivations which prompt companies to innovate, as well as the type of innovations, the importance of a governance procedure and also explains the detected interrelations between innovation and job quality. Finally, the conclusions chapter underlines the main ideas of this study and offers a series of recommendations both for improvement of innovation management in companies and regarding regulations and policies.

2 The industry

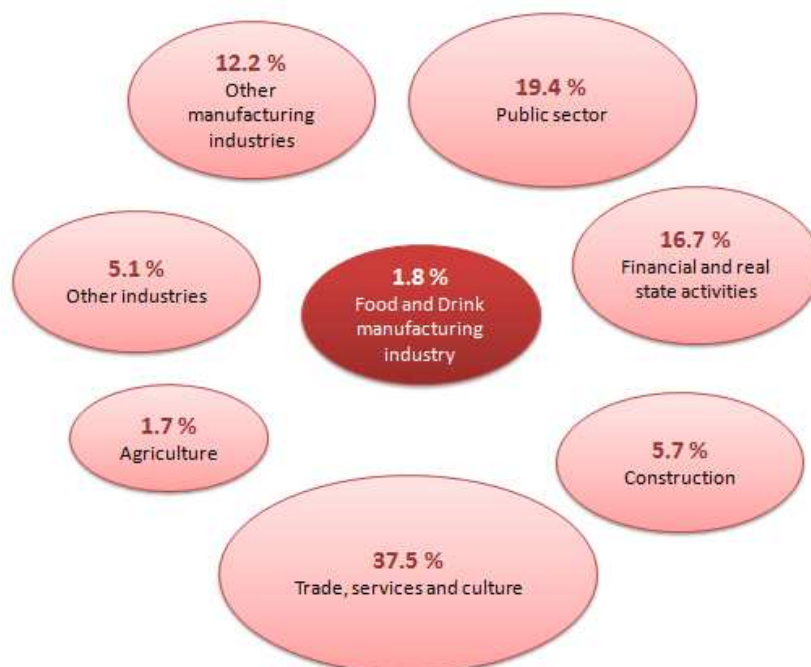
Initial knowledge of the industry and the basic context is essential in order to tackle innovation processes and their dynamics in relation to job quality.

2.1 The industry in figures

The latest FoodDrinkEurope 2016 report indicates that the agri-food industry, with a turnover of 1,089 billion Euros, is the **largest manufacturing sector** of the European Union (EU28) providing employment for 4.24 million people in the EU (Eurostat 2014). The data indicated here include the NACE rev.2 C10 category of agri-food products and C11 category of drinks. In the sector, a total of 291,854 companies conducted their business in 2014, according to Eurostat, wherein SMEs account for 49.5% of the turnover and 62.8% of employment created in the sector.

This industry signifies 1.8% of the Gross Added Value of the European Union in 2013, being one of the big contributors to the European economy, ahead of other manufacturing sectors such as the car industry.

Figure 1: Contribution of the food and drink industry to the EU economy (2013, %)



Source: Own elaboration from the data of FoodDrinkEurope, 2016

Bearing in mind these 4.24 million workers, as indicated in FoodDrinkEurope, 2016, it is one of the **employment sources** which generate the greatest number of jobs and with relative stability. Nevertheless, employment in the sector fell by 4.4% between 2008 and 2010 and 0.5% between 2010 and 2012, probably motivated by the financial crisis which hit the European Union during those years and mainly affecting countries with a certain agricultural tradition.

The EU-28 countries where these workers have a greater representation with respect to the national workforce are Croatia (6.5 % of the workforce), Poland (5.9%), Cyprus (5.7%) and Bulgaria (5.4%). The percentage of workers in the sector is lower in United Kingdom (2% of the workforce), Sweden (2%), Luxembourg (2.2%) and The Netherlands (2.6%) (Eurostat 2014).

The average number of persons employed by agri-food companies is 16, which is higher than the average in manufacturing companies (14), but considerably lower than in other sectors such as pharmaceuticals (133) or the car industry (119). On average, worker productivity is lower than in the other manufacturing sectors. The fragmentation of the sector is one of its characteristics as it will be analyzed later.

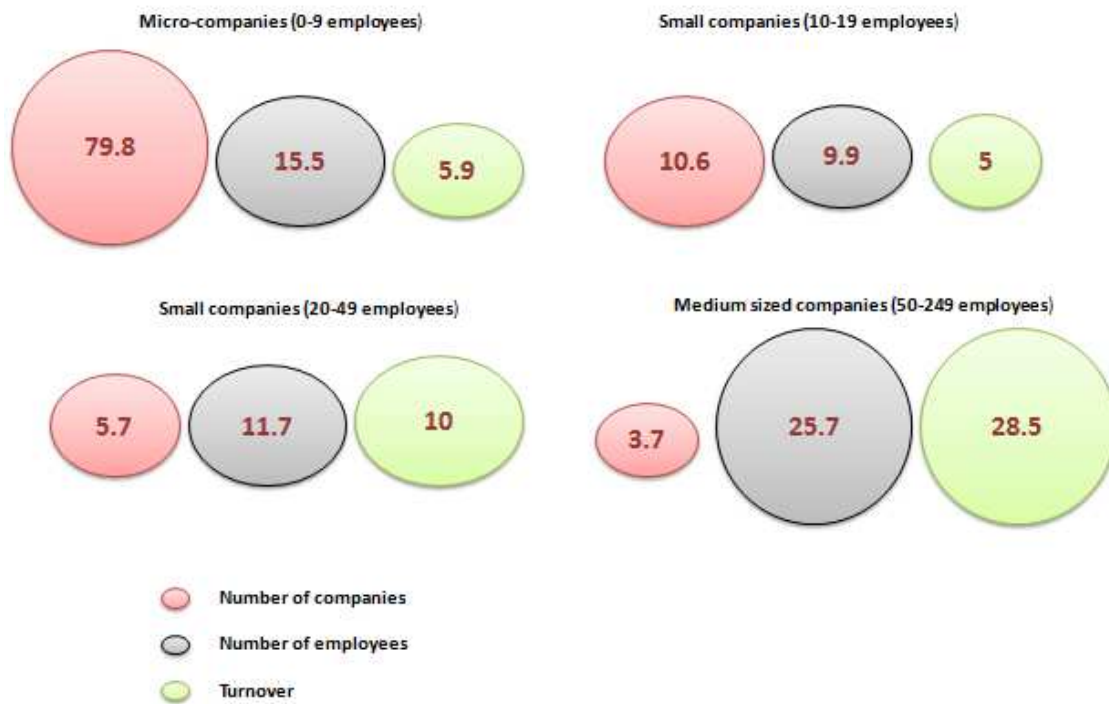
This sector is **predominantly masculine**, with 58% of male workers (Eurofound, 2015). On the other hand, the proportion of workers who have a woman as boss is of 35% in the case of women and of 8% in the case of men, which is considerably lower if compared to the European average of 47% and 12%, respectively.

The average age of workers in this sector is similar to that of the group of EU28 industries, although the proportion of young workers is slightly higher (11% as compared to 9.2% of the EU). Workers aged over 50 have a lesser representation (23% of the workforce of the agricultural industry as compared to 27% of the EU28 total (Eurostat 2013).

It is a **highly diverse industry**, comprising fruit and vegetables processing, dairy products, meat processing and drinks. The 5 main business categories which represent three quarters of the business volume and more than 80% of the total number of companies and employees are: bakery and flour-based products, meat sector, drinks and "other sundry food products".

Small and medium-sized companies generate almost 50% of the turnover and of the added value of the sector, in addition to providing employment to 2.8 million persons. Self-employment has scanty representation in the sector, 4% of the companies are self-employed workers with employees, and 4% is self-employment without employees, as compared to 4% and 11% respectively in the group of EU28 industries. The following figure shows the main characteristics of agri-food sector companies by size:

Figure 2: SMEs in the EU food and drink industry (2013, % by company size)



Source: Own elaboration from the data of FoodDrinkEurope, 2016

At Member State level, Germany, France, Italy, United Kingdom and Spain are the greatest producers of food and drink products according to turnover (Table 1) contrasting with the figures in regard to the percentage of workers in the sector indicated above. This industry is an essential part of many national economies, representing in various cases more than 15% of turnover.

Table 1: Food and drink industry data by EU member (2014)

| Country | Turnover | Number of employees | Number of companies |
|----------------|-----------|---------------------|---------------------|
| Austria | 22.040,0 | 79.401 | 3.872 |
| Belgium | 45.227,3 | 86.868 | 7.323 |
| Bulgaria | 4.944,3 | 90.706 | 5.963 |
| Croatia | 5.084,4 | 59.502 | 3.250 |
| Cyprus | 1.411,7 | 11.166 | 908 |
| Czech Republic | 13.233,3 | 101.928 | 8.926 |
| Denmark | 25.819,4 | 60.447 | 1.589 |
| Estonia | 1.870,2 | 15.005 | 525 |
| Finland | 11.153,5 | 38.639 | 1.734 |
| France | 184.546,3 | 593.080 | 62.225 |
| Germany | 191.876,9 | 819.223 | 29.731 |
| Greece | 13.237,7 | 76.127 | 14.442 |
| Hungary | 11.153,7 | 99.817 | 6.700 |
| Ireland | 26.485,3 | 44.746 | 1.634 |
| Italy | 129.121,6 | 343.286 | 56.412 |
| Latvia | 1.834,5 | 25.575 | 1.003 |
| Lithuania | 4.237,2 | 42.010 | 1.601 |
| Luxembourg | 970,5 | 5.344 | 161 |
| Malta | - | - | 384 |
| Netherlands | 68.833,8 | 121.808 | 5.639 |
| Poland | 55.440,5 | 395.952 | 13.098 |
| Portugal | 15.138,6 | 99.519 | 10.948 |
| Romania | 11.131,1 | 179.992 | 8.798 |
| Slovakia | 4.344,0 | 35.720 | 2.910 |
| Slovenia | 2.158,8 | 14.499 | 2.160 |
| Spain | 105.131,8 | 334.694 | 27.334 |
| Sweden | 18.062,0 | 53.939 | 4.008 |
| United Kingdom | 97.058,3 | 367.386 | 8.613 |

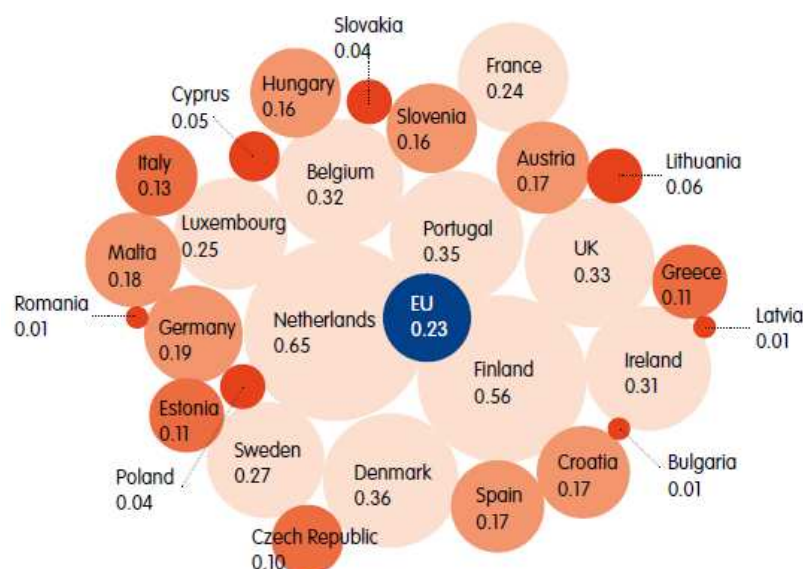
Source: Annual enterprise statistics for special aggregates of activities (NACE Rev. 2), data retrieved from Eurostat Website

Research and development expense in the agri-food industry at European level totals 2.5 billion Euros (FoodDrinkEurope, 2016). The trends which motivate innovation are the introduction of different products and the variety of sensations, as well as sophistication and easier handling.

As regards the **most innovative sub-sectors** of the European-wide agri-food industry, we can highlight the processing of convenience foods, dairy products and alcohol-free drinks. They are followed by frozen foods, processed meat and poultry, and biscuits. This shows the large number of sub-sectors which adds difficulty to the generalisation of conclusions at agri-food industry level.

Private investment of European agri-food companies in research and development is of lower intensity if compared to other international regions. In terms of private investment as a percentage of output between 2010 and 2012, Europe had an investment of 0.23% as compared to 0.73% in Japan, 0.63% in Australia and 0.57% in the United States. At European Union level, private investment in R&D goes from 0.65% in The Netherlands to 0.01% in Rumania (Figure 3)

Figure 3: Private investment of the food and drink industry in R&D as a percentage of output in the EU (2010-2012, in %)



Source: FoodDrinkEurope, 2016 and Eurostat (BERD and National Accounts) (Including tobacco)

The growth in the agri-food product market is linked to **exports**, which has doubled in the last decade reaching 98.1 billion Euros in 2015. Exports have increased by 5.2% with respect to 2014 (FoodDrinkEurope, 2016). Agri-food exports represent 7% of the goods exported by the EU, being world leader in this type of exports (European Commission 2016). A quarter of the exports have been sold to countries outside the EU, also showing an increasing rate in recent years. On the other hand, imports have increased by 6.5% with respect to 2014. NAFTA (North American Free Trade Agreement) continues to be the main trading partner of the EU, followed by EFTA (European Free Trade Association) and ASEAN (Association of South-east Asian Nations).

2.2 Working conditions and job quality in the agri-food sector

The objective of the Eurofound Working Conditions Survey is to measure working conditions in different European countries, analysing the relationship between different aspects of quality in employment, identifying risk groups, furthering areas of progress and contributing towards the development of European policies which foster improvement in job quality.

The methodology followed in the sixth survey carried out in 2015, EWCS 2015, (the first survey was conducted in 1991), has been personal face to face interviews (around 44,000) with randomly selected workers based on a statistical sample made up by a representative cross-section of society. The survey was conducted in 35 countries: the 28 Member States, the 5 EU adherence candidates (Albania, the former Yugoslav Republic of Macedonia, Montenegro, Serbia and Turkey), as well as Switzerland and Norway.

In general, EWCS 2015 indicates as main characteristics of job quality in the agri-food sector: greater prevalence of jobs, excessive working hours in micro companies, lesser appreciation of quality of life by workers than the EU28 average, greater exposure to environmental and ergonomic risks, highly informed workers on health and safety issues, and work stress for various employee profiles. Below, there are remarks on the different factors analysed and their relationship with the group of economic sectors of the 35 countries that participate in the survey.

One of the aspects under scrutiny is the **type of contract** in the agri-food sector, bearing in mind the sex of the worker. In this regard, there is a prevalence of indefinite contracts (76% of women workers and 82% of men) as compared to fixed-term contracts. Furthermore, there is a majority of full-time contracts, with only 5% of men and 30% of women having a contract of 34 hours or less. These values are also notable if compared to the European Union average (38% of women and 12% of men).

In regard to the **workday**, in general, agri-food industry workers have an average working week of 39 hours, one hour more than the European average for sectors as a whole. In regard to gender, women work on average lesser hours than men, but they dedicate more time to work as the size of the company grows. Men, on the contrary, have a longer working day in small companies.

The survey also shows that the proportion of persons who would be more satisfied working shorter hours is greater in small companies. Moreover, it is in this type of companies where employees work the greatest number of unsocial hours (weekends, nights, etc.). This leads us to think that the average number of individual working hours in micro companies is greater than in other larger companies of the sector and than the average of all sectors. This fact is also corroborated by the data from the case studies conducted to support this analysis. For example, in the case of Spain, the case study of the biscuit factory (SP-BISCUIT) regarding a very large company shows that the workers, to a high degree, adjust to the working day of 8 hours. On the other hand, for case studies in relation to wineries and oil presses – all small and medium-sized companies (SP-WINERY, SP-WINE_COOP and SP-OIL_MILL) – the workers remark on the intense workload during certain seasons of the year associated to the farming or treatment of the processed product (harvesting, pruning, etc.).

Work-life balance is worse both for men and for women in the agri-food sector if compared to the EU28 average for all sectors. It is only better in the case of men who work in companies of more than 250 employees.

Turnover in the workplace is greater than in the EU28 average (52% against 47%). Furthermore, 32% of the workers conduct their activity under a multitasking system. This is more frequent in small and medium-sized companies, where it is common for workers to acquire various responsibilities, as was also observed in the case studies conducted.

In general, workers of the agri-food sector consider, according to EWCS 2015, that their qualification and **training** is adequate for their job responsibilities. However, the percentage of workers who confirm they have received training is much lower in this sector if compared to the European Union as a whole, becoming more marked with age. Women workers have benefited from less training than men.

In general, **workload** is greater for agri-food sector employees than in other industries. Nevertheless, the survey shows that the profiles at greatest risk of work stress due to intense workload and reduced autonomy are women in SMEs and men in large companies, or those aged fewer than 35 or over 50 in small and medium-sized companies. This work stress can be compensated by a good social atmosphere in the working environment. In this regard, the workers of the sector enjoy a more positive social environment than the European average, except for women workers in SMEs.

With respect to **occupational hazards**, workers show they know the safety norms to a greater degree than the European average. Environmental risks, followed by risks in regard to posture and movement, are the most common in the agri-food sector.

2.3 Main challenges of the agri-food industry

Agriculture and agri-food industry are sectors which are linked intrinsically and sequentially, so that agri-food needs agriculture in order to be able to carry out its activity. Farming provides the raw

materials for the processing of products and, to a large degree, agri-food companies are linked to the land through the farming concerns, and this is especially true in the case of small industries. This is why both sectors face common future challenges.

The main challenge of the agri-food industry will be to ensure the supply of food products in a context of growing population and consumer levels. On a worldwide scale, the United Nations Food and Agriculture Organisation (FAO) has warned that by 2050 it will be very difficult to maintain food supply, with the world population once more at risk of famine. This risk is due to the growth of the planet's population to 9,200 million people, climate change and the increasing scarcity of water (Domingo et al., 2015, Olav and Marchewka, 2017). For 2050, there is an estimated increase in the demand for food of 60%, an increase of 30% in the water required for agriculture in 2030 and a 45% increase in the consumption of energy for this same year.

This is why both agriculture and the agri-food sector must increase their productions by 1,200 million tons, of which 1,000 should be cereals and their by-products. At EU28 level, its 500 million consumers also need a reliable supply of healthy and nutritional food products at an affordable price (FAO).

Together with the challenge of supplying the population with sufficient food products (security), there appears the challenge of doing so with improved healthiness. There is talk, therefore, of the above mentioned concept of healthy and nutritional food products, especially bearing in mind that there are studies published by the World Health Organisation (WHO) which pinpoint food as being behind 40% of the cancers of unknown aetiology and a third of cardiovascular illnesses (Domingo et al., 2015).

Financial access and affordability of food is also a challenge. Not only should there be food in sufficient quantity, it must also be within reach of consumer economies. Eating cheap is one of the requirements which has been strengthened by the economic crisis and which forces us to look for more efficient technologies to achieve this (Domingo et al., 2015).

Lastly, but no less importantly, and something that has been underlined to a large degree by the European Union in recent years, there is an endeavour to ensure that production of these foodstuffs is sustainable (Domingo et al., 2015). The technologies applied have been useful but are requiring the use of large quantities of petrol by-products which, in turn, do not help control the other two accompanying challenges: climate change and the scarcity of water. The implementation of systems for correct environmental management of the entire chain, analysis of the complete product cycle, determination of the best techniques available for the prevention of contamination or maintenance of biodiversity, are other goals which can be demanded from the sector. The target is to supply food in sufficient quantity, that is financially affordable, adequate health-wise, appetising and environmentally friendly. These are challenges to be met to a large degree through innovation. Science and new technologies can allow us to find more sustainable growth and development models for food.

Furthermore, there are many current and future parallel challenges which have an effect on the agri-food industry, such as worldwide competition, economic and financial crises, climate change and the volatility of commodity prices, such as fuel and fertilisers.

2.4 Institutional framework and context

Each of the three cornerstones tackled in this study - innovation, job quality and agri-food industry - has its own regulatory and institutional framework and there is no common outlook, even if the European Union does have a strategy for innovation in agriculture and food sustainability.

In this regard, the Europe 2020 strategy has defined the roadmap to be followed in order to implement innovation in Member States. The Innovation Union was launched in 2010 as flagship initiative of the Europe 2020 strategy for the purposes of strengthening and eliminating the weaknesses in Europe in

regard to innovation in order to achieve a more competitive Europe in view of budgetary limitations, demographic variations and increase in global competition (European Commission, 2015a).

The Innovation Union, during its first years, has managed to promote innovation, integrating it in the main European, national and regional policies and involving all the key actors. Decisive measures have been adopted; however, response has not been equal in all the Member States. The commitments requiring greater national participation have progressed to a lesser extent, partly due to long legislative procedures and because they are less binding by nature (European Commission, 2015a, Makó and Illéssy, 2015).

Five priorities are established within the framework of this initiative: strengthening the knowledge base and reducing fragmentation, getting good ideas to market, maximising social and territorial cohesion, pooling forces to achieve breakthrough: European Innovation Partnerships (EIP) and leveraging our policies externally.

Under the first priority, we should highlight the launching of the Horizon 2020 financial instrument, as the biggest EU Research and Innovation programme ever, with around 80 billion Euros for the 2014-2020 period. This instrument spans different areas of development which includes the agri-food sector. In this regard, the challenge is to meet consumer needs and preferences while minimising the associated impact on health and the environment. Research and innovation will address food and feed security and safety, the competitiveness of the European agri-food industry and the sustainability of food production, processing and consumption.

Furthermore, a Strategic approach to EU agricultural research and innovation has been established which will be implemented between 2018 and 2020, thanks to Horizon 2020 funding. The strategy aims to boost demand-driven innovation and the implementation of research, creating synergies between EU policies (European Commission, 2015b).

Meanwhile, the European Innovation Partnership “Agricultural Productivity and Sustainability” has set in motion the interactive innovation model, which aims to increase project impacts through the establishment of a process of genuine co-creation of knowledge (European Commission, 2015b, European Commission, 2014).

Competitiveness of small and medium-sized companies is also being pursued Europe-wide through the COSME programme. This programme endeavours to help access to financing on the part of SMEs, support their internationalisation and access to markets, create a favourable environment for competitiveness and promote an entrepreneurial culture.

At national level, there are great variations with respect to innovation policy. Within the framework of the Quinne project, an analysis has been conducted on innovative policies within the European Union and of the Member States participating in the project (Makó and Illéssy, 2015). Generally, the conclusion was that there are two types of countries: those which combine the use of tax instruments (i.e. tax incentives) with direct schemes and programmes, which include France, Hungary and The Netherlands; and those countries which have a variety of schemes and programmes without significant incentives (Germany, Sweden, Spain and United Kingdom).

With regard to agriculture, the Common Agricultural Policy (CAP) has been one of the cornerstones of the Union in recent decades. This policy, created in 1962, represents an “*association between agriculture and society, between Europe and its farmers*” (European Union, 2017). In order to tackle the aforementioned challenges, the CAP has permitted farmers to carry out multiple functions for society, especially that of producing foodstuffs.

Many of these farms have been transformed into companies of the food industry or represent their raw material supply. There now appears here the first concept highlighted in the fieldwork conducted in order to get a better understanding of the link between innovation and job quality in this sector; namely, the difference between agri-food companies associated to the land and farming of one or more agricultural product, as opposed to those industries which acquire their raw materials in the market and which use them to generate a new agri-food product.

The CAP has contributed towards the quality of life and working conditions of farmers, both through direct contribution to the economy and aids to income which pay the farmers as support (direct payments of pillar 1 of the PAC), and market measures to tackle certain situations, focusing on rural development with initiatives such as training, aid for modernisation and innovation in farms, fostering of co-operativism and the promotion of local products, among others. This policy has contributed significantly towards innovation in the sector and the conservation of local quality products, which has also entailed the consolidation and growth of the agri-food industry, often linked to the environment.

As far as job quality is concerned, Makó et al. (2016) point out that this is also a priority in the Horizon 2020 strategy, but no direct relationship with innovation is established.

In regard to the context, in the last 15 years there have been two significant events which have had an effect both on agriculture and on the agri-food industry, which varies according to the Member State. On the one hand, the adhesion to the European Union of various central and eastern European countries; and on the other, the economic crisis which began in 2008, according to Carraresi and Barterle, 2015.

Analysing the first of these events, the extension of the European Union borders opened up possibilities of trade with another 13 countries, thus increasing commercial exchanges and demand (the latest adhesion was Croatia on 1st July, 2013). In turn, as indicated by Bojnec and Fertó (2015) these events intensified competition between the countries and the creation of new opportunities, both for business and for employment and professional careers for European workers.

Secondly, the world economic crisis of 2008, which in the case of Europe had particular effect on the Mediterranean countries, has prompted trends in agriculture and the agri-food business which had never been seen before (Carraresi and Barterle, 2015).

Effects such as the loss of confidence in international markets, difficulty of access to financing with consequent need for international investment, high deficits which have entailed intense austerity measures, etc., have meant a reduction in investment in research, development and innovation, the loss of numerous jobs and the reduction of job quality, the closure of less competitive companies of the sector, etc.

Nevertheless, firms operating in agri-food activities have been less affected by the economic crisis in the later period of years analysed than those in other industries due to the anti-cyclical nature of the food sector. Firms from the most competitive countries were able to identify and fully take advantage of the opportunities existing in the EU market during this period. Thus, a firm's capability to act in international markets is becoming more and more important, just as it is for small businesses to achieve successful results (Carraresi and Barterle, 2015).

2.5 Conducted analysis

As mentioned above, the methodology followed for analysis of the effect of innovation in job quality in the agri-food sector is based on case studies. It is a research method which implies a process of investigation characterised by the systematic and detailed examination of companies; in this case, related with the agri-food industry.

The case studies have been conducted in Spain and Hungary. In the case of Spain, the food industry is the largest industrial sector with over 90 billion Euros of annual turnover. Its relevance is even greater if the agri-food value chain is analysed, which contributes more than 8% of the GNP, and makes up the second backbone of the economy after tourism (Domingo et al., 2015, RegioPlus Consulting, 2016). In Hungary, its relevance is similar, being the second most important sector in terms of number of workers and third most important producer in the manufacturing sector (Kálmán et al. 2016).

Both countries have a strong agri-food tradition, an industry which has grown and developed in close contact with the rural environment, and therefore considered a key sector for the population and for rural development (Domingo et al. 2015, RegioPlus Consulting 2016, Kálmán et al. 2016).

The job quality of the workers of the agri-food industry has changed in both countries in the last years. In Hungary, the attractiveness of the food industry for employees is rather modest due to unfriendly working conditions. However, significant improvements have been achieved since 2004. As a member of the European Union Hungary has adopted and implemented all the common EU regulations, standards of food production and inspection. Several quality assurance systems implemented have positively influenced working conditions (for example: HACCP, ISO 9002), new standards and norms as well as environmental expectations contributed to create a healthier environment and friendly working conditions. Employers have to make sure, for example that the rules of occupational health and safety are respected. Due to the need to document the workflows, the traceability and quality of working conditions were also further improved (Kálmán et al. 2016).

The daily operation of the food industry involves a great numbers and variety of equipments and machineries. The skilled jobs are increasingly important compared to unskilled jobs and require a wide range of high skill knowledge: engineering skills, packaging technology skills and environmental knowledge are increasingly important. The developments often require creativity and intellectual work (in case of product development, marketing) (Kálmán et al. 2016).

In Spain, the financial crisis has had an important impact in this sector, although this has been lower than in other industries. In short, some of the particularities of the job quality of this sector in Spain are: the pay restraint during the period of economic crisis has generally been lower in the food sector compared to other sectors; are more workers covered by a collective agreement in this sector than in the rest of sectors; and employment contracts with a duration of more than 1 year are somewhat more frequent; moreover, average working hours in this sector are higher than in the rest of the economy (RegioPlus Consulting, 2016).

The case studies have been carried out fully by Quinne project partners in the two countries. Specifically, an analysis has been made of four companies in characteristic sub-sectors of Spain (SP-WINERY, SP-WINE_COOP, SP-BISCUIT and SP-OIL_MILL) and three in Hungary (HU-PASTA_COOP, HU-WINE_ASSOC and co-operation project for wineries HU-WINE_EXPORT):

- **SP-WINERY:** It is a winery located in the northwest of Spain which produces wines of good quality regulated by Denomination of Origin (D.O.) labels. The company arise as a private initiative and it is part of a 3 winery group. It is an innovation leader in his region as they have invested a great deal of effort and time in developing different research, development and innovation projects as a source of knowledge of their product. The winery in question has 28 permanent staff and the same number working intermittently, which when calculated as full-time equivalents, would stand at 40 workers. (RegioPlus Consulting, 2017a).
- **SP-WINE_COOP:** The companys organisational model is one of an agri-food cooperative (wine) made up more than 50 members. The organisational structure is characterised by a high level of participation, with integration of the members in organisational management. It is based on a

Governing Board, selected by the members, that is directly responsible for the Wine Cellar employees, which currently consist of 5 workers. (RegioPlus Consulting, 2017b).

- **SP-BISCUIT**: This is a family business which was the pioneer in the manufacture of biscuits and bakery and cake products. Its constant efforts at innovation and its strategy oriented towards R&D make it a leader in the healthy biscuit segment. The company has three production plants, housing the modern biscuit manufacturing technology. Currently, the company has more than 1000 employees. Over recent years, it has seen a major rise in its workforce, from around 250 employees in 2002 to more than 1000 in 2017. Since this is a big company, it is the only Spanish case study which has and R&D&i and Human resources departments and trade union representation (RegioPlus Consulting, 2017c).
- **SP-OIL_MILL**: The company is a family run business made up of the parents and three children, which has carried out different projects linked to the food industry and in this particular case, to tourism. The organisational unit selected for analysis is the fourth of the family business group created by the family, and consists of an olive farm and associated mill, which has been recognised under the Designation of Origin system for Olive Oil of the region where it is located. The olive farm has 4 employees (RegioPlus Consulting, 2017d).
- **HU-PASTA_COOP**: The main activity of the company is pasta manufacturing. The company group, involved in pasta manufacturing and producing flour and egg as well as seeds is entirely in Hungarian ownership and controls all the processes ranging from raw material production to selling the finished products. A cooperative organisational culture and the related micro-corporatism were created by the prospect of long-term promotion opportunities and the strong social ties between the company and the local community. Because of conscious development strategy during the past 45 years, the efficiency of production has been increased through the use of the most modern technology and now the production is entirely automated. At present, there are 132 different jobs at the Group and several hundred workers (Kálmán et al. 2017).
- **HU-WINE_ASSOC**: It is a small family winery. The organisational-managerial (marketing) innovation of the company is connecting wine consumption to gastronomy services. They are part of an association of innovation, the “Wine Road”. It is a tourism product in the form of a thematic journey into a wine region. It is based on local initiatives and cooperation (Gubányi et al., 2017b).
- **HU-WINE_EXPORT**: This case study focuses on a Hungarian winery looking for ways to survive in a competitive market as well as the winemakers’ cooperative organised and managed by it. The winery is a family enterprise with nine employees; four of them are semi-skilled. They participate in the Kadarka Roundtable. This is a bottom-up initiative launched in 2013 in which professional members have a shared agenda to cooperate in developing a common premium category of kadarka bottled wine primarily marketed for export (Gubányi et al., 2017a).

The methodology followed pursuant to an in-depth analysis of these cases includes two main actions: (1) in-depth research work on the industry to be analysed and of the sub-sector in which it conducts its activity, and (2) a series of interviews with employees and managers both of the company and of organisations/entities which are key to the development of the business. During these interviews, there has been an attempt to identify in detail the degree of business innovation, analysing the different transformations implemented by the company in recent years, as well as job quality and the mutual relationship between them. In this regard, there has been detailed analysis of the different factors considered to be key dimensions of job quality according to the definition used in the QInnE project (see Warhurst et al. 2016). These factors include salary, working hours, personal satisfaction, professional career perspectives, work-life balance, occupational safety, presence of unions, etc.

Table 2 summarizes the case studies analysed, the type and size of company studied as well as the number of interviews conducted in each case.

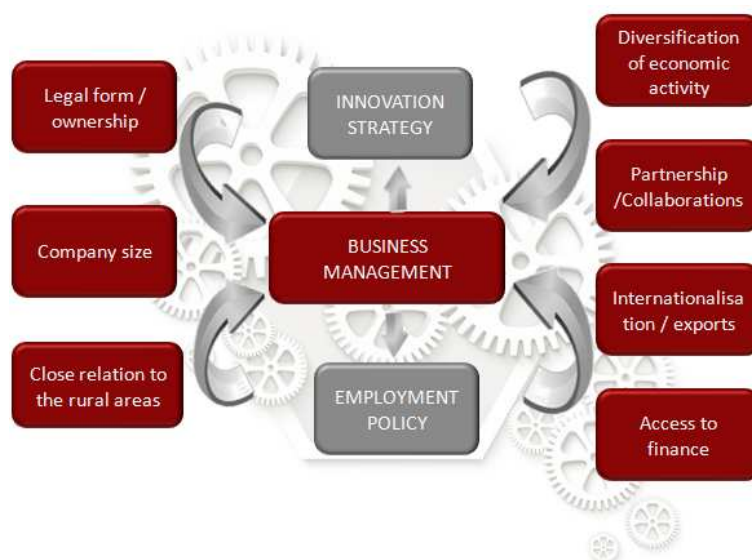
Table 2: Case studies in the agri-food sector

| Pseudonym | type of company | number of employees (< = 50; 51-500; 501-2500; > 2500); | number of interviews |
|----------------|--|---|----------------------|
| SP-WINERY | Independent company | < 50 | 6 |
| SP-WINE_COOP | Independent co-operative | < 50 | 7 |
| SP-BISCUIT | Independent family owned company | 501-2500 | 9 |
| SP-OIL_MILL | Subsidiary of a large agri-food holding (family owned) | < 50 | 7 |
| HU-PASTA_COOP | Independent co-operative | 51-500 | 16 |
| HU-WINE_ASSOC | Family business/Association | < 50 | 5 |
| HU-WINE_EXPORT | Family business/ Round table | < 50 | 9 |

Source: Own compilation based on case study reports (see list of reports in section 6 of this chapter)

Another important factor is that the agri-food industry has a **wide variety of sub-products**: meat, dairy, processed fruit and vegetable products, wine, etc. This implies that the global analysis of the sector is complex given the number of sub-sectors it spans. The case studies conducted have focused on characteristic sectors or pioneering companies in each of the countries under scrutiny: wineries, oil presses, leading-edge biscuit and pasta factories which are leaders in the sector.

A detailed analysis of the case studies has revealed a series of common points which are considered influential factors both in company management and in the innovation processes implemented in the agri-food industries and in job quality, as shown in Section 4. Below is a brief analysis of these factors.

Figure 4: Common factors identified affecting business management

Source: Own elaboration

2.5.1 Influence of the context and legal form of companies

Previous empirical research has highlighted that the type of organisation or company is a critical factor when it comes to fostering or downshifting participation of workers in their own improvement of the working environment (Toner 2011). In the agri-food industry, the context and market orientation has had a special impact on the types of business organisations which exist today.

As from the decade of the nineties, there has been a rapid process of agri-industrialisation in Europe, characterised by the incorporation of private companies (Henson and Cranfield, 2013). In general, we can mention three large sets of changes (Henson and Cranfield, 2013, Reardon 2007): an increase in food processing, distribution and supply of agricultural consumer goods outside the farm, institutional or organisational changes in the relationship between agri-industrial companies and primary producers, and the changes in the primary production sector in terms of product composition, technology, sector-wide structures and market.

Events such as the liberalisation of trade and bilateral trade agreements have prompted the opening of markets to the agri-food industries. . Furthermore, in recent decades, the investment in technology in the industry has multiplied as the experts confirm. This was associated to the progress from technological transformation in the 20th century to the era of digital transformation (Berger and Frey, 2016).

In this industrial context, together with the political changes that have come about in recent years, especially for those countries which have been the last to adhere to the European Union in order to create EU28, changes have occurred regarding the ownership of the companies. In this regard, as indicated by Kálmán et al. (2016) there is a marked **process of privatisation** of agri-food industries which began at the beginning of the nineties and which had particular effect in eastern European countries. The aim of privatisation, in the case of Hungary, was to increase the competitiveness of companies and strengthen its integration in an international market, also favouring the incorporation of innovation and modifying the labour conditions of workers.

A good example is the case study of the pasta factory (HU-PASTA_COOP). During the period of privatisation, the management decided on changing the company form. As a result, the group of companies was established in 1990. The assets of the new company were shared nearly evenly between the employees and managers with a nominal value of one billion forint and other assets of the same volume. The members of the cooperative were given stocks during the course of privatisation. Asset concentration, changes in regulations, corporate acquisitions and a transparent organisational structure led to the formation of a larger company group (Kálmán et al., 2017).

This opening to the global market signified the input of **foreign investment and ownership** in the agri-food industry. In the case of Hungary, of note is the current existence of around 200 agri-food producing companies in the country, of which two-thirds belong to foreign investors (Kálmán et al, 2016).

Another of the characteristic factors has been the fragmentation of the sector. It reduces competitiveness of the companies. Traditionally, the most common way of preventing fragmentation was to create **co-operatives**, company organisations that bring together partners that agree on objectives and that normally take charge of storing, transforming and marketing in this sector. In fact, in the Spanish scenario, the marketing of farm products via co-operatives acquires a volume near the average in the European Union, with a percentage of between 40% and 50% of turnover.

This formula offers certain advantages to small producers as much as it boosts an increase in their bargaining powers (both in collective bargaining with sellers of agricultural inputs and with purchasers of the prepared outputs) and the generation of economies of scale and of scope that they would not

have access to on an individual basis (reduction of transaction costs and quality control in the supply chain, access to innovation and technologies, etc.).

The co-operative is, in a certain way, an innovation in itself within the framework of the different types of company (SP-WINE_COOP, HU-PASTA_COOP). It is a case of corporate economy and innovation, where the interests of the members prevail. In SP-WINE_COOP the organisational structure is characterised by a high level of participation through the Governing Board, selected by all the members (RegioPlus Consulting, 2017b).

In the pasta factory (HU-PASTA_COOP) the cooperative organisational culture and the related micro-corporatism were created through employees' participation in company ownership and through the prospect of long-term promotion opportunities and the strong social ties between the company and the local community (Kálmán et al., 2017). In addition, the owner status of employees of the company group has strong impact on the everyday life of the company. When the former agricultural cooperative was transformed, all employees were given shares in relation to their number of shares held in the former cooperative. Later some employees sold their shares for financial consideration while others retained them. This is how the current ownership structure has been formed in the end. All managers are owners so they do not only push the interests of their own division forward but they also worked for the success of the entire company.

According to the interviewees' experiences, the owner-employees agree with and support the directions of development. In their view developments are favourable; they understand their necessity and practically they are proud of working for such a socially responsible workplace.

„We can take part in such developments that do not necessary take place at other companies.” (Electrician, HU-PASTA_COOP).

According to Morales (2006), co-operatives present three main aspects on which to build advantage and competitiveness: human capital, structural capital (both support and favour the co-operative principle of education, training and information, which is the soul of co-operativism) and relational capital (capacity of networking between co-operatives which allows them to meet more objectives jointly than individually). Also Sissons et al. (2017) corroborate that co-operatives are a legal entity which are a source of empowering and quality in employment.

At the same time, the agri-food industry has been traditionally linked to the territory and to farming. Considering the private and family ownership of the land, a high percentage of agri-food industries are **family owned businesses**. The majority of the case studies analysed correspond to this type of company (SP-BISCUIT, SP-OIL_MILL, HU-WINE_ASSOC and HU-WINE_EXPORT). In the case of Spain, for example, 82% of manufacturing companies are family owned (Instituto de la Empresa Familiar, 2015).

From the case studies analysed, there emerges the importance of company ownership in its management strategy, which has a direct influence on the innovation and job quality policies. The different forms of management, communication, interrelation with workers, corporate roadmaps and business lines, etc., are factors which are directly linked to the ownership structure.

Of note is the case of the Hungarian pasta manufacturing company (HU-PASTA_COOP) founded in 1953 and converted into a farming co-operative before the collapse of the socialist political-economic regime. Later on, during the privatisation process in 1990, all the shares were distributed among the employees, becoming an example of micro-corporativism. This company structure has been key to the participation of employees in all the corporate policies of the company, as well as being an innovative strategy that was pioneer in the sector and in the country (Kálmán et al., 2017).

2.5.2 Company size

The agri-food sector is characterised by its **fragmentation**; as seen before, almost half of the turnover of the sector is generated by small and medium-sized companies. In the case of Hungary, for example, two thirds of the companies of the sector are micro companies, with less than 10 workers (Kálmán et al, 2016). The case in Spain is similar, with 79 % of micro companies of the total of 23,083 companies in the sector (RegioPlus Consulting, 2016). Accordingly, most of our case study companies are small companies too (SP-WINERY, SP-WINE_COOP, SP-OIL_MILL, HU-WINE_ASSOC and HU-WINE_EXPORT). This means that those companies do neither have defined R&D&i and human resources departments, or an internal trade union structure.

In general, the small size of companies is a limiting factor for corporate competitiveness when it comes to internationalisation, innovation and increased productivity processes. For that reason, some of these companies need the cooperation to implement innovation projects (see 2.5.4).

In the case of the food industry, the differences between sub-sectors involve a great diversity in terms of turnover and employment figures. Dissemination of technological information and know-how is necessary among SMEs, due to their limited capacity for investment and innovation (Toner 2011).

2.5.3 Relationship with the local environment

As mentioned earlier, the agri-food industry has always been closely tied to farming as it is the origin of the raw material whose will be transformed in the food industry. Its relationship with the local environment is direct and dependent. That is why a high percentage of the agri-food companies are located in rural areas, contributing towards economic development and the creation of employment in these areas (all of the case studies).

In this regard, the case studies conducted have shown that in innovative processes which generate employment, the agri-food companies give priority to **hiring local workers**, provided that they have the required qualification. The relation of the industries with the environment, therefore, distinguishes them from companies with a greater urban presence, showing a certain social bond between the agri-food industry and the local environment.

In addition, two types of agri-food companies have been shown to exist when it comes to **dependence on crop** or raw material and how they relate to job quality. Firstly, there are companies which acquire from the local or non-local farmer the required raw material(s) to obtain the final product, as in the case study analysed of the biscuit family (SP-BISCUIT), where the required ingredients are acquired and then transformed through a processing chain. In this type of company, normally of larger size, the workers have clearly defined responsibilities and working shifts and the organisation is not affected by seasonal issues.

Secondly, an important part of sub-sectors (vineyards, livestock, olive groves, etc.), develop two activities: the transformation of the products and the farming, as in the case of the wineries under scrutiny which have their own vineyard (SP-WINERY, SP-WINE_COOP, HU-WINE_ASSOC and HU-WINE_EXPORT). In this case, the companies tend to be of a smaller size and the characteristics of the crop/livestock require from the worker a certain degree of availability or variation in working hours. For example, the seasonal nature of the vineyard affects winery workers as much as they are affected by workload peaks associated to the grape harvest and vine pruning. In all the case studies, there is evidence that workers accept such increases in workload in their stride and as something inherent to their job responsibilities.

2.5.4 Importance of co-operation

Co-operation, associations and partnership, transfer of know-how, etc., are an essential element for the introduction of innovation in the agri-food industry. The above-mentioned fragmentation of the sector entails the need to network in order to develop know-how and thus survive in a global market and in a competitive scenario.

Given the lack of research, development and innovation departments in the small companies which prevail in the sector, **of note is the co-operation with research centres and universities** to generate innovation and opportunities, and to maintain employment (SP-WINERY, HU-PASTA_COOP, HU-WINE_ASSOC and HU-WINE_EXPORT). In the case study of the Spanish winery, the majority of the research projects of the winery are implemented in cooperation and collaboration with different departments (viticulture, microbiology, etc.) of the CSIC (Advanced Scientific Research Council, part of the Ministry of the Economy, Industry and Competitiveness). They are joined by a close relationship which has now reached the level of friendship, and thanks to which both communication and ideas flow freely (RegioPlus Consulting, 2017a).

In the HU-WINE_ASSOC case study, a tourism product in the form of a thematic journey into a wine region has been analysed. It is based on local initiatives and cooperation, and works as an association (Gubányi et al., 2017b).

„We have to stress that a new thing in this region was that enterprises cooperated this way. Basically, oenologists like preparing their wines on their own but, at the same time, the power of cooperation should not be disregarded, either as this can take the individually producing oenologists into a different dimension.” (Professor, external expert, HU-WINE_ASSOC).

On the other hand, as upheld by Carraresi and Barterle (2015), participation in national or international projects financed with public funding are also a source of innovative initiatives.

2.5.5 Need to export

An analysis of the agri-food industry shows how exports of agri-food products in Europe have grown each year in the last decade. In a liberal and open market, with trade agreements with many countries or regions of the world, internationalisation of companies and exports have emerged as a way to maintain the business and a necessity as an alternative to the sale of products in locally saturated markets. The European Union is **world leader in agri-food exports**; making up 7% of EU exported goods (European Commission 2016).

The study conducted by Carraresi and Barterle (2015) seems to indicate that there exists a clear interrelation between competitiveness and specialisation in export or export-orientation of the country.

All the companies analysed in the case studies export part of their production, mainly within the common market, and in some cases also internationally to America and Asia. In the company SP-WINERY, the commercial department of the winery is made up of one manager and 7 other persons, 3 of whom are dedicated to export, 3 to the domestic market and one person who works on backup and is the logistics manager of the group (RegioPlus Consulting, 2017a).

The recent investments at the pasta factory (HU-PASTA_COOP) have resulted in a significant capacity increase. Efficient exploitation would not have been possible without increasing the volume of export. Domestically, increasing brand turnover has a limited potential, which is why in the past few years the company has turned to manufacturing brands for trade export. In addition to developing

manufacturing, their logistic activities are also being significantly improved. As a result, their products can be sold at very competitive prices to even longer distances (Kálmán et al., 2017).

The implemented innovation has helped companies to reach the level of competitiveness required to participate in international markets. In turn, maintaining this competitiveness requires a strategy which ensures the export of their products. This fact has prompted the creation of new profiles and the need for new skills in workers, such as those related with languages in view of internationalisation and export, or with technology depending on the innovation implemented.

Investments made in marketing and communication activities (market research, consumer surveys, trade fairs, etc.) help reduce the risk of failure and develop essential skills needed to succeed in exporting (Carraresi and Barterle, 2015).

2.5.6 Business diversification

In recent decades, farming activity has seen a drop in its cost-effectiveness, partly caused by the liberalisation of markets and partly due to the increase in the cost of commodities. This, together with other factors, has caused the reduction in employment in the sector. This is why both farmers and companies of the sector have seen the need to create new business lines for their activities. Without a doubt, one of the ways of diversifying the business has been the transformation of farming products, making the agri-food industry a very strong sector within the European Union.

On the other hand, creation of synergies with other economic activities has been fostered which, as a whole, improve the viability and sustainability of the businesses. In this regard, the **tourism** sector has been the foremost creator of synergies (ASAJA, 2011). Observing the case studies conducted, we can conclude that tourism represents a complement to the business in those agri-food industries linked to a crop or livestock farm; that is, associated to the land. That is the case of Spanish and Hungarian wineries (SP-WINERY, SP-WINE_COOP, HU-WINE_ASSOC) which often offer guided visits to vineyards and installations, together with wine-tasting. Similarly, in some cases, this wine tourism is linked to gastronomic tourism, where local products can be tasted. In the case of HU-WINE_ASSOC, the application of the new business model was made easier by the culture of the local wine tourism (Gubányi et al., 2017b).

This type of product and sector innovations entails the creation of new profiles and organisational changes in the distribution of responsibilities among the workers.

2.5.7 Access to financing

Another of the factors identified in the case studies, which are common to certain kinds of agri-food industries, and which have a direct impact on innovation and job quality, is **access to financing**.

Due to the fragmentation of the sector and the large percentage of small and medium-sized companies in the agri-food industry, most of them do not have a specific amount budgeted for research, development and innovation (SP-WINERY, SP-WINE_COOP, SP-OIL_MILL, HU-WINE_ASSOC and HU-WINE_EXPORT). Hence, in addition to fostering networking to provide incentive for innovation, this type of company needs aid and public financing for development. This is considered a limitation to innovation and, therefore, to its relationship with quality in employment, and companies of the sector are therefore financially dependent on public support.

The case is different for large companies (SP-BISCUIT and HU-PASTA_COOP) where, even though in some cases they are beneficiaries of public aid, most of them have an annual budget for investment in innovation, as well as their own R&D&i department.

3 Innovation and job quality

As pointed out by Heijs and Buesa (2016), theoretical and empirical literature published to date does not identify an accepted model with respect to the effects of innovation on job quality or vice-versa. In the same way, no definitive bibliography has been found which spans the three areas studied in this article: job quality, innovation and agri-food industry in the European Union. In this same study, two schools of theory are identified which provide their view on the impact of innovation on employment at a macro-economic scale: a neoclassic trend based on compensation mechanisms which ensure the recovery of lost employment due to innovation and a more evolutionist view which recognises the problems in the labour market generated by the technological process. The first school presumes that workers are universal and can be employed in any sector or for any kind of job and that; therefore, innovation in new products has a positive effect on employment, while innovation in progress will have an effect which depends on each situation. According to the second school of theory, there exists “technological” unemployment associated to the imbalance between the training of the workers expelled from traditional sectors and the human capital requirements in emerging innovative sectors.

In terms of job quality, empirical studies have shown that, in the eighties and nineties, structural changes have destroyed low skilled employment in traditional sectors while there has been an increase in skilled jobs in the medium and high technology sectors (Heijs and Buesa, 2016). It is known that certain organisational, technological or product changes or innovations have a direct effect on the labour conditions of workers. In this regard, Muñoz de Bustillo et al. (2016) point out that technological and organisational changes in companies in general produce an increase in productivity, which translates in salary increases and reduction in working hours and improvement in working conditions. Heijs and Buesa (2016) conclude that 62% of the empirical studies analysed in their report show an improvement in worker skills as indicator of quality, and in 60% an improvement in terms of salary.

Furthermore, literature shows a positive interrelationship at member state level between job quality and innovation, with a greater repercussion in the intrinsic quality of work, and lower for health and safety and work-life balance (Muñoz de Bustillo et al., 2016).

The following sections will analyse more in detail the motives and reasons behind the incorporation of innovation in the agri-food sector, the type of innovations with the greatest effect on the sector and their interrelation with job quality. It is based on the 7 case studies conducted in Hungary and Spain and supported, to the greatest degree possible, by existing literature.

3.1 Innovation motivations and types

The introduction mentions the affirmation of Berger and Frey (2016) regarding the technological stagnancy which has characterised the agricultural sector for years, even though in recent years progress has been considerable.

Domingo et al. (2015) indicate that there are at least three vectors which have an effect on accelerating innovation in the agri-food sector: growing knowledge of the relationship between food and health, the expansion of genomics and emerging technologies in other sectors, but which are applicable to the agri-food industry. The latest surveys conducted in 2016 by FoodDrink Europe indicate that the trends which motivate innovation are the introduction of different products and the generation of new sensations, such as sophistication and easier handling (FoodDrinkEurope. 2016).

It has already been stressed in this analysis that one of the most efficient corporate tools for generating competitiveness and solving both internal (sustainability) and external (austerity, for example) issues is innovation. Jaruzelski et al (2017) affirm that the rate of introduction of innovation has increased

considerably in the last 10-15 years, with important advances in genomics, software, communications, logistics and technology.

According to the Oslo Manual, 2005, (OECD, 2005), there are four main types of innovation:

- Innovation in product/service: Introduction into the market of new (or significantly upgraded) products and services. It includes significant variations in technical specifications, in components, in materials, in the incorporation of software or in other functional features.
- Innovation in processes: Implementation of new (or significantly upgraded) manufacturing, logistics or distribution processes.
- Organisation innovation: Implementation of new organisational methods in the business (knowledge management, training, assessment and development of human resources, value chain management, business re-engineering, quality system management, etc.), in work organisation and/or in relations abroad.
- Marketing innovation: Implementation of new marketing methods, including significant upgrades in the purely aesthetic design of a product or packaging, price, distribution and promotion.

It is frequent to observe interrelations between the different types of innovation. For example, how product or process innovations entail changes in marketing strategy. An example is the innovations of procedures implemented in the Spanish winery SP-WINERY. The innovations related to a more sustainable and environmental friendly crop-growing techniques turns out to be of great interest for commercialising the product in countries of northern Europe where this kind of biosustainable activity, circular economy and utilisation are appreciated (RegioPlus Consulting, 2017a).

In the pasta factory (HU-PASTA_COOP), the economic success of the company is based on the following three drivers: technological, organisational and social innovations. According to the interviews, joint-participation of employees and management (using Employee Stock Ownership Plan (ESOP) and Management Buy-Out (MBO) schemes) was the key social innovation, which offered not only the urgently needed financial resources in the early 1990's for the technological and organisational renewal, but also resulted in the cooperative culture based micro-corporatism. (Kálmán et al., 2017).

The case study of the Hungarian Kadarka wines (HU-WINE_EXPORT) shows how an organisational innovation of the oenologist involves new innovations and changes in the quality of jobs. The change from socialism in the period before the regime change entailed the loss of knowledge in a generation of oenologists in Hungary and other winegrowing regions in Central and Eastern Europe by taking away the transmission of production processes that have been passed down from generation to generation in Western Europe. In the case of wines associated with the Kadarka grape, the trade itself had to be rebuilt from scratch by setting up standards of quality that all wines termed as kadarka have to meet. As a result of the Kadarka roundtable and networking and sharing of knowledge that this effort has achieved, the participants will be more receptive to further innovations and their application in the future, which can have direct positive impacts on employment and job quality (Gubányi et al., 2017a).

In general, we find that in large companies there exists a defined innovation strategy, a regularly updated roadmap which establishes the lines of work to be followed (SP-BISCUIT and HU-PASTA_COOP). However, in small and medium-sized companies, which are more characteristic of the sector, usually specific innovative projects are implemented, which depend to a great extent on the financing available (SP-WINERY, SP-WINE_COOP, SP-OIL_MILL, HU-WINE_ASSOC and HU-WINE_EXPORT).

Traditionally, the public sector has been the economic engine of R&D&i expenses, covering 55% of the costs in 2011. As the case studies show, financing opportunities have a great influence on adapting innovative practices (HU-WINE_ASSOC, Gubányi et al., 2017b).

The financing of the research projects in the Spanish winery (SP-WINERY) is largely obtained from the winery's own resources, as well as from the numerous calls for grants for research and innovation which are applied for. The technical director of the winery emphasises that public support for investment in research and innovation are fundamental to being able to carry out these projects:

"Over recent years we have been receiving various grants from the CDTi (the Technological and Industrial Development Centre of the Ministry of the Economy, Industry and Competitiveness). We look above all for non-repayable grants. Without this kind of assistance it would be complicated because the cost is very high. These grants represent between 30 and 50% of the financing of the projects. They are regional, national or European grants." (Head of administrative department, SP-WINERY).

Nevertheless, due to the slowdown in the world economy, and the mentioned context of economic crisis and austerity measures, this investment in research and development has dwindled. All this has meant that private investment has acquired ever increasing importance, also visible in the agri-food industry (Jaruzelski et al. 2017).

According to Henson and Cranfield (2013), technological advances can be observed in general (particularly information and communication technologies) and, in the agri-food industry, in primary production (for example, the application of biotechnology) and the manufacturing sectors (for example, new processing methods). These technological advances have contributed towards the creation of unprecedented new opportunities for agri-food companies, in terms of innovation of products and processes, vertical and horizontal links in the supply chain, distribution systems, etc. Nevertheless, they also increase the fear that agri-food companies could fall behind if they are not able to access these technologies in a fitting and cost-effective manner.

In the case studies we have analysed innovations in practically all spheres, primarily the following:

- **Market demand.** Demand directly affects the product to be marketed and consequently the marketing strategy. Modified and new packaging models, quality brands, healthier and environmentally friendlier products, fresh cut products, etc., are some examples of adapting to market requirements which have arisen in recent years in the agri-food industry. These have entailed the incorporation of product innovations, technological innovations and, in some cases, organisational innovations.
- A clear example of observed market demand is the case of the biscuit factory (SP-BISCUIT). In this case, the company had to adapt to new market requirements of healthier biscuits, allowing the company also to put an end to the seasonality of the product, associated to the autumn-winter season. This new line of business and product meant, in addition to the incorporation of the required technology to be able to develop the market, the reorganisation of employees to adapt to the new line of work (RegioPlus Consulting, 2017a).
- **Product knowledge and quality improvement.** Understanding the factors that affect the quality of the final agri-food product is essential in a free competition market; that is why another objective detected that is applicable to innovative projects is research and development in new techniques to improve the product.
- As mentioned earlier, fieldwork showed that there are two types of agri-food industries, depending on whether they are linked or not to a crop or livestock farm. In the case of the former, it has been observed that a large part of the innovative strategy of the company is focused on better knowledge of the crop, in order to achieve a higher quality product (SP-WINERY, SP-WINE_COOP, SP-OIL_MILL, HU-WINE_ASSOC and HU-WINE_EXPORT). In this regard, it has been observed how different technologies are used in the case of wineries (computer applications, sensors, drones, new applications, etc.) which permit more detailed knowledge of the vine, of

conditions which affect grape quality (climate, soil, irrigation, etc.), of farming techniques, etc. Therefore it is a case of innovations to improve both products and processing. To a large degree, in-depth knowledge of a product results in a more sustainable crop and a reduction in costs in certain cases.

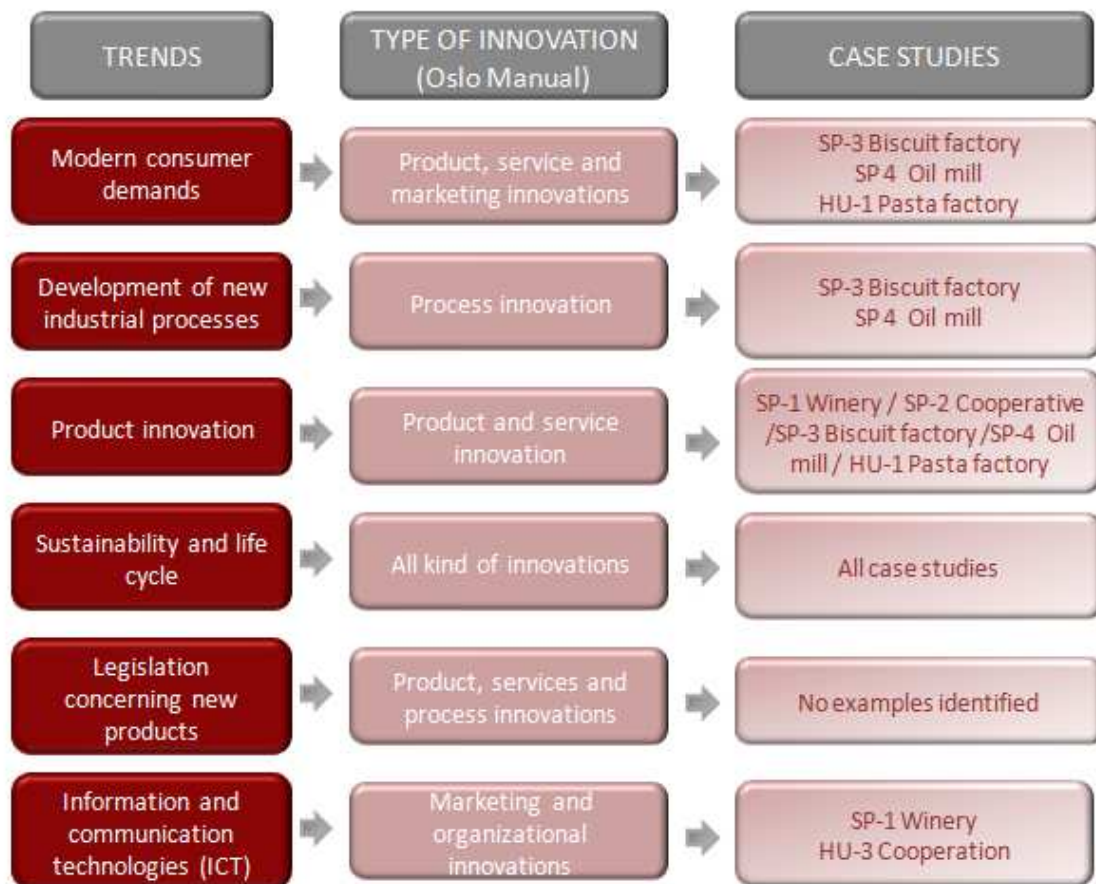
- **Change of context.** Changes of context force companies to adapt to new situations generally in a short period of time. The economic crisis which affected Europe as from 2008 and the consequent austerity measures implemented in the Member States, especially those located in the Mediterranean region, forced companies not only to increase competitiveness but also to pursue sustainability. Innovation and internationalisation became corporate strategies.
- The Hungarian pasta company (HU-PASTA_COOP), for example, managed to adapt to the collapse of the socialist political-economic regime and to corporate privatisation in 1990, by innovating the organisation structure and implementing micro-corporativism (Kálmán et al., 2017).
- **Reduction of costs and effectiveness.** In connection with the changes in context, sustainability has become another corporate guideline. The effectiveness of product processing has been achieved both through delving into knowledge of the crop in some cases, and mechanising the processes by means of incorporation of technology.
- Generally, in all the case studies analysed, the effectiveness of product processing has been both a goal and a consequence of innovation. For example, in the oil press (SP-OIL_MILL), the acquisition of spearhead technology helped them to respond more effectively to pests in the crop and obtain a better quality of oil thanks the availability of devices which allow them to recognise the right moment to harvest the olives, etc. (RegioPlus Consulting, 2017d).
- **Organisational improvements.** The agri-food sector is not characterised by organisational priority when it comes to design innovation strategies, rather the organisational improvements are usually the consequence of product or process innovations. Nevertheless, as mentioned before, the case study of the pasta industry (HU-PASTA_COOP) allows us to see how organisational innovation can be at the origin of all corporate strategy on innovation which could not have been implemented without the participation and efforts of all the members (micro-corporativism). Also the case study HU-WINE_EXPORT analyse an organisational change of the oenologists which involve the renewal of the marketing strategy of the local wine.

Generally, and after observation both of the fieldwork conducted and the literature review, the innovative agri-food companies in Spain carry out an active technological strategy in order to increase their product range, maintain market share and open new markets (including internationalisation), improve production flexibility, reduce costs and increase viability, improve working conditions and reduce environmental impact (Revista alimentaria, 2008).

With regard to improvements in job quality, this does not appear as a fundamental motive for innovation in the agri-food sector. However, as pointed out by Muñoz de Bustillo et al. (2016), even if the motivation behind the innovation process varies and does not have improvement in job quality as main focus, there do exist transfer mechanisms in innovation which link it to job quality. However, these are also related to or influenced by other factors which should be borne in mind, both internal (ownership and legal structure of the company) and external (for example, the market itself), as we will show in our analysis further below.

In addition, Del Pino (2001) includes six trends in the perspectives of innovation progress in the agri-food industry. Within this context, it forecasts the development of different technological processes which will have consequences in different spheres (industry, quality of life, employment, etc.). Figure 5 shows the relationship between these trends, the type of innovation (based on the categories established in the Oslo Manual) and the innovations identified in the case studies.

Figure 4: Innovation trends in the agri-food sector



Source: Own elaboration

3.2 The importance of governance

As remarked earlier during this analysis, the agri-food sector is fragmented, with a large proportion of small and medium-sized companies which generate the greatest amount of employment. In general, in these SMEs, the relationship between those responsible in the company (managers) and employees is usually more direct and the use shorter channels of communication.

In the case studies analysed, it has been observed that the ideas for innovation and improvement arise both bottom-to-top and top-to-bottom in this sector. That is, the role of the worker is important both for proposing the innovation and for obtaining the necessary feedback regarding the positive or negative effect of the technology or change. In this regard, in the more competitive small companies, even if there is a tendency for innovation and predefined lines of strategy, **the direct and close communication between the workers and their managers is essential** in order to implement improvements in the daily running of the industries and serves as a point of departure for innovation.

In the cooperative of wine (SP-WINE_COOP) the top down initiatives (from the managers) have allowed the greatest innovation in recent years, associated with the modernisation of the wine cellar. The modernisation process involved changes not only to the functions of the wine cellar workers, but also to the way of work of the cooperative members, in as much as mechanisms were established to receive the grapes more quickly, flexibly and in better conditions.

The bottom up dynamic (from the cooperative members) is usually proposed as a result of needs observed by the workers themselves (at technical and systems level). They propose innovative

formulas to overcome problems observed when carrying out their work. The Governing Board then decides on whether to implement the innovation (RegioPlus consulting, 2017b).

„The company workers are the ones that are most up to date with innovations in the sector. Ultimately, cooperative members are farmers who specialize more in agriculture. However, the final decisions on implementing innovations rest with the Governing Board selected from the members of the Cooperative.” (oenologist, SP-WINE_COOP).

In large companies, communication flow is more structured (SP-BISCUIT and HU-PASTA_COOP). They have innovation strategies which are usually defined between the heads of various departments (R&D&i, marketing, sales, CEO, human resources, etc.) and with an R&D&i department which centralises the implementation of the strategy. In the case SP-BISCUIT the drive for innovation is underpinned at the company by the existence of an R&D department made up of 7 persons, who participate transversally in all the company's meetings (RegioPlus consulting, 2017c).

Even if communication with the employee is not so direct, there exist articulated transfer mechanisms for ideas so that the workers can provide their view of the experience. A good example of these mechanisms is the “*idea box*” which exists in the case study analysed of the Hungarian pasta company (HU-PASTA_COOP), where employees can suggest improvements in the efficiency of the company's processes. If employees have an idea on how to improve efficiency in their own or in other related activities, they may put their proposal into the box located in the centre of the shop floor. The rationale behind making suggestions for the neighbouring workplaces is the following: an outsider may recognise efficiency enhancing solutions better than the others who work there on a regular basis. The submitted proposals are evaluated by the management of the given area and if they find it feasible the creators are given monetary awards. In practice, this means ideas written on a form--such as “What is the idea/problem?” “What would you suggest?”--are collected in the box in the shop floor. The new ideas that are implemented are rewarded by paying the contributors, an amount added to their salary at the end of the month (Kálmán et al., 2017).

It also shows that the different corporate management models influence directly the predisposition for innovation. In this regard, as mentioned earlier, in small companies where there is a company head or manager or technician who fosters direct communication with the workers, the implementation of innovation is less costly as far as adjustment of workers is concerned, as the group of workers is directly involved. On the other hand, in large companies, an open, communicative and transparent management which also fosters participative processes such as the example of Hungarian micro-corporativism, have a positive effect on innovation options and the improvement of job quality. A good example for that is the abovementioned idea box implemented at the Hungarian Pasta factory. Previously, the management collected ideas for small scale, incremental process innovation from the maintenance worksheets. With these simple idea boxes it is much simpler. Moreover, the employees feel that they have their voice, that their remarks are important for the management. It is also worth noting that if a submitted idea proves to be useful, the employee receives financial reward. Last but not least, the idea box is a good tool for the employees to improve professional fulfilment at their job and this does not limit to one specific area. This way the idea box contributes to the inclusivity of the workplace.

“Sometimes an outsider looks at things differently and simpler. Through the idea boxes, I can share my opinion not only in my own professional field.” (Repairmen, HU-PASTA_COOP).

Large companies have their own unions (SP-BISCUIT, HU-PASTA_COOP). The work of the representatives is to advise and support the workers in their own dealings with the company, preparing

texts, regularising working conditions, etc., as well as representing all the workers in general (SP-BISCUIT, RegioPlus Consulting, 2017c). The analysis has shown that these worker representatives normally do not participate in the proposals or negotiations in regard to innovation, thus the union is not a conveyor of information or ideas in this respect. Their actions are only related to innovation in cases where this has important consequences on the job quality of the workers.

3.3 Innovation/job quality nexus

It has already been said that the agri-food industry is a sector which has been technologically stagnant in recent decades. Nevertheless, motivated primarily by the need to pursue a solution for the financial crisis and austerity measures, as well as by the new era of digital transformation, in recent years the technical modernisation of the industry has increased considerably. This fact has had direct – although without high impact yet - consequences on jobs and on working conditions.

Literature reminds us that there are many additional factors which affect the ability to determine a direct relationship between innovation and job quality, and that this depends to a great extent on the context, the people and the sector (Toner, 2011). In the cases in our sample, two interrelated factors seem to have an important influence on both job quality and on the strategies and possibilities of innovation: the ownership and management system of the company (family business, private company, co-operative, etc.), and its size (small, medium and large company).

In the case study SP-WINE_COOP the small size and the cooperative ownership facilitate adaptation of the working times to the workers to enable them to balance personal, family and working life whenever this does not interfere with the work being suitable carried out, especially more delicate tasks such as wine treatment (RegioPlus Consulting, 2017b).

"We are a family. The size of the company and the relations with the members allow family and working life to be balanced." (Blue Collar, SP-WINE_COOP).

The case study report on the Spanish company SP-OIL_MILL shows the latest market innovation established by a family run group of companies. The family based nature of the company gives it a set of special characteristics such as the transmission of values and family culture to the working environment and the concept that the family company is a living project of several generations. The family always bets on innovation in their new companies (RegioPlus Consulting, 2017d).

"Before, I worked in another group company, the family found I had training in farming and pruning and that I have experience and really enjoy working in this area. So I went on to work at the farm. I'm really happy, I love the work, we're like a family and what's more I work right next to home and that lets me enjoy my free time that much more." (Blue Collar, SP-OIL_MILL).

The key role of social responsibility and the inclusive approach of the management of the pasta factory (HU-PASTA_COOP) was necessary for the modernisation strategy. The continuous technological innovations involved the massive restructuring of the labour force and the use of knowledge (Kálmán et al., 2017).

In HU-WINE_EXPORT, the objectives of the Roundtable include the creation of an open and innovation-friendly professional environment that can benefit all involved by enhancing efficiency, increasing profitability, while enhancing employment and the working conditions of the employees by enriching the accumulated common knowledge base (Gubányi et al., 2017a).

The diversity of sub-sectors in the agri-food industry however signifies a large obstacle when it comes to generalising the conclusions reached in the fieldwork.

With regard to the agri-food industry, our case studies show that the rate of implementation of innovative actions or strategies have an effect on a limited number of dimensions of job quality, such as training, the need for new skills and profiles and workload, as indicated in Table 3. Despite the fact that Heijs and Buesa (2016) conclude that in 60% of the studies analysed in their report, favourable salary differences associated to the implementation of innovations can be found, it has not been possible to corroborate this fact in the case studies conducted for the agri-food industry. Additionally, no sector-wide effects have been detected in regard to work-life balance, inclusion, working hours, autonomy in employment, etc.

Therefore, the table below is followed by an analysis of the most significant interrelations identified between job quality and innovation. We have tried to compare it with existing literature, in order to provide solidity to the findings.

Table 3: Effects of innovation on job quality

| Dimension | Indicator | Effect |
|---|--|-----------------------|
| Wages | Pay variability | No changes |
| Employment Quality | Permanent/Temporary Status | No changes |
| | Job Security | Positive impact |
| | Internal Progression Opportunities | Improvement in skills |
| | Working hours | No changes |
| Education & Training | Learning Opportunities on the Job | Positive impact |
| | Opportunities for General vs. Specific Skill Acquisition (Transferability) | Positive impact |
| Working Conditions | Individual Task Discretion/ Autonomy | No changes |
| | Job Variety | Multitasking in SMEs |
| | Work Intensity | Increase of intensity |
| | Health and Safety | Positive impact |
| Work-Life Balance | Work Time Scheduling (Unsocial Hours) | No changes |
| | Working Time Flexibility | No changes |
| Consultative Participation & Collective Representation | Direct Participation or Organisational Decisions | No changes |
| | Consultative Committees-Works Councils | No representative |
| | Union Presence | No representative |

Source: Own elaboration

3.3.1 Volume of work, work intensity and wages

It was remarked earlier that a large part of the innovations implemented in the agri-food industry are linked to technology. The origin of these innovations is varied, but they contribute towards common goals of better sustainability of the industry and increased competitiveness. These goals are achieved either through cost containment (mechanisation and streamlining of processes, energy and other savings, etc.), the introduction of new processing and products or improvement in the quality of the final product.

This type of innovation has contrary consequences in the agri-food industries, so that – depending on the type of innovation – it may entail a reduction in workload or, on the other hand, an increase:

On the one hand, the technological innovations and the mechanisation of processes through the acquisition of new and modern technologies contributes to a reduction in workload, an increase in speed of processes and, generally, a reduction in the effort required for a certain task on the part of a certain worker or group of workers (SP-WINE_COOP, SP-OIL_MILL). This is in line with a general trend towards a reduction of cost, as identified by Muñoz de Bustillo et al. (2016).

In the interviews conducted in the case of the and state-of-the-art oil press (SP-OIL_MILL) the workers comment that thanks to the introduction of specialised and innovative machinery, they are able to respond more rapidly before problems arising in the farm (for example, pests) and can identify the exact moment when the olives are best for harvesting, thus increasing the quality of the final olive oil (RegioPlus Consulting, 2017d):

"When we started with the treatments we took 14 or 15 days and two shifts to do all the olive trees. We bought a new spray system and then it took us 6 days. Now with the new tractor we do the job in 3 days. We've reduced the treatment work a lot, if there's an epidemic, the reaction time is much shorter. And we're also happier in our work." (Blue Collar, SP-OIL_MILL).

Literature often associates this kind of technological increase in efficiency with the loss of jobs. Nevertheless, in the cases included in our sample it has been impossible to corroborate that this effect is clear in the agri-food industry. In addition, some of the cases show that the work labour has been restructured in order to adapt it to the innovation changes avoiding layoffs.

In the pasta factory (HU-PASTA_COOP), despite the growing extent of automation, layoffs have been avoided in the company. The employees who could have been made redundant are still employed by using internal retraining. The automation of packaging primarily had its influence felt in regrouping labour force in egg packaging and egg selection. Nevertheless, as the authors of the case study emphasise, regrouping employees is not typical for the agri-food industry (Kálmán et al., 2017).

With regard to the effects of the innovation on employment in general at the biscuit company (SP-BISCUIT), it is actually associated to lesser needs for human resources. Nonetheless, innovation has contributed to improving the results of the company, and this has enabled reinvestment in the introduction of new product lines which have generated new jobs. This process, between 2002 and 2017, led to a rise from around 250 employees to more than 1000 (RegioPlus Consulting, 2017c). However, it has been possible to pinpoint in the cases studies that the process of implementation of innovation related to new products or improvement of processing usually entails an increase in the workload of employees involved in its development. To illustrate this point, the start up of pilot projects in the wineries analysed entails additional dedication in terms of time and resources for the treatment of the pilot plots assigned to the research projects (RegioPlus Consulting, 2017b).

"For my job it means a greater workload, though not as much as in other projects we have undertaken. I have to continue making the usual wine, and another new one at the same time, with specific analyses, etc." (Oenologist, SP-WINERY).

Another example is the technical tests carried out in the biscuit industry to test new products (SP-BISCUIT). These tests have to be carried out in hours that do not affect continuous production, which implies that the worker has to adjust his/her timetable to such tests.

"We have to have a certain flexibility because we must fit the times we perform industrial testing around the activity of the lines of production, to adapt so as to hinder production as little as possible." (Blue Collar, SP-BISCUIT).

This is in line with a general trend observed by Supervielle and Pucci (2008) who point out that in those companies which transform their own cultivated crops; there was an increase in workload.

In this regard, we found that the one-off increase in workload is not - in all of our cases - associated to additional compensation for the worker (salary or other).

"In terms of salary these projects don't have any consequences for me. But the projects are very interesting, I learn a lot about working with the vineyard and about the grape, it motivates me." (Blue Collar, SP-WINERY).

These results corroborate, to a certain degree, the conclusions of *EWCS 2015* which indicated that in companies of the agri-food sector, employees work a greater number of unsocial hours (weekends, nights, etc.). Within the group of companies in our sample, it is a characteristic associated to a greater extent with those industries linked to farms.

3.3.2 Training and new skills

Without a doubt, the **acquisition of new skills** is one of the factors of job quality which has been observed most often and is directly and positively influenced by the rate of innovation in all the case studies.

Given the specific nature of the tasks to be carried out in working with the crop, the winery needs to have qualified personnel who they train, and therefore, it is necessary to have specific profiles (SP-WINERY, RegioPlus Consulting, 2017a).

The degree required for the personnel specific to innovation, within the R&D department of the biscuit factory, is normally Food Science and Technology. When so required by the development of a given innovation, specific training has been given to the workers (SP-BISCUIT, RegioPlus Consulting, 2017c). A process of professionalisation of the workforce is under way. The need and appropriateness of having properly trained personnel has been detected, so that there is currently a biannual training plan, a dual internal training process in which veteran personnel of the company instruct new employees, and an agreement to conduct the training processes with other entities and technology centres. Among the achievements, there is the drive for the Professional Baking and Biscuit-making Certificate approved by the Ministry of Education, Culture and Sport. The idea is that the majority of the personnel of the company should hold this certificate, which is currently possessed by 70 workers.

Regardless of the type of innovation, it usually requires additional knowledge or a training process on the part of the worker. This fact has been observed in literature by various authors, as pointed out by Toner (2011). Also Benavides (2007) assures that knowledge and experience are important when it comes to establishing and strengthening productive and innovative networks.

In general, both small and large companies have an established training scheme or programme, so that the worker can participate in it on an annual basis. In the case of small companies, it is common for training to be outsourced. In the case SP-WINE_COOP, the training of the workers is based on the qualifications required for the job profile and the completion of the tasks required by the company at the time of contracting. There are also ongoing training activities (although there is no formal program) with two clearly differentiated branches (RegioPlus Consulting, 2017b):

- Training received by workers with the inclusion of new technology (normally included with the purchase of machinery) geared towards effective use of same and maximising output.
- And participation via the "Fundación Tripartita". The principal mission of the foundation is to promote, coordinate and further the training of workers in companies. The mode in which it operates is by granting loans to companies so that they can invest in training for their employees.

The acquisition of new skills may be one-off, for example, the training entailed for the use of a new machinery or technology, or can be more prolonged, such as learning of a language in a context of internationalisation of companies. In the pasta factory (HU-PASTA_COOP), the smooth use of new equipment requires the regular professional development of employees. On the one hand, the suppliers of the new machines are training operators and they also assist in installation when it comes to a new technology. On the other hand, through in-house training courses, experienced colleagues are training the new, inexperienced staff: this is the practice of on the job training (OJT). These are typically technical trainings with the participation of maintenance staff and operators (Kálmán et al., 2017).

The literature analysis conducted by Heijs and Buesa (2016) indicates that 62% of the empirical studies show an improvement in the qualification of workers, which is associated to an improvement in job quality. Nevertheless, innovation is not the only factor which implies the acquisition of new skills, as assured by Toner (2011), who points out that the level and type of workforce skill are the result of many causes, of which technical change – or, more broadly, innovation – is only one.

In the case HU-PASTA_COOP the innovation was accompanied by a training programme developed by the human resources department, and at the same time, the acquisition of new skills supports the emergence of innovative ideas by workers. It should be pointed out that it is a **circular and incremental interrelation**, so that the fact of increasing the qualification and skills of the professionals can, in turn, lead to new innovations, given that greater experience implies a more detailed knowledge of processes and procedures. This fact is corroborated by the findings of Montoya (2015), who indicates that in an integrated innovation management system, knowledge management and technology management have a positive influence in the management of creativity and that the latter has a positive influence on innovation of products and processes. Furthermore, there is positive effect between the management of knowledge and of technology, and between innovation of products and of processes. Similarly, Kababe (2013) pinpoints that innovative behaviour may be explained by the incremental learning process through interaction. Toner (2011) also concludes that skills and knowledge are both input and output of innovation: Implementing a particular innovation often requires training a workforce, and use of a given innovation by the workforce in production and consumption gives rise to incremental improvements to the original innovation. Kim (2002) pointed out that *“an increase in the supply of skills can generate skill-based technical change”*.

Due to workforce limitation some workers assume different tasks (multitasking, SP-WINE_COOP) in the small and medium-sized companies. Certain workers accumulate the new skills acquired and needed for the implementation of innovation (Eurofound, 2015.); therefore, there is an increase in job responsibilities.

„When a new technological feature is introduced, it may be necessary to reorganise the internal working structure.” (Oenologist, SP-WINE_COOP).

As they are a small company, all the new tasks that the technology involves are assumed by the same 5 employee of the winery.

To a certain extent, it can be said that a higher level of training and skills can, in the long term, have a direct influence on career options in the industries, especially in those large companies where the worker has more skills options for advancement.

3.3.3 Creation of new jobs and emergence of new profiles

Work stability in the agri-food sector is a characteristic factor observed in the literature (*FoodDrinkEurope, 2016*) and corroborated by the case studies conducted. This stability translates in a

high percentage of indefinite contracts. The analysis of the case studies has also shown that there is a majority of full-time contracts. The biscuit factory (SP-BISCUIT) opts for permanent contracts, with around 93% of the employees engaged under these conditions (RegioPlus Consulting, 2017c).

Temporary-term contracts are more typical for industries linked to farming, given that the characteristics of the different crops imply seasonal peaks of work (such as harvesting, pruning, etc.) which require extra workers. But in any case, from small to big companies, employment stability has been observed in the case studies. The innovation creates more competitive companies which contribute to the maintenance of the labour.

"In the winery, there are 28 of us who are permanent, though if you calculate the permanent discontinuous workers in terms of annual full-time equivalent contracts of 1700 hours, there are more than 40 of us. Here it's very seasonal, the land has moments with lots of work, such as harvest and pruning times. We have a lot of people who work about 800 hours per year every year." (Technical Director, SP-WINERY).

Regarding the job creation, the case studies show that the new contracts generated because of specific technological or product innovations are temporary contracts in small companies, in order to train the workers of the industries how to lead with the innovation. But this conclusion can't be generalise to all innovations and different companies of the agri-food industry.

In EU28, as shown in EWCS of 2015, 76% of women workers and 82% of male workers have an indefinite contract. This same survey indicated that only 5% of men and 30% of women have a contract of 34 hours or less. The majority of the interviewed women with part-time contract in the case studies indicate that the motive for applying for a part-time contract has been work-life balance.

The new era of digital transformation has already had effects on the new profiles, more akin to communication and technologies. This fact was corroborated in the case studies conducted. The volume of new persons hired associated to innovation cannot be highlighted as a relevant conclusion, except in the cases in which the introduction of new processes and products have entailed an important increase in productivity and profitability of the company, as is the case of the Spanish biscuit factory (SP-BISCUIT). In this company, the introduction of a new healthy product has prompted a new line of business which has increased the profit of the company and has led to an important increase in the number of workers. But it is considered exceptional in this type of cases, associated to a greater extent with large companies.

Nevertheless, in some of the smaller companies in our sample, workers have also been hired. In the case of the Spanish winery (SP-WINERY), the new innovation projects implemented usually entail an additional workload for the team responsible for working on the land, especially before the moment of harvest. As an indirect consequence, more personnel are hired, not to carry out the extra work of this project, but to collect the grapes from the rest of the plantation. Thus the senior workers can manage the innovation projects as it requires more knowledge and properly manage. In this example, it can be seen how the hiring of new workforce has implied a relocation of the senior workers in the company.

In this regard, in the cases in our study the new profiles hired in the majority of cases require new skills which have not to date been incorporated in the agri-food industry. They are more engineering-based profiles, often focused on dealing with technology, digitalisation, communication and marketing (SP-BISCUIT, HU-PASTA_COOP). In other words, it goes to show the need to hire qualified workers, with a higher level of education, who can meet the technical requirements of the moment. Technical modernisation of processes has meant, therefore, the need for more qualified profiles.

At present, there are 132 different jobs at the pasta factory (HU-PASTA_COOP). Recently, tasks in certain jobs were enriched to make them more attractive and even their names have been modified (Kálmán et al. 2017). For example: laboratory assistant is now quality controller, programmer is now IT development specialist. The use of new technologies resulted in new jobs (e.g. technician, process engineer). When examining the last 10 years it can be concluded that with the emergence of new jobs the proportion of employees with higher and secondary education has increased.

„Nowadays it is not enough if someone wants to work so much – although it is a very important condition which is hardly met – but proper technical qualification is also a must.” (Director of the Pasta Factory, HU-PASTA_COOP).

This is in line with earlier research. Supervielle and Pucci (2008) indicate that new technologies introduced, in turn, important modifications with regard to work organisation and worker composition. The new working conditions require greater knowledge, more responsibility, more heedfulness, greater dedication and versatility. This can also lead to skill shortages, as the example of the Biscuit company (SP-BISCUIT) shows: At this company, the R&D department consists of 7 persons, all women, and the idea that additional personnel could be incorporated to cover only the peaks of activity is considered tricky. The peaks of activity occur when a customer demands a variation of their products and the department has to develop a variation of them in a short period of time. The technical training the personnel must have is highly specific, and it is not possible to find sufficiently well-qualified professional profiles (RegioPlus Consulting, 2017c).

The description of the industry already remarked that it is a predominantly male sector (Eurofound, 2015). It seems that the inclusion of women is not being fostered in the digital era. Although this cannot be generalised, in the particular case of HU-PASTA_COOP the profiles of engineers have been occupied by men in recent years. Kálmán et al. (2017) indicate that because of recent technological advances, there has been an important shift in the gender composition of employees. Of the different activities of the company, egg production is still dominated by women labour force. However, when looking at the overall share of women, their number has decreased. The proportion of women was 40 percent in 2010, which was decreased to 34 percent in 2016. There are professions where men dominate such as electronics, technology and maintenance. With the popularity of engineering skills, the ratio of men has increased in the labour force.

The inclusion of young people in companies is not clear, although there exist an interrelation between the new contracts engaged and relatively recent training profiles in the case of the pasta factory (HU-PASTA_COOP), such as all those related to information and communication technologies.

To ensure long-term labour supply, the company organizes joint programmes with the local authorities, elementary school and regional institutions of vocational training. The Local Government together with the firm tries to identify the professions in shortage and financially support apprentices to select and learn these occupations. The objective of this joint initiative is to provide the students of secondary or higher education - with a permanent address in the rural area - with scholarships to help support the local labour market.

Within the framework of the agreement with the local elementary school, students can take part in professional career days where not only production processes are demonstrated but also machines can be tried. On these career days, students could try the different bar code readers, and even programme robots. The objective of such events is to get potential future colleagues acquainted with the work processes of the factory and inspire them in the future to be engineers, mechanics or electricians.

The company is also active in organising dual training according to which they accept two students for a year from local university who would work with them for experience (Kálmán et al., 2017).

As indicated previously, the interrelation between the agri-food industry and the rural environment where it is usually located should be highlighted. Therefore, in addition to contributing towards maintenance of economic activity, heritage and environment of these rural areas, the case studies analysed underline that the hiring of personnel, whether temporary or permanent, is covered as far as possible with workers from the area. Thus, the bond between the industry and the environment is increased, becoming a unique source of employment and sustainability of the rural environment and of the families who live there.

In SP-WINERY the temporary contracts during pruning are mostly offered to the same people every year. In the harvest season, however, the personnel vary more, around 25% of them coming back every year, depending on the availability of temporary workers (RegioPlus Consulting, 2017a).

3.3.4 Other aspects of the quality of the work

Highlight the subjective perception obtained in the case studies with regard to the positive quality of work should (at least for blue collars workers). Even innovations which lead, as observed, to an increase in workload without additional compensation are understood by the worker as part of his/her daily activity and as a necessary task for the sustainability of the company and, therefore, his/her job. The case studies show that job satisfaction is determined by several factors, one of them is the possibility of be leader and innovative in their sector.

„You see how interesting the innovation project is, the more projects the more we're going to know about the product. I like to develop those kind of projects“ (Oenologist, SP-WINERY).

In the biscuit factory case study SP_BISCUIT, it can be concluded from the interviews conducted that workers are satisfied with their jobs. The location of the company in a rural environment means that it is a secure professional option in an area with few employment possibilities (RegioPlus Consulting, 2017c).

The interviews conducted in the case study SP-WINERY show that people who work at this company are aware which the peaks of work, and accept, for example, that during the harvest season all have to work longer hours than those established. It should be said that the satisfaction of the workers is linked to other kinds of improvements and the fluid communication that appears to exist in the winery, which could be described as possessing a family working environment (RegioPlus Consulting, 2017a). The interviewed workers at SP-OIL_MILL generally expressed satisfaction with the quality of the jobs at the business group. Ideas that were expressed included the trust that the company placed in its workers, satisfaction with the salary, the possibility of working in different companies of the group, etc. (RegioPlus Consulting, 2017d).

In this regard, in the Spanish case studies, the fact that the majority of agri-food industries are small and medium-sized companies contributes to a certain extent to this positive perception of job quality in those industries where the relationship with management is friendly and fosters communication (SP-WINERY, SP-WINE_COOP, SP-OIL_MILL). Relationships are generated between the workers and employers which are almost familiar, characterised by closeness and understanding.

“I'm really happy, I love the work, we're like a family.” (Blue Collar, SP-OIL_MILL).

“In terms of salary, I can't complain, I've never had to ask for anything, they give it to me first. The company trusts me and I can make my own decisions. If I have to work more

hours I do it because I have a responsibility to fulfill." (Farm Worker, Blue Collar, SP-OIL_MILL).

"I'm fine, I think I have good job quality. I've been here for 21 years and this is a company that supports people's work. I have been growing with the company and you evolve along with it. It's like a single piece. Every time I needed something, the company supported me." (Oenologist, SP-WINERY).

In the case study of the wine cooperative (SP-WINE_COOP) labour issues that arise in the company are usually resolved via informal channels favoured by the "almost family" relations that exist between the workers (with greater or lesser responsibility in the company structure), as well as with the members of the Governing Board (RegioPlus Consulting 2017b).

Meanwhile, literature shows that workers of the agri-food sector enjoy a more positive social environment than the average in Europe (Eurofound, 2015).

4 Conclusions and recommendations

The agri-food industry is the largest manufacturing sector in EU28, providing employment for 4.24 million persons and characterised by its fragmentation, where SMEs make up for around 40% of turnover and 62.8% of employment created.

The agri-food industry faces the great challenge of feeding a growing world population in a healthy and sustainable manner. EU-wide, this sector has been affected by political changes in recent decades, including the incorporation of new eastern European countries to create EU28 and the economic crisis of 2008 with consequent austerity measures which are still in effect in certain countries today, especially those of the Mediterranean area.

The agri-food industry has gradually adapted to the needs both of the market and of politics. In the face of such important changes as the opening of markets or the new era of digital transformation, the agri-food sector has found itself in the need to incorporate innovation and job quality in its business strategies in order to ensure competitiveness. Therefore, this is a sector which adapts to the changes occurring around it.

4.1 Main conclusions of the study

The comparison between the case studies conducted in Hungary and Spain have led to the identification of certain factors which influence the design and implementation of innovation strategies, while conforming the employment policies in the agri-food industry. Eight factors have been identified:

- Ownership and management system of the company (family business, co-operative, private company, etc.), influenced to an important degree by the political context. There is evidence in the reviewed literature which confirms the importance of these factors in the process under scrutiny; namely, our findings suggest that the structure of the company can encourage or hinder the participation of workers in the improvement of their own working environment and in the innovation process. In this regard, our findings show that, in general, in all company types, innovation is fostered, although co-operativism and the family business stand out for the better communication between workers and managers and a governance which encourages an innovative spirit. In fact, in several of the family businesses studied, innovation has emerged in this line (SP-BISCUIT, SP-OIL_MILL, HU-WINE_ASSOC). The influence of the ownership has been also detected in the cooperatives case studies (SP-WINE_COOP and HU-PASTA_COOP).

- Company size: the agri-food industry is characterised by its fragmentation, a fact which has been analysed as a limit to the competitiveness of companies and innovative processes. Of the case studies carried out, only the largest companies have their own R & D department (SP-BISCUIT and HU-PASTA_COOP).
- Relationship with the environment: it is a fact that the majority of agri-food industries are located in the rural environment, providing a source of employment and development in these areas (SP-WINERY, SP-BISCUIT, SP-OIL_MILL, HU-PASTA_COOP, HU-WINE_ASSOC and HU-WINE_EXPORT). Furthermore, the origin of product processing in various analysed cases is associated to a farm and, therefore, to a local product and to a specific environment and climate (SP-WINERY, SP-WINE_COOP, SP-OIL_MILL, HU-PASTA_COOP, HU-WINE_ASSOC and HU-WINE_EXPORT).
- Importance of co-operation: linked to the fragmentation of the sector and the limitation that this means for research and development, networking arises as support and a required source of innovation. In the case of the Spanish biscuit industry, its collaboration with technology centres and universities generates positive synergies over innovative processes (SP-BISCUIT).
- Exports: the opening of markets and the political context has led to the need for internationalisation of the agri-food industries. This fact has meant the adjustment of companies to the new scenario. From the case studies made it follows that one of the reasons and consequences of innovation is the export of production to new markets (SP-WINERY, SP-BISCUIT, SP-OIL_MILL and HU-PASTA_COOP).
- Business diversification: another of the resources which the agri-food sector has used to increase its competitiveness has been diversification especially that geared to tourism. This is the case of the case study of the Spanish mill (SP-OIL_MILL), which tries to take advantage of the opportunities offered by tourism in the island where it is located and the winery that offers guided visits to its facilities (SP-WINERY).
- Access to financing: access to the financial resources required for the incorporation of innovation in companies is identified as a limitation. The use of fixed items in the corporate budget for innovation has only been detected in the case studies of larger firms (SP-BISCUIT and HU-PASTA_COOP).
- Also shown is the important role played by governance and communication flow between management and workers when it comes to the design and improvement of innovative processes, especially in a context where small and medium-sized companies prevail (SP-WINERY, SP-OIL_MILL). Due to this fragmentation, the role of unions and worker representatives in the sector is not considered relevant in these governance processes.

The innovations implemented in the agri-food industry respond to new consumer demands (new industrial processes and new products) (SP-WINERY, SP-BISCUIT, SP-OIL_MILL, HU-PASTA_COOP), to the sustainability of the industry (SP-WINERY, SP-WINE_COOP, HU-PASTA_COOP, HU-WINE_ASSOC, HU-WINE_EXPORT), as well as to the changes in information and communication technologies primarily (SP-BISCUIT, HU-PASTA_COOP), job quality not being a basic motivation for innovation.

The research conducted shows impact of innovation in job quality in four main aspects:

- The workload or work intensity. In this regard, there are two contradicting realities. On the one hand, technological implementation usually prompts a reduction in manual workload and an increase in process speed (SP-WINE_COOP, SP-OIL_MILL, and HU-PASTA_COOP). And, on the other, during the process of introduction of the innovation, an increase in workload is generated for the workers involved. Examples of this are the cases of the Spanish winery (SP-WINERY) or biscuit factory (SP-BISCUIT).
- Training and acquisition of new skills: it has been shown that in all of the cases in our sample, innovations required additional knowledge or training for the worker. Moreover, this is a circular

relationship, so that the increase in knowledge influences in turn innovative behaviour. In the case of the Hungarian pasta company (HU-PASTA_COOP), the innovative spirit instilled favours that the workers themselves propose, in turn, new ideas for improvement. This is associated in an increase in job quality.

- In small companies, there are processes of concentration of skills and tasks in a same worker (multitasking) as can be observed in the small wine co-operative (SP-WINE_COOP).
- New jobs and emergence of new profiles: the agri-food sector is characterised by the stability of its contracts, as have been shown in the interviews and in literature (SP-WINERY, SP-BISCUIT, SP-OIL_MILL, HU-PASTA_COOP). The innovation creates more competitive companies which contribute to the maintenance of the labour. The effect of digital transformation has not yet had consequences on job creation, but it has had an effect on new profiles (SP-BISCUIT, HU-PASTA_COOP), with the tendency to hire more qualified workers, with higher education and of an engineering or technical slant, as occurs in the Hungarian pasta company which has reached a high degree of technical modernisation in recent years. Furthermore, in the cases included in our company sample the creation of new jobs were associated to innovations in new products and processes. New hiring has encouraged the hiring of local workers, thus contributing to rural development. All of the companies analysed hire local workers and, for farming-related fixed-term contracts, there is an endeavour to hire the same people each season.
- Other aspects of job quality: Job satisfaction in the companies in our sample is high, but not necessarily due to the innovations but to other factors as social environment, close family-like relationships, etc. Although both in bibliography and in the study conducted, a positive correlation has been found between innovation and the job satisfaction indicated by the workers (SP-WINERY, SP-WINE_COOP, SP-BISCUIT, SP-OIL_MILL HU-PASTA_COOP).

To conclude, certain good practices are fostered which increase job quality of the worker and in turn generate an environment that is favourable for innovation. Examples of these practices are governance processes, such as the "idea box" explained in this article, or training schemes adjusted to the needs of the worker.

4.2 Recommendations

In order to promote the innovation strategy in the sector and take advantage of the positive synergies generated with employment (both in terms of quantity and quality), there is a need to boost promotion of certain aspects. This takes us to compile a series of good practices identified in our case studies that seem to have benefitted companies' innovativeness, employment levels and job quality and may therefore serve as benchmarks for companies and political programmes:

- Facilitate access to training for workers as mechanism for promoting worker motivation and innovation in the industry (SP-BISCUIT, SP-OIL_MILL).
- Promote the workers collaboration with research centers as source of knowledge and adaptation to market demands, especially in the case of small and medium-sized enterprises that lack their own R & D department (SP-WINERY, SP-BISCUIT, HU-WINE_ASSOC).
- Promote the cooperation with other companies within the industry to develop together I&d&i and marketing projects in order to reduce the cost of the investment and to increase the impact of the results (HU-WINE_ASSOC, HU-WINE_EXPORT). The creation of an open and innovation-friendly professional environment that can benefit all involved, by enhancing efficiency, increasing profitability, while enhancing employment and the working conditions of the employees by enriching the accumulated common knowledge base.
- Increase labour flexibility (in terms of improving the adaptation on working time to workers requirements/restriction, in order to allow for better work-life balance as a strategy to boost

workers motivation, especially in the case of industries that have workloads that need the involvement of workers (SP-WINERY, SP-OIL_MILL).

- Prioritize the development of innovative and research projects (SP-WINERY, HU-PASTA_COOP).
- Foster the participation of workers in fairs, workshops and meetings that promote the knowledge transferability. Programming of periodic meetings at the internal level that allow transferring these news to the different departments of the company (SP-WINERY, HU-WINE_ASSOC).
- Involve the senior workers with a large experience in the company in the innovations as a motivation for the professional career (SP-WINERY, SP-BISCUIT, SP-OIL_MILL, HU-PASTA_COOP).
- Establish an annual budget for innovation, ensuring that the company make financial and human resources available for this initiatives (SP-BISCUIT).
- Develop relations with other industries (such as tourism) capable of reducing the seasonality of companies linked to agricultural production, while facilitating the maintenance of the labour (SP-WINERY, SP-OIL_MILL, HU-WINE_ASSOC).
- Create specific mechanisms to the workers can to propose innovative ideas, such the “idea box” concept of the Hungarian pasta company (HU-PASTA_COOP).

5 References

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6 List of Case Study Reports and Industry Profiles

| Case studies | |
|--------------------------|--|
| HU-WINE_EXPORT | Gubányi, M., Makó, C. and Illéssy M. (2017a). <i>The 'Kadarka Roundtable' Initiative: Social and organisational preconditions of cooperation in the context of individual competition</i> . Case Study Report for WP6 of the QuInnE project. Unpublished manuscript. |
| HU-WINE_ASSOC | Gubányi, M., Benke, M., Makó, C. and Illéssy M. (2017b). <i>Villány-Siklós Wine Road Association as a Driver of the Regional Social-Organisational Innovation</i> . Case Study Report for WP6 of the QuInnE project. Unpublished manuscript. |
| HU-PASTA_COOP | Kálmán, A., Makó, C., and Illéssy, M. (2017). <i>Pasta Factory: Inclusivity Driven Continuous Technological Innovation</i> . Case Study Report for WP6 of the QuInnE project. Unpublished manuscript. |
| SP-WINERY | RegioPlus Consulting (2017a). <i>Winery</i> . Case Study Report for WP6 of the QuInnE project. Unpublished manuscript. |
| SP-WINE_COOP | RegioPlus Consulting (2017b). <i>Winery Cooperative</i> . Case Study Report for WP6 of the QuInnE project. Unpublished manuscript. |
| SP-BISCUIT | RegioPlus Consulting (2017c). <i>Biscuit Factory</i> . Case Study Report for WP6 of the QuInnE project. Unpublished manuscript. |
| SP-OIL_MILL | RegioPlus Consulting (2017d). <i>Oil Mill</i> . Case Study Report for WP6 of the QuInnE project. Unpublished manuscript. |
| Industry Profiles | |
| Hungary | Kálmán, A., Makó, C., and Illéssy, M. (2016). <i>Industry profile: Agri-food Industry - Hungary</i> . Report for WP6 of the QuInnE project. Unpublished manuscript. |
| Spain | RegioPlus Consulting (2016). <i>Industry Profile: Agri-food sector – Spain</i> . Report for WP6 of the QuInnE project. Unpublished manuscript. |

7 Annex – Summaries of Case Studies

SP-WINERY (RegioPlus Consulting, 2017a)

Brief characteristics of the companies' structure and business strategy

Origin and enterprise: Winery founded in 1990. Anonymous society

Number of employees: < 50 permanent, ~15 % part-time

In 1990, the winery was founded. At the same time, it set up its own vineyards with the idea of respecting and safeguarding the identity of the wine of O Rosal. The winery has evolved considerably both in production and different kinds of preparations of wine, always using native varieties.

The winery does form part of a group of companies, among which is a company that processes Galician products and two other winemakers created subsequently, as part of the commercial strategy pursued by the company.

The foundational premises used by the winery to create its wine are: continuous care and monitoring of the vines during their growing cycle, winemaking with each of the varieties separately and fermenting with native yeasts isolated and selected from the winery itself (some of these yeasts have been patented following research projects, as will be commented upon later).

Recent major innovations

Since the year 2000, the company has participated in numerous research projects, financed with its own resources and regional, national and European funding. These projects are always aimed at knowing more about the vine so as to yield a wine of high quality. Two of these projects have been related to food. In the first of these, which gave place to the second, the molecules with anti-tumour and anti-metastatic effects were identified. Currently, they aim to identify which ways of working the vineyard increase the concentration of those molecules beneficial to health in the wines as well as in other products of the process.

Innovation-job quality nexus

The effect of this project is bound up with the quality of the wine. Therefore, it has an indirect impact in relation to job quality. As consequences:

- The increase in workload entailed by organizing the pilot plots selected should be highlighted, especially during the moments of pruning and collecting the grapes.
- Given the specific nature of the tasks to be carried out in working with the crop, they need to have qualified personnel who they train, and therefore, it is necessary to have specific profiles.
- Another inherent consequence is that given that these profiles are responsible for collecting and handling the grapes from the pilot plots, extra personnel must be taken on for the traditional grape collection.
- In addition, the commercial team uses this reputation for engaging in research projects to foment communication in sectors other than winemaking, for instance, in the scientific press. This therefore represents added value when commercializing the product.

SP-COOP (RegioPlus Consulting, 2017b)

Brief characteristics of the companies' structure and business strategy

Origin and enterprise: Cooperative founded in 1930s

Number of employees: < 10 permanent

The old Cooperative was founded in the 1930s, when a group of local winegrowers came together with the aim of responding to the growing demand for wine from the rapidly expanding city of Madrid.

The organisational structure is characterised by a high level of participation, with integration of the members in organisational management.

In the early 80s, the company started to bottle wines with the Designation of Origin of Madrid (it was one of the pioneers in this regard) and has reached the point where it is now a producer of a complete range of wines with a designation of origin.

Important innovations in recent past

The most important innovations over time have been organisational innovations, and more recently, innovations given over to the acquisition of machinery and chemical treatment processes. In any case, such innovations have respected the production parameters established by membership of the Designation of Origin for Wines of Madrid.

Key findings on interrelationships between innovation and job quality, employment and inclusiveness

The innovations have made impact more than anywhere on the improvement of product quality, but only in a marginal sense on job quality. In this regard a change has taken place in the structure and distribution of tasks, mainly in the harvest period, leading to an increase in the volume of work at this period, which has been resolved by increased overtime.

On the other hand, tasks have been facilitated/simplified in post-production phases, without any changes to the volume of work or therefore to working hours.

SP-BISCUIT (RegioPlus Consulting, 2017c)**Brief characteristics of the companies' structure and business strategy**

Origin and type of activity: A family business which was the pioneer in the manufacture of biscuits

Number of employees: > 1000 (Permanent: 56%)

The company boasts panoply of products which ranges from the traditional biscuits for breakfast, to a complete range of healthy biscuits, in the production of which it leads the sector: wholegrain, with fibre, low-calorie, organic, cholesterol-free, chocolate-coated, wafers, sandwich biscuits, cookies, etc.

In view of all this, the company has sown the seeds to maintain its position of leadership in the sector, covering the possibilities of the national market, and basing its future growth strategy on exporting. Its investments in technical and human capital mean it is a modern company. Thanks to this, the valuation of the company is high in aspects such as salary level, quality of employment, or working day.

Important innovations in recent past

Currently, the company is focussing, among other things, on replacing the fats in biscuits by healthier oils. It already has product lines of this kind developed, and the objective is to end up by integrating them into all the lines of production.

Key findings on interrelationships between innovation and job quality, employment and inclusiveness

Development of the innovation activity in the company is characterised by the following features:

- A constant investment in innovation representing 3% of the annual budget.
- A specific R&D department employing 7 people.
- Transversal activity affecting all the departments of the company and which demands constant coordination: from the creation of the new product at the R&D department, passing through checking of the issues related to food safety, identification of the needs in human resources, in production machinery, and selection of marketing actions and access to the market.
- The personnel involved in developing innovation have constant needs for training which affect not only the R&D technicians, but all the operatives and technicians who work on the innovative product lines.
- Ongoing need to be up to date with the novelties arising in the market so as to continue being a benchmark for the sector. This makes it necessary to keep up constant communication with universities and research and technology centres.

SP-OIL_MILL (RegioPlus Consulting, 2017d)**Brief characteristics of the companies' structure and business strategy**

Origin and type of activity: Family group of three companies dedicated to food: one canning company, one dedicated to the packaging of olives and a third, initially bottled and distributed oil that has now been incorporated into direct production.

Number of employees: Small enterprises (less than 50 workers: 94% permanent)

The male head of the family was responsible for the group's origins, and the aim from the outset was to link work on the land with ownership of farms. With this the family chose to develop a business that was linked to the family tradition of high-quality, hand-made farm produce. The firm commenced in the sixties with the production of capers.

Their future project is to carry on working on high-quality foods to continue growing, further enhance their presence in national and international markets and make use of the opportunity presented by the importance of the region as a tourist destination to promote themselves. The reputation of the company is high in aspects such as salary level, quality of employment, or working day.

Important innovations in recent past

Production at the farm has been on a super-intensive basis, so as to achieve the best quality oil with the highest production levels of olives, reduce the need for labour and facilitate treatment and collection of the product. For this, the latest technology has been installed in the mill. The mill was built in such a way as to make it possible to visit the entire complex for tourists.

Innovation and job quality nexus

The main results obtained thanks to the commitment to innovation are the following:

- Diversification and addition to the business activity of the group via the creation of a new high-quality product with the D.O. Oli de [region] brand.
- Production of an extremely high-quality product under a super-intensive cultivation and control format of production by sectors that enables greater production combined with best possible quality. All these efforts have led to the product receiving the Oli de [region] Designation of Origin.
- Three specific jobs have been created and other posts already in the company have been given additional work.
- Technology provisions in the daily work of the farm and mill have reduced the time required for work and the response time to certain situations, facilitated work in the fields, improved job quality, etc. At the same time, the technology has brought about a reduced need for labour.
- The general satisfaction of the workers already employed in the company has improved considerably, as they feel a particular interest in developing this product.

HU-PASTA_COOP (Kálmán et al., 2017)**Brief characteristics of the companies' structure and business strategy**

Origin and enterprise: Founded in 1950's as an agricultural cooperative

Number of employees: < 250 in the pasta company

The company can be found in the Central Transdanubian region of Hungary. The main activity of the company is pasta manufacturing. The turnover of the pasta factory amounted to 32 thousand tonnes in 2016, which was 60% higher than in 2010. With its 35 percent share in the dried pasta market, the company is a market leader in Hungary. With 140 million eggs produced annually on three farms, it can also be regarded as the largest egg producer of the country. Half of the eggs (75 million) are sold in their shells while the other half in the form of fresh eggs is used in the pasta factory. The enterprise is involved in integrated plant production on approximately 8800 hectares in the region. In addition, it also deals with forage production (23 thousand tonnes/year) and grinding in mills (140 thousand tonnes/year). The company group employed altogether almost somewhat less than 500 persons in 2016 and prefers employing those who live in the village or the nearby settlements that used to be part of the former agricultural cooperative, the legal predecessor of the company.

Recent major innovations

The construction of a new pasta factory and a warehouse is currently ongoing. With the new pasta factory, it doubles the capacity (it can produce 65-70 thousand tons a year), most of which is to be sold abroad. The capacity of the dough manufacturing complex will exceed the size of the entire pasta consumption in Hungary, and a pasta factory, which is the most efficient, will be established at the European level at the beginning of 2018.

The automatic high-warehouse can accommodate 11 600 pallets. With the investment, existing storage capacity will also be doubled, as it will be able to store more than 3000 duplicate sheets from 8200 stacks in the new warehouse. The investment is based on state-of-the-art automated technology, and has expanded the number of 500 employees currently working in the Group with 20 new jobs.

Innovation-job quality nexus

- Technological developments have created new types of labour demand. With regard to school education, qualifications and specialised skills are becoming increasingly important, especially in technical fields.
- New jobs have been created using the new technologies (eg.: technologist, process engineering).
- Over the past 10 years, the importance of training has been extremely intensified. This learning process is both induced by organisational and technological innovations.
- With the increasing mechanicity, the emphasis is on labour safety.
- Over the years, and the technological advances, the gender distribution has changed. The proportion of male employees grew by the spread of technical jobs.

HU-WINE_ASSOC (Gubányi et al., 2017a)**Brief characteristics of the companies' structure and business strategy**

Origin and enterprise: Small family business in wine and hospitality sector since 1990s
 Number of employees: The enterprise primarily has blue collar employees; white-collar employees include the owners and the management. The number of blue-collar workers fluctuates depending on seasonal labour demand.

The business possesses a 60-hectare area, and has premium category wines. They have focused on redefining old wine varieties. The sales of their wines have been linked to gastronomy, wine tastings, wine-university. This is the organisational-managerial (marketing) innovation of the winery. The culture of the local wine tourism, the Villány-Siklós Wine Road Association makes the work of the winery easier. The ICT like online reservation system, Vine Guard system based on software-supported monitoring system is an important source for innovations. The central player in the development and innovation processes of the winery is the owner-manager who shares her practical knowledge with the members of the winery. The owner-manager has always been consulting with the Villány-Siklós Wine Road Association, advisors and experts from outside, professional communities with other wineries. She is in constant touch with the accountants, economists, bookkeepers of the capital city. She is member of Master Mind group, which works via Skype. The organisational and technological innovations have resulted in the appreciation of trainings, studying, team work and have increased both balancing the workload and incomes.

Recent major innovations

The Wine Road is a tourism product in the form of a thematic journey into a wine region. It is based on local initiatives and cooperation, and works as an association. Launching the products of The Wine Road to the market is eased by community marketing, its services and standards meet the international requirements. The Association is an organisational innovation. The Association was established in 1994 by strategic partnership of the stakeholders of Villány and Siklós mini-regions, and it includes wine producers, mayors, county politicians, university teachers and researchers, tourism professionals. The EU Phare programme funded the Wine Road and financed hospitality, tourism trainings, and provided the entrepreneurs with interest-free credit. The Wine Road has qualifying system based on the qualifying system of the European Wine Road Association and chart. The number of qualified members has increased since 2000 and by now 14 settlements have joined the initiative. By meeting European tourism standards, the competitiveness of the enterprises may be enhanced. The Association coordinates the economic, gastronomy and cultural services provided by its members that make local producers, such as P. F. W., more competitive. The Wine Road creates jobs. Its innovation strategy means ICT-based community marketing activity in which Facebook, the website of Villány Wine Region and different mobile applications play a great role. The Association promotes the regional presence of the wineries and popularize local wine consumption. The Association is the tool of collective learning by trainings. The cooperation and collective performances supplementing individual competition can favourably influence the learning and innovation ability of the Association.

Innovation-job quality nexus

After the radical social-economic regime in Hungary opportunities challenged family wineries to gain experience within and outside the country to improve wine making and marketing-sales through innovation and collaboration. The Wine Road Association has been playing a central role in organising production, sales networks and strategic cooperation. The Association positively influences the improvement of the market position of producers and service providers by means of its accessibility, visibility, contractual and non-contractual relations, information exchange and its unique regional quality tourism product.

HU-WINE_EXPORT (Gubányi et al., 2017b)**1. Brief characteristics of the case**

The Roundtable is a bottom-up, evolutionary initiative, a cooperation of family wineries from Hungary, Slovakia, Romania and Serbia. The cooperation is five years old, and has 8 main members. It aims to develop premium-quality wines from a specific Hungarian grape in uniform bottles for national and international markets. In order to do so, the wineries who are competitors and cooperative partners at the same time, needed to define the minimum standards of this special wine, and had to integrate their very different personalities, cultures, values, different reputations, business success and other resources. A professional jury consisting of 9 people was set up and each wine has to undergo a blind tasting procedure carried out by the members of the jury. Only wines that comply the necessary qualitative and quantitative requirements gain the right for marketing under the uniform bottles and labels.

2. Important innovations

The Roundtable works like a community of practices, in the sense that it is a partnership-based professional network of competing oenologists who are to set up commonly accepted quality standards for a barely known type of wine. By doing so, the Roundtable carries out a number of innovation activities. The Roundtable itself represents an organisational innovation. The members share with each other their knowledge on product and process developments. Many of them regularly cooperate with agricultural academic/scientific institutions in order to develop and preserve more valuable clones of the grape, which is a technological innovation. The oenologists also recognised the importance of marketing and they spend significant resources on the design of the uniform bottles and labels. The Roundtable also aims to educate the customers in order to increase the demand for the wine.

3. Key findings on interrelationships between innovation, job quality and employment

The Roundtable is an instrument for the oenologists taking part in the cooperation to enhance their turnover and profit, first on the national market, and later on the international stage. It obviously makes a positive impact on employment and in the case of a successful cooperation the number of employees in the wineries is likely to increase. In an optimistic scenario, wages will also increase and job security will improve. One of the most important points of cooperation is sharing the knowledge and experience of oenologists so that employees can also profit as they can gain job specific knowledge that can increase their value on the labour market, primarily due to on-the-job learning and informal trainings. In addition, if the owner oenologists learn to work together as a team, it may also have a positive impact on the organisational culture of the single wineries, strengthening autonomous teamwork and increasing the support received from both the supervisor(s) and colleagues.

CHAPTER 5 – Digitalisation and Artificial Intelligence: the New Face of the Retail Banking Sector. Evidence from France and Spain

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with the support of Nuria Corchado and Laura Fernández

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1 Introduction

The focus of this chapter is on the *retail banking industry* and the main innovations that have affected its activities in the past ten years. The aim is to analyse the interactions between these innovations and job quality (JQ). This concerns not only *employment*: employment contracts, wages, career opportunities and training. But it relates also to *working conditions*. To address this issue, we rely on several case studies in Spain and France (respectively two and three case studies).

In 2014, the banking sector employed 370,000 persons in France,²³ and 209,000 in Spain, making it one of the leading private sector employers in services, representing around 3% of the private workforce in each country (source: Observatoire des métiers de la banque, 2015; RegioPlus Consulting, 2017a). Among financial activities, retail banking activities account for about 70% of employees in each country.

In the aftermath of the 2008 crisis, both countries faced key challenges that have shaped both the implementation of various innovations and the evolution of employment and job quality in the retail banking industry.

First, all banking networks have been confronted with new regulations at the international, European and national level, such as the European Payment Services Directive. Regarding employment, these regulations have necessitated the restructuring of some activities for compliance reasons. This has had some effects on employment in corporate investment banking activities but also in retail banking (through regulation on consumer protection for example). Regarding innovation, regulations may be considered as impediments, or at least as brakes, acting on innovation rather than as promoting it, because of the costs in time and money they entail.

Moreover, following the 2008 crisis, interest rates decreased sharply, and they have remained historically low since then. Therefore, banks have tried to reduce their costs, restructuring (i.e. ‘resizing’) their networks. Branch numbers have been cut particularly in southern European countries where networks were still very dense (branches relative to inhabitants) compared to northern European countries. This process has been especially severe in Spain, where all the savings banks (*las Cajas*) disappeared after 2009 (see Castillo, 2013). Such restructuring started before the 2008 crisis but was amplified by it. In this context, digitisation has been used to accelerate (and sometimes to justify) restructuring and the ensuing job cuts.

Second, customer behaviour has dramatically changed over the past ten years, particularly due to the facilities provided by Internet and cell phones. As the number of digital customers has been increasing, banks have had to offer new products that can be accessed online via Internet. That is a powerful driver of marketing and process innovations in retail banking. As customers visit bank premises less often, almost all the banking networks have announced branch closures. The consequences on employment have been significant, reinforcing the impact of the financial crisis.

²³ FBF-AFB perimeter (i.e. including mutual and cooperative banks).

Third, in an online bank market which is already quite competitive, new competitors offering cheaper bank services have emerged. ‘Pure players’ that started by offering online banking services to connected clients have begun to develop more services like loans at cheaper costs than more ‘traditional’ banks. In the market segment of payment means, traditional banks compete with new players like ICT companies or retailers. For instance in France, Orange (with 29 million clients) launched Orange Bank in May 2017 with 400,000 clients forecast for the end of 2017, and 2 million in 2024. In April 2017, the retailer Carrefour unveiled a new product: a bank account for only €5.

In this context, banking networks have to boost their online business to counter both low-cost Internet competitors and falls in visitor numbers to local branches. All these challenges explain why it is difficult to disentangle the effects of innovation from other factors that could have accelerated changes through the take-up of innovation and affected directly or not employment and job quality in this industry.

Regarding *innovations*, retail banking has been particularly exposed to changes driven by *digitisation* (encompassing various kinds of changes) and, more recently, by *artificial intelligence*. These changes have been transforming profoundly the contents of jobs in the main occupations/transactions carried out by banking advisors and, more broadly, the organisation of work in the whole industry (the division of labour between back and front offices, new activities created as distinct organisational units or integrated into existing units). As such, *organisational choices* shape the implementation of innovations and subsequently the effects on employment and job quality. This assumption has structured our fieldwork (see the company sample in Section 2) and research.

This chapter is structured as follows. Section 2 presents our company sample, the reasons why we chose these firms and some methodological remarks regarding our fieldwork in Spain and France. Section 3 reviews further the details of innovation trends in banking, over the past 10 years, seen from the perspective of the companies we studied and the organisational choices they have made. Two main recent drivers of innovation are considered here: digitisation and artificial intelligence. Section 4 deals with the impact of these innovations on employment and job quality. Customer advisors are the main occupation group in retail banking so far and thus are particularly concerned by technological and organisational changes. Two strategies have been identified in our company sample and are presented here: job polarisation and job enrichment. Overall, worsening working conditions are a common feature whatever the company and its strategy. This observation is developed before we conclude the chapter.

2 The Company Sample

Our research design relies on case studies in various establishments in the banking sector. The aim was to conduct interviews, in each establishment, with managers, ideally at different levels of the organisation, including the human resources manager, with union delegates and, if possible, with some employees. Previously, we met some experts in order to select better our companies and to specify our questions.

At the time of the survey, most of the banking networks had announced branch closures through press releases. Therefore, getting agreement from managers in the industry to be interviewed was extremely difficult.

Finally, five companies accepted to participate in the research (see Table 1). The sample of case studies may not be representative, statistically speaking. But it had to be illustrative enough of potentially different situations that could influence the interaction between innovation and job quality in the retail banking industry.

Table 1: Overview of the Case Studies

| Pseudonym | type of company / establishment | number of employees (< = 50; 51-500; 501-2.500; > 2.500) and number of branches | number of interviews (+ interviewed persons*) |
|----------------------|---|--|---|
| SP-COMMERCIAL | Commercial bank, operating world-wide. | > 2.500 employees in Spain ~ 3.000 branches | 8 – including 1 affiliated worker and 2 trade union representatives |
| SP-FINTECH | Fintech; an independent company operating in Spain and Mexico, providing instant financing services for online purchases. | <= 50 employees | 9 – including a trade union representative |
| FR-ONLINE | An online bank (i.e. a ‘Pure player’). A wholly owned subsidiary of a large French commercial bank 2 sites in France. | 501-2.500 employees in France | 5 (3*) – 1 HR manager + 2 union representatives, one on each site. No acceptance for further interviews. |
| FR-COMMERCIAL | Commercial bank, operating world-wide. | > 2.500 employees in France ~ 2.000 branches in France (<>9.000 worldwide) | 8 (7*) – including 3 union representatives). |
| FR-COOP | Cooperative/mutualist bank | > 2.500 employees in France ~ 3.000 branches in France | 12 – including 1 union representative and 7 employees in a local branch |

* (number of interviewed persons in a few cases lower, because some respondents were interviewed several times)

Source: Compilation based on case study reports (RegioPlus 2017a, 2017b; Perez 2017a, 2017b, 2017c)

Two big ‘traditional’ commercial banks participated, one in Spain and one in France. Both are the most representative of commercial banks in their respective country, while also operating worldwide.

Commercial banks are at the core of the circulation of money in capitalist economy. In France, the banking industry is quite concentrated; six banking networks manage over 80% of the approximately 12 million current accounts, throughout the country. Commercial banks accounted for 60% of employees in the banking sector in France, and 42% in Spain in 2009 (OECD, 2011). The banks we chose belong to these major groups.

Since the deregulation of banking and financial activities in the 1980s in Europe, French banking groups have been able to expand into all businesses, including retail banking (with nearly 70% of all employees), corporate and investment banking and asset management.²⁴ In Spain, in line with the structure of services provided, almost three-quarters of banks are holding companies (34%) or provide other financial services (39.3%), corresponding to collective investment funds and similar financial entities (13.8%), and financial intermediation (12.9%), although these are characterised by their larger size (RegioPlus Consulting, 2016). As we said above, we have focused on retail banking activities which involve “the management of large volumes of low-value transaction services such as accepting deposits, transferring funds, issuing cheques and drafts, providing safe-deposit facilities, lending money and acting as trustees.” (Consoli, 2005).

In these two cases, interviews sought to illustrate: the way these banks have adapted their organisational structures to implement digitisation; the business strategies underlying these organisational choices; and the main occupations that have changed in retail banking in this context, etc.

One ‘mutual’ banking network in the project recalls that cooperative banks are banking institutions which were initially created in the 19th century to serve local business communities by providing financial support at a cheaper cost than commercial banks (for small firms, farmers and consumers). Cooperative banks are much more decentralised than their commercial counterparts. Owned by their customers, they follow the cooperative principle of one person, one vote. Also, members of local branches (clients, employees) vote and select their own boards of directors that manage their own operations (even if most strategic decisions require approval from a central office).²⁵ We thought it was interesting to select one cooperative bank to test if such a bank (whose

²⁴ The concept of ‘universal banking’ was challenged after the subprime mortgage crisis. Indeed, in France, the Law of 26th July 2013 obliged banking groups to separate their deposit activities from speculative trading, by creating distinct subsidiaries. In the end, this Law has not been fully implemented, probably because of a lack of political will.

²⁵ Moreover, in the French context, if all banks have belonged to the National Federation of Banks (*Fédération bancaire française*) since 2002, ‘commercial banks’ have their own collective agreement and share an employers’ representative body: the ‘*Association française des banques*’ (AFB). The AFB produces statistics and analysis through its monitoring Observatory concerning professions and

users are its owners) makes different organisational choices when faced with digitisation compared a traditional commercial bank.²⁶ In addition, we had the opportunity to look at an experiment in such a retail banking network, based on the implementation of a cognitive solution (derived from artificial intelligence) designed by IBM and named Watson. As one of the biggest branches accepted to test this cognitive solution before its implementation in the whole network, and we were able to meet several people involved in this experiment (managers and bank advisors) and question them about the likely changes that this new tool would have on the content of their work and on employment.

Moreover, we selected **two emblematic players** in banking innovation: a (Spanish) Fintech firm (i.e. a start-up in financial activities), and a (French) ‘pure player’ (an online bank).

The **Fintech** firm is a limited independent company whose geographical area of influence is Spain but which is now undergoing a process of internationalisation with plans for expansion in Mexico. Launched in 2014, it consists of an instant financing service for online purchases, offering a system that combines an instalment payment method with very competitive prices, and marketing tools that enable financing to be used as a promotional lever for stores.

For the **online bank**, it is interesting to note it started-up in the 1990s already and then grew through a succession of mergers and acquisitions, before being bought in turn a few years ago by one of France’s largest commercial banks. Nowadays, this online bank is one of the leaders in the French market with more than 900,000 clients.

On the whole, about 40 interviews were carried out, mainly during the second semester of 2016 and the first semester of 2017; all of them have been recorded and transcribed.

It is important to stress that the aim here is not to compare the French and Spanish situations.²⁷ Instead, it is to highlight relationships between innovations and job quality in different institutional contexts and for different kinds of actors. The aim is more about opening the ‘black box’ to disentangle some basic mechanisms underlying the interactions between innovation and job quality, as a complement to expert information that can provide a more general overview. A key

qualifications within its perimeter. At the same time, each mutualist bank has its own collective agreement. In 2013, 45% of employees in the French banking sector worked in cooperative banks. The trend is flat for mutual banks, and slightly decreasing for commercial ones, suggesting that the former have been able to withstand better the US subprime mortgage fallout (see www.economist.com/node/15331269).

²⁶ According to Corrocher (2002), the corporate governance of a bank (i.e. either a commercial bank, a savings bank or a cooperative bank) is relevant in explaining the speed and intensity of adoption of Internet banking. Indeed she found that “cooperative banks are not very inclined to adopt Internet banking because their activity is very much concentrated on basic financial transactions – loans and deposits – and because they usually have a small and local customer base” (p.25).

²⁷ Unlike, for instance, Dietsch and Lozano-Vivas (2000) who compare the French and Spanish banking industries in terms of their respective cost-efficiencies.

idea has also been that the interactions studied were not universal mechanisms, but embedded in given organisations, which were themselves embedded in specific institutional contexts.

3 Innovation Dynamics in Retail Banking

3.1 A historically innovative industry

According to Eurostat, if we exclude the particular case of ‘scientific research and development’, then ‘financial and insurance’ activities are one of the most innovative activities among services, together with ‘telecommunications and IT’. This is particularly so for organisational and technological innovations (Gautié and Perez, 2015).

Nor is it new. Indeed, the banking sector has experienced a longstanding process of innovation since computerisation in the 1960s. According to Consoli (2005), who studied the evolution of the British retail banking system starting from the late 1800s, three “micro-paradigms”²⁸ characterise the key transformations that have challenged the structure of banking.

The first one was the transition from electric to electronic communications between the late 1800s and the mid-1950s. “In this context, the implementation of inventions such as the telegraph, the typewriter and the punch-card machine provided a key impulse for the development of new procedures in the management of transactions and information” (Consoli, 2005). The growing importance of information management brought two changes in the organisation of banking. A greater division of labour with the emergence, at the branch level, of new occupations like typists and clerks, which stimulated employment; and, at the corporate level, a better coordination of branches with the central offices with several layers of hierarchy. At the industry level, this phase corresponds to a relative concentration of banks through mergers and acquisitions, and to the expansion of branch networks.

The second phase was the transition from processors to databases from the mid-1950s to the 1980s. Until the 1970s, the use of computers and processors in banking was mainly limited to back-office procedures and to support the expansion of the branch networks with the growing customer bases. When the competitive environment changed during the 1970s, banks started to exploit further the benefits of automation. “The real turning point (...) was taking technologies outside the physical premises of banks” (Consoli, 2005), with the diffusion of Automated Teller Machines (ATMs) or cash points, together with the use of credit cards. Consoli notes that the introduction of the early cash dispenser was complemented by the adoption of Saturday closure for branches, in order to save labour costs. Moreover, he qualified the ATM as a “killer application” because of the large and strategic consequences ATMs had on the industry: challenges to service provision, the development of parallel markets for complementary applications, opportunities for consumers to carry out “free-from-branch transactions”, intra- and inter-firm coordination.

²⁸ Consoli refers to “a pattern of solutions to technological problems based on principles and technologies that are embedded in specific context”. Beyond ICT that have been the dominant paradigm in this industry, Consoli points out the role of “micro-paradigms” that emerged within this process.

According to Consoli, the last phase he has observed in retail banking since the 1980s concerns “the proliferation of the service delivery channels building on the experience of ATM; (...) banking anytime, anywhere”. To compensate for the huge investments that computerisation required, banks have maintained their networks to provide services on a large scale, at least in an initial phase. With the new competitive landscape (i.e. regulatory change), financial institutions tried to reduce their costs; rather than expand their structure by employing system managers, programmers and so on, they looked outside the banking sector to find the expertise needed. Moreover, the spread of ATMs in public places (other than bank premises), their enrichment with new functionalities, etc. have gradually led to customer disaffection with branches and confirmed that access to banking services no longer necessarily passes through branches. In other words, “over the last decade the principle that access to service should be independent from the physical location of the financial institutions has become the engine of evolution of retail banking” (Consoli, 2005).

Therefore, the diversification of channels for the delivery of financial services has been driven/boosted by the dissemination of ATM and of plastic cards (credit and debit cards) that have allowed electronic payment (to the detriment of cheques) and remote services in a secure framework for transactions.

At the time Consoli wrote his paper (at the beginning of 2000s), he concluded that “the future of retail banking seems channelled towards an increasing use of Internet-based transactions”. This is our next point.

3.2 Recent trends of innovation: digitisation and Artificial Intelligence

3.2.1 Digital banking and the development of online banks

A dramatic change in customer behaviour

According to all our interviewees, huge transformations have been occurring in the banking sector over the last decade and the main driver by far is digitisation. As the French Observatory of Occupations and Skills in the banking sector has reported, “Digitisation is an imperative for business” that needs to be “connected, smart, agile and social” (Béziade and Assayad, 2014).

Digitisation refers to the growing phenomenon of integration of digital technology in everyday life. Modern communication channels such as the Internet, mobile phones, tablets and social networks are now widely used by bank customers. For instance, in the case of SP-COMMERCIAL, the number of digital customers increased by 20% from December 2015 to December 2016, and the number of mobile customers by 38% for the same period (RegioPlus Consulting, 2017a).

According to the findings of the 2016 ‘Survey on [ICT](#) usage in households and by individuals’ conducted by Eurostat, 85 % of European households had access to the Internet from home in 2016. On average, 59 % of European Internet users are using online services of Internet banking. Only 44 % of younger Internet users performed some kind of electronic transactions with a bank (for payment, transfers, etc. or for looking up account information), compared to 55 % aged 55-74, and 65 % aged 25-54.

Internet habits vary significantly according to country and age groups.²⁹ Respectively 76% and 82% of households in Spain and France used Internet at least once a week in 2016 (79% in EU-28); the frequent use of Internet is higher for the young (16-24) and for persons with a high level of education. Not all customers are therefore attracted to digitisation in the same way and some are more enabled to organise and control their finances in a more autonomous way. On the other hand, some customers refuse to or cannot switch to digital use (in rural areas for instance, or among the oldest customers). Banks thus have to deal with the different capabilities of customers, adapting their products and interfaces for more remote and automated services. Moreover, technology makes it easy to learn about products and services, and many clients require fast and timely access to information. As a result, the needs and expectations addressed to bank advisors have also changed. They are more informed, more demanding too, and more volatile.

As shown in the analysis of SP-COMMERCIAL, this process of changing towards digital banking has arisen with the evolution of customer types. Currently, demand is oriented towards digital products which facilitate connection between the clients and their bank and which offer services that are easy, comfortable and rapid to use. The offices have historically been the channel for getting to know people and working with them. Today, the customers decide how and when they want to approach the bank and choose what best fits their needs for each moment and situation, whether this is through Internet banking, mobile banking and its applications, or even through smart TVs (RegioPlus Consulting, 2017a).

The implications for the banking sector are substantial (see also Béziade and Assad 2014). Innovations triggered by digitisation encompass

- *Product innovations*:³⁰ they include various Application Programming Interfaces (API), software and mobile applications (such as Personal Finance Apps). Financial products have to be simple to understand and to be put online.
- *Marketing innovations*:³¹ as banks are adopting a ‘customer-focused’ approach, these innovations rely on data analysis in order to optimise the ‘customer experience’: CRM (Customer Relationship Management), PRM (Prospect Relationship Management), DMP (Data Management Platform). Banks also try to promote their brand more effectively through social networks.

²⁹ In 2016, respectively 17% and 10% of households in Spain and France had never used Internet (14% in Europe Union-28). Source: [http://ec.europa.eu/eurostat/statistics-explained/index.php/Internet access and use statistics - households and individuals](http://ec.europa.eu/eurostat/statistics-explained/index.php/Internet_access_and_use_statistics_-_households_and_individuals).

³⁰ A product innovation is the introduction of a good or service that is new or significantly improved with respect to its characteristics or intended uses. This includes significant improvements in technical specifications, components and materials, incorporated software, user friendliness or other functional characteristics (OECD 2005, p.48).

³¹ A marketing innovation is the implementation of a new marketing method involving significant changes in product design or packaging, product placement, promotion or pricing (OECD 2005, p.49).

- *Process innovation*:³² delivering remote banking services is itself a process innovation. Automation of banking processes allows procedures to be shortened and simplified, to save time for some occupations such as customer advisors; and to improve controls in order to meet legal and regulatory requirements. Virtualisation allows processing time, back office tasks to be reduced, and the tracking of processing (electronic signature, etc.) to be improved.
- *Organisational innovations*:³³ aim to cope with the growing delivery of remote services; the “resizing” of physical banking networks (branches) as the partnerships between banks and Fintech establishments can be considered as such an innovation. Choosing to create an online service as a subsidiary or as an internal unit of the company is another kind of organisational innovation.

3.2.2 Testing the introduction of cognitive solutions on a retail banking network: the French cooperative bank example

Artificial Intelligence (AI) is spreading to all industries and in many activities, including law and surgery etc. In the banking industry, the Royal Bank of Scotland and City Group were pioneers using cognitive solutions to deliver banking services.

Marvin Minsky, a mathematician and computer scientist, is considered as “the father” of AI since his seminal book, “The Society of Mind” published in 1985.³⁴ Among developers of AI, IBM is one of the leaders through its Watson system, a cognitive solution that encompasses several programs and applications such as conversation (“build and deploy chatbots and virtual agents across a variety of channels (...) and even robots”, or natural language understanding (“analyse text or extract meta-data (...)).³⁵ Because this fascinating technology can mimic human behaviours (for instance conversation) in real time, the effects on employment are feared particularly (France Stratégie, 2017). Many press articles have echoed this fear with impressive titles such as “A major British bank decides to advise its clients with a robot”,³⁶ or “When robots replace the employees of finance”.³⁷

In France, the first commercial use of Watson by a financial institution to assist its professionals occurred in 2016 in a mutual bank, FR-COOP (Perez, 2017c). According to the Chairman’s message to its employees “*The Watson project (...) is a system that recognises natural language and will enable account managers to serve customers more effectively by providing faster answers to their*

³² A process innovation is the implementation of a new or significantly improved production or delivery method. This includes significant changes in techniques, equipment and/or software (OECD 2005, p.49).

³³ An organisational innovation is the implementation of a new organisational method in a firm’s business practices, workplace organisation or external relations (OECD 2005, p.51).

³⁴ Source: <http://news.mit.edu/2016/marvin-minsky-obituary-0125>

³⁵ Source: <https://www.ibm.com/watson/>

³⁶ Source: <http://www.lopinion.fr/edition/economie/grande-banque-britannique-decide-conseiller-clients-robot-98929>

³⁷ Source: https://www.lesechos.fr/18/11/2016/LesEchos/22321-042-ECH_quand-les-robots-replacent-les-salaries-de-la-finance.htm

questions. *It is not a job-killing robot, but a technology that improves customer relationship quality.*"

Watson was tested for one year with 150 client advisors in 20 branches. Our interviews were located in one of these branches where we met the director and eight employees, mainly customer advisers. Another director, a representative of the trade union SNB (Syndicat National de la Banque et du credit) at a group level shared his thoughts with us. We also interviewed the project manager, and the HR manager at the Group level.

Interestingly, testing this tool was not a request by the bank, nor that of workers (as an answer to problems that employees had expressed). It followed a top-down decision, initiated by IBM itself. As the project manager said,

"Usually, in the network, one starts from the needs expressed by the network and one seeks solutions. In this case, it was done totally inversely. It was a partner of the group, IBM, which came in the first half year of 2015 with a mature technology, wanting one of its customers, namely us, to have this technology at our disposal in French" (Project Manager, in charge of the implementation of Watson, FR-COOP).

Two cognitive solutions were tested, to begin with:

- An E-mail Analyser: Clients write to customer advisors; then, *"the department must be able to understand the intention, in whatever way the customer expresses it, within a list of 30 most recurring intentions. These 30 intentions represent 80% of our customer requests"* (Project Manager, FR-COOP). As they are not all value-added (modifying an appointment, filing an opposition a credit card, etc.), once the intention has been detected, the idea is to equip customer advisors with the link to the application in the mail, which allows the client request to be processed, and to provide answers for the customer advisor in order to respond more quickly to the customer.
- A "Virtual Assistant": The virtual assistant is installed on the customer advisors' workstation; rather than fetching in their database with keywords and wasting time searching for information in paper documents, the virtual assistant types the question in natural language, not as an expert but as a generalist writing. *"On the email analyser, the maximum rate of recognition of intentions will be 75%. This is the same rate as for a human. On the other hand, the drop-out rate is reduced by two. Our customer advisors searching in (our data bases) get tired at one point. The correct response rate was increased by 50%."* (Project Manager, FR-COOP).

How did union representatives and employees react to this experimentation?

On the basis of press information about AI, the first reaction of the unions was fear. *"International studies warn that the AI and new cognitive technologies will put hundreds of millions of employees out of work. How many in our company?"* a leaflet by the CFDT union asked in FR-COOP. Rapidly, union representatives in work councils asked for an independent expertise to assess the potential impact of Watson on employment. The idea, shared by all unions in the company, is not to oppose technological development but to be aware of the consequences on the working environment and

on employment. As an SNB trade union representative said *“We are all convinced that there will be consequences for employment. At the SNB we are smart enough to say that we cannot go against progress. On the other hand, it is necessary to accompany the ensuing employment problems. (SNB representative and Director of a local branch, FR-COOP, quoted after Perez 2017c). What will Watson do to workers? As the CFDT leaflet said: “The system intervenes in our place: what will we do? What will be our leeway?”*

The project manager said that IBM had “very aggressive communication on the subject”; but after having actually used Watson, *“we are certain here that there is no capacity for intelligence, no creativity, no capacity for summarising information, even if it is a network of neurons: there is input and output. We are far from AI”*. This reassuring remark is based on current applications of Watson and fits with what the workers we met think about Watson. *“I do not have any concerns. I know the tool is not going to replace our work. It does not know our clients. We know them. That is our strength”* (Customer advisor 2, 15 years of seniority, FR-COOP).

But the relevant question, which the expertise also raised, is: what next?

3.3 Strategies that foster innovation

3.3.1 The emergence of new actors

Digital technologies have facilitated the entry of new entrants into the market, such as agency-free banks (online banks or ‘pure players’) and independent payment or investment (savings) providers that have already penetrated the retail banking market in certain segments (see Box 1). Among them, ‘Fintech’ operators are emblematic of innovation in this industry.

‘Fintech’ (this term is used by all actors in the banking industry) means Financial Technology used to provide financial services via software. Fintech companies are usually start-ups that represent the R&D function of financial services (banking, insurance, investment, asset management, etc.) in the ‘digital age’.

“For many Fintech firms, the true innovation comes not from technology but from uses. They are in breach of the integrated system of production and distribution of products that characterises banks. They have succeeded in imposing themselves by placing the users at the centre of the services they offer. The customer's path is under-optimised by the banks, which often remain locked in a product-centric model rather than a ‘customer-oriented model.’” [i.e., built on the evolution of customer needs] (quoted in Bpifrance, 2016).

Box 1: The ‘Compte Nickel’ as a success story told by one of its designers and producers

Hugues Le Bret was the CEO of Boursorama, a digital bank subsidiary of Société Générale (SG) and is currently an adviser in communication and strategic issues. He was fired by Société Générale in 2010 after writing a book about the scandal that involved a trader, Jérôme Kerviel, whose inconsistent trading lost SG €4.6 billion, and for which Kerviel was convicted in 2014. Le Bret argued that the financial system itself was dangerous and needed more regulation.

After his departure, he met Ryad Boulanouar, a creative engineer, fond of electronics and technology, a “geek”. He had had several jobs in which he developed processes like automatic machines in railway stations to buy and exchange tickets, on-line payment systems for few companies, etc. He created the Ingevoucher solution, a “global leader in payment and cash collection networks” (a pre-paid payment card), currently used by the mobile phone operators all over the world. His parents emigrated from Algeria in the 1960s; his father died when he was a teenager. His mother went through hard times with three children and little money. That period of his life gave him the idea of opening access to a ‘banking account’ without any bank, allowing the poorest (and those who cannot have a bank account anymore like indebted people) to acquire easy access to a method of payment. His idea was to equip tobacco sellers³⁸ with a device for providing a digital wallet with a ‘bank identification number’ and a payment card. To do this, an agreement of from France’s regulator was necessary (the ACPR, or *autorité de contrôle prudentiel*). Looking for contacts in the banking system, he met Le Bret who decided to use his relationships to develop this project initially labelled ‘NOBANK’.

The story shows how it was difficult (even impossible) to convince major banking groups to invest in this project. Indeed, major banks required too many guarantees and did not want to take any risks. Conversely, smaller financial establishments managed by their own founders³⁹ were more familiar with innovative projects and accepted to get involved in NOBANK (though they did ask for an alternative name that was less ‘pejorative’). (Source: Le Bret 2013).

Lastly, the company behind the success of Nickel Account and its 540,000 accounts, announced that BNP had acquired 95% of its capital, for an undisclosed amount, which could well have exceed €200 million, according to *Le Monde*, i.e. 10 times the turnover achieved last year. For the time being, the management team, which created the success of this ‘neobank’ with its status as a payment institution (which does not offer credit), remains in place. The team includes notably the co-founders, the engineer of the subscription terminal, Ryad Boulanouar as honorary president, and Hugues Le Bret, as president and ambassador (Source: <http://www.latribune.fr/entreprises-finance/banques-finance/bnp-rachete-la-success-story-compte-nickel-678661.html>).

Digitisation represents a challenge for traditional banking networks which are trying to seduce customers with new products such as new payments’ devices. To develop such innovations, banking groups have tried to launch new partnerships with IT companies that are seen as

³⁸ In France, there are 28,000 tobacco sellers that receive around 13 million customers every day. They sell various products alongside tobacco, such as scratch loto tickets of the State gaming enterprise (*Française des jeux*), tax stamps, etc. These tobacco sales outlets collect around €20 billion per year for the State (currently equivalent to one third of France’s annual interest payments on national debt).

competitors in the short or medium term; because, as the Head of the French ‘Observatoire des métiers de la banque’ put it: *“New competitors are not banks anymore (...). ICT firms like Orange are serious competitors (...)”* (quoted after Perez, 2016).

Two types of partnerships are of interest. The first one is often mentioned by interviewees and concerns partnerships with GAFA (Google, Apple, Facebook, Amazon) but nothing is precisely defined.⁴⁰ The second is more visible and involves Fintech.

“The ‘Big Six’ (French banks) were not interested in these small firms until the past 2-3 years, when they realised that Fintech could become a serious competitor or hold a competitive advantage which could also be exploited by the Big Six.” (Head of the French ‘Observatoire des métiers de la banque’, quoted after Perez 2016).

On 4th May 2016, the CEO of the Fédération Bancaire Française, attended the Fintech Summit 2016 in Paris, and pleaded for win-win cooperation between banks and Fintech operators.

*“Banks consider that a partnership between the two is necessary to improve the whole financial ecosystem and to open up new opportunities: fintechs can benefit from a strong structure for developing their activities while banks can take advantage of the high reactivity of fintechs and can quickly develop new services”.*⁴¹

Each banking group has tried to develop partnerships with Fintech operators, funding some promising start-ups. They have created *ad-hoc* structures, sometimes named “Labs” (i.e. technology hubs oriented towards Fintech firms), hoping that innovations (such as new apps, robot-advisers, etc.) will be developed. For instance, FR-COMMERCIAL has recently launched a co-working space dedicated to innovation, and also a kind of awareness platform about new technology and innovations on financial matters (Perez, 2017b). Most innovations have been developed by start-ups that may be acquired as subsidiaries by a banking group. For instance, FR-ONLINE recently acquired a Fintech company that had developed Personal Financial Management Software which helps users to manage their money (Perez, 2017a).

“Why did we buy it? We have already been aggregating bank accounts since 2011. We did not buy it back to acquire a competitor, we bought it to internalise resources, know-how and skills, to save time, we internalised this resource, to go faster down the ‘road map’ (sic) of development than had been planned”. (Director of Marketing and Website, FR-ONLINE)

³⁹ Like Olivier de Montety, the current Chief Launch Officer of Compte Nickel, who has also developed several services for “light baked Fintech” (such as Fimatex, the ancestor of Boursorama, or Zebank).

⁴⁰ Source: <http://www.atelier.net/trends/articles/fintech-revolution-gafa-se-veulent-allies-banques-instant-441500>

⁴¹ Source: <http://www.fbf.fr/en/french-banking-sector/overview/marie-anne-barbat-layani-at-the-fintech-summit---%C2%AB-fintech-and-banks-must-work-together-%C2%BB>

In this sense, SP-COMMERCIAL possesses innovation centres all over the world that play a fundamental role in the digital transformation the Group is facing. These centres foment interaction with the innovation ecosystem, especially with entrepreneurs, start-ups and developers. In this, the objective of the bank is to be in constant contact with new ideas and talent as a source to draw on, and make headway against the challenges of the financial services industry. They also aim to create a giant web of knowledge among all centres (RegioPlus Consulting 2017a).

“The creation of a global knowledge network and the establishment of interactions with the ecosystems of the entrepreneurs of each region are priority objectives in the open innovation strategy of the bank.” (Innovation Centres & Open Innovation Director, SP-COMMERCIAL)

In Madrid, SP-COMMERCIAL has a Living Lab which showcases the main innovation projects of the bank for visitors to the centre, while it is also used as a laboratory where new products and services are tried out with real users, in a setting which recreates different scenarios of daily life. At this centre, workshops, conferences and seminars are organised around the main theme of innovation (RegioPlus Consulting, 2017a).

3.3.2 Internet banking as a substitute or complement to traditional (incumbent) banking

All banking networks have to deal with digitisation. According to the Head of the French ‘Observatoire des métiers de la banque’,

“It is very difficult to obtain precise information at the industry level because the main banks are competitors and are reluctant to explain their difficulties regarding digitisation. But different strategies are going on to adapt jobs (volume and skills) and organisations to this emerging ‘new model’.” (quoted after Perez 2016).

Nevertheless, these strategies remain unclear. According to our interviewees (as union activists at a branch level and employees themselves), top management of their organisation has no idea of the strategy that would be necessary to cope with this “digital revolution”. According to a CGT representative at the industry level

“Our feeling is that nobody knows exactly what will be or should be retail banking tomorrow. There is no real strategy. Competitors quickly imitate the first group that makes a decision. It is more a question of image than of strategy.” (Trade union representative CGT, quoted after Perez 2016).

This assessment is largely shared by unions. “They don’t know where we are going...” said a Union activist for SNB, and this feeling is a cause of worry for employees in a changing environment.

While all the big banking networks elaborate and show off strategic business plans including the digital transformation,⁴² interviews with top management in several of our case studies confirmed

⁴² For instance, SP-COMMERCIAL defined a new strategy in 2015 based upon 6 priorities, which it has called the transformation of the bank: best customer experience: aiming to be the leaders in customer

this feeling of uncertainty. For instance, the HR manager of the French cooperative bank FR-COOP said (Perez 2017c):

“It is true that the trade unions were probably marked by planning, perhaps the Soviet Union, I do not know? They say to us: “you have a plan, tell us, in 5 years what you are going to do”. Listen, if we knew this, we promise you we would tell you, but we do not know. They always follow this logic somewhat, believing the company has a vision ... Of course we try to have one, but often they overestimate enormously our ability to anticipate things. That does not mean that we do not anticipate, but it has its limits.”
(HR manager, FR-COOP)

According to Arnaboldi and Claeys (2009), two main business models can be identified: “*classic banks start to cross-sell bank products via a website in order to reach new clients and diversify their distribution channels (“click and mortar”). An alternative strategy is the creation of a pure Internet bank without the support of physical branch*”. However, in practice, these two strategies are not entirely alternatives. Indeed, the large majority of traditional European banks have set up an Internet portal *and* a separate Internet bank with has its own brand and function as an independent entity. Regarding our case studies, FR-ONLINE is a ‘pure Internet bank’, but one which has functioned as an independent entity from a traditional bank since 2015. By contrast, SP-COMMERCIAL and FR-COOP have followed the first strategy (each one having an online bank but operating in a very distinct way from the traditional bank with very few interactions).⁴³ FR-COMMERCIAL stands out because it has chosen to create its online bank as a bank service (although with its own brand, its own website and, in part, its own infrastructure), rather than an independent structure.

Clients seeking mainly cheap and quick deposit accounts would probably prefer Internet banks. Hence, Internet banks may cause innovation in the banking sector, and serve as learning experience for mixed banks in terms of technology.

These organisational choices are not neutral for employment and job quality, as we will show in the next section.

To conclude this section, we note that ICT has been at the core of a process of structural change in retail banking for several decades. In this respect, digitisation is not really “disruptive” and has several strong elements of continuity with the past:

In this industry (as probably in others), the effects of ICT on employment are inseparable from:

- at a firm level: the organisational and managerial choices made by firms (technological innovations as opportunities and constraints that trigger the emergence and/or the suppression of activities, competences, etc.), are in part shaped by trends at the sectoral level.

satisfaction, driving digital sales, new business models: supported by the Fintech system, optimisation of capital allocation, leadership in efficiency and best team (RegioPlus Consulting, 2017a).

⁴³ As proof, no interviewee spontaneously addressed the subject, whether they were management, union representatives or employees.

- at an industry level: corporate governance, interaction among firms (imitation effects, uncertainty about business strategies, etc.), and regulatory bodies (that facilitate competition in the market or not; see regulations of Fintech activities).
- The effects on employment in the banking sector have always been feared (see for instance the literature on ATMs); or the Nora Minc Report in France in the late 1970s.⁴⁴

Regarding the entry of new players and the need for new expertise, ICT has yielded the changes in the boundaries and structure of retail banking. Moreover, the composition and modes of delivery of banking services have drastically changed. French and Spanish banking systems share some common features: a rather dense retail banking network (number of branches per inhabitants) and a rather late evolution of retail banking in the face of digitisation (particularly compared with the UK, Netherlands and the Nordic countries).

Let us now look at the impact on the job quality of the changes impelled by these new ICTs, opening the “black box” of several actors, including three “incumbents” (i.e. traditional banks).

4 Impact of Technological and Organisational Changes on Job Quality

As suggested above, it is largely process innovations, strongly supported and stimulated by new technologies (mainly digitisation and AI) that have impacted work activity in the banking industry in the past decade, interacting with organisational changes which have accompanied these technological advances.

Our purpose here is to analyse the impacts of such innovations on both JQ and employment, and how these impacts are mediated by organisational choices through the lens of our five case studies.

The French Observatory of Occupations and Skills in the banking sector distinguishes three main families of operations in retail banking: sales (half of the workforce), operations processing (one quarter) and support functions (such as HRM; about 20%). Within the top two occupational groups, the most frequent occupation is “customer advisor”. This occupation has been especially impacted by digitisation, which affects the content of work, the working environment and required skills (Béziade and Assayad, 2014). An important part of the interviews thus concerned this profession and the way in which the organisations have evolved it in this context (hiring requirements, internal career paths, training provision and so forth).

After considering briefly how employment has evolved at the sectoral level in both countries (Section 4.1), we will turn to the main changes regarding employment and JQ for sales forces (4.2),

⁴⁴ In France, in 1978, the President of the Republic, V. Giscard d'Estaing, commissioned a report on the computerisation of society. Directed by two senior civil servants (Simon Nora and Alain Minc), this report became a best-seller, given worries about the social repercussions of computers. Indeed, after the first oil shock and the rise in unemployment, the consequences on employment were a matter of concern, even if at the time the main consequences of information technology concerned individual freedoms more. Concerning tertiary sectors such as insurance or banking, the report predicted employment savings of 30% in the 1980s. These forecasts nuanced the image of IT as a noble, job-creating sector with high added value (Walliser, 1989).

and then for the whole industry. These changes challenge human resources managers who have to recruit and retain the relevant profiles (4.3). Regarding new players, it may be asked if job quality is somehow better within these organisations than within incumbents, and how it fosters creativity and innovation (4.4). Hence, two different strategies stem from the case study analysis: polarisation of jobs versus job enrichment, strategies for which we try to find some explanations (5). Finally, a salient feature that is common to our case studies is the worsening of working conditions (4.6).

4.1 Retail banking: a macro overview of a declining sector?

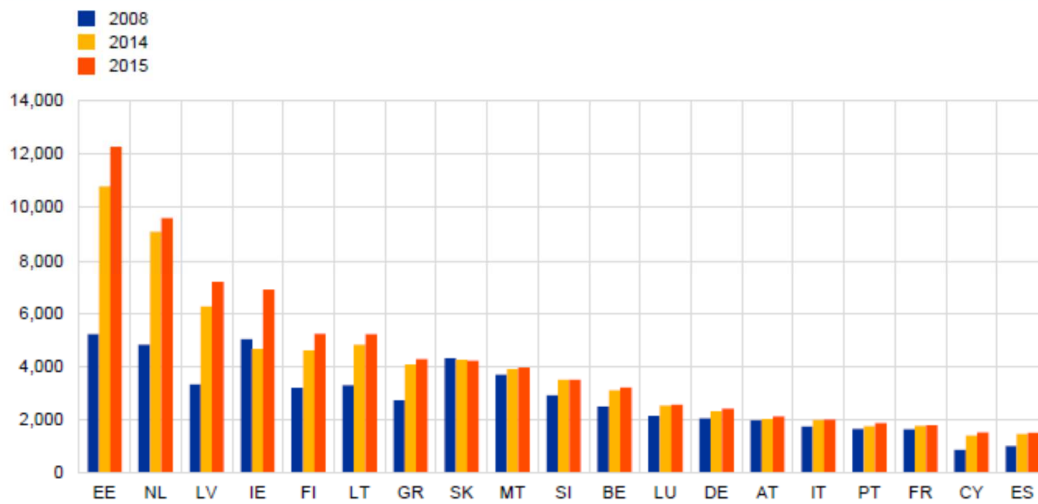
Over the last decade, job destruction occurred in the banking sector in Spain (-4% between 2008 and 2015: source Eurostat, quoted in RegioPlus Consulting, 2016) and in France (-4% from 2007 to 2014). The 2008 crisis partly explains these job losses (particularly in Spain), together with gradual changes in the business model of retail banking, which, it should be recalled, accounts for two-third of employees in the banking sector in both countries.

The resizing of the banking system after the 2008 crisis is reflected in the decline of the number of local bank units (i.e. branches) in the euro area by 17.6% over the period from 2008 to 2015. According to the European Central Bank (2016), almost half of the decrease is accounted for by Spain, but other big economies such as France also contributed significantly to this decrease.

Two indicators show both the profile and the trend of changes in the Spanish and the French banking systems between 2008 and 2015. The territorial density of the banking network is remarkably high in both countries, despite the increase of population per local branch over the period (Figure 1). The resizing of the banking networks has resulted in job destruction and, in parallel, internal reorganisations (such as passing from physical branches to e-branches or telephone platforms). Consequently, the population per bank employee has increased significantly in Spain (a little less in France), suggesting an increase in workload for the incumbents (Figure 2). Indeed, in 2015, the population per bank employee was 236 in Spain and only 163 in France (the average in the euro area being at 169), whereas the population density was similar in both countries (European Central Bank, 2016, p.27).

Figure 1: Population per local branches of banks in European Countries

Population per local branch in euro area countries in 2008, 2014 and 2015

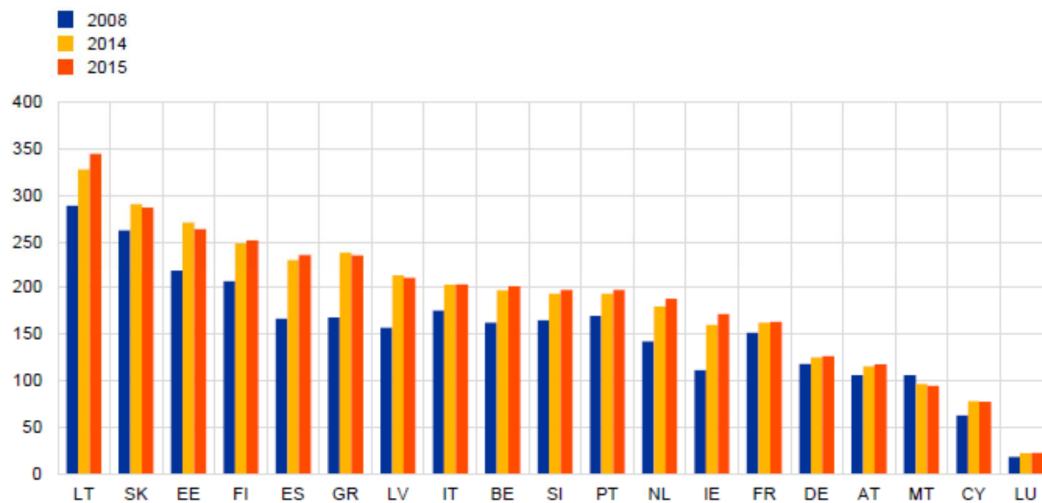


Sources: ECB (SSI statistics), Eurostat and ECB calculations.
 Note: Branches refer to the local units of credit institutions.

Source: European Central Bank, 2016: Chart 2.4

Figure 2 Population per bank employee in European Countries

Population per bank employee in euro area countries in 2008, 2014 and 2015



Sources: ECB (SSI statistics), Eurostat and ECB calculations.

Source: European Central Bank, 2016: Chart 2.5

In our case studies, all traditional banks have gained an increasing number of digital customers and some have decided to close branches and to shed some workers. At the company level, it may be difficult to evaluate the overall decrease in employment, because of merger and acquisition strategies over the same period. For instance, in SP-COMMERCIAL, there was a severe cutback in employment between 2012 and 2014 (about -10%) but after the acquisition of a regional bank, staff expanded again.

In FR-COMMERCIAL, the volume of employment (in retail) and local branches has followed the same decreasing trend since 2010 (-13% for branch closures and -6.5% for employment between 2010 and 2016). Hence, it seems that job cuts in retail banking have not been compensated by job creation in 'new' activities in connection with digital transformation. FR-COOP is the only French banking network that has not yet announced a plan to close branches, basing its strategy on maintaining a dense physical banking network favouring proximity between customers and its sales staff (Perez, 2017c).

"We believe that there is a future for a physical banking network, but that it must be associated with all the tools of remote banking, and all the possibilities of non-physical contact that the technology allows. That is the bet that we are making, which is not so simple, as it will have to find a balance in terms of cost. Indeed, we are in an activity where staff costs represent 60% of overheads, which is the choice we have made at the present time." (HR manager, Group level, FR-COOP).

Beyond job destruction, which was drastic in Spain but more progressive in France, it is necessary to open the black box in order to observe the reallocations of labour and the internal reorganisations that the macro indicators conceal or do not reveal. Indeed, process and technological innovations constitute new constraints but also new opportunities for the banking sector.

4.2 Sales forces: the main changes regarding employment and JQ

As stated above, the implementation of Internet banking has been a key strategic issue, which has led to different places and modes of work organisation (Table 2). In all cases, providing remote banking services implies new profiles of customer advisors and somehow a different type of work organisation.

Table 2: The Organisation of Customer Relationship Services in our Case Studies

| | Pure player (exclusively online) | Integrated mixed strategy | “Expanded” traditional bank |
|--------------------------------------|---|--|---|
| SP-COMMERCIAL and FR-COOP | | | Customer advisers in local branch (whatever the channel) |
| FR-COMMERCIAL | | Customer advisers in the Online Bank (OLB) Call centre contact agents (exclusively online) Customer advisers in local branch | |
| FR-ONLINE | Customer advisers and sales advisers (exclusively online for remote customers) | | |

4.2.1 Pure players: a pure external market for customer service employees

For ‘pure players’, the customer relationship is organised in two functions: a sales force (or prospects) and customer advisors. The former are responsible for answering phone calls from people wanting to become customers (or existing customers who want to open new accounts). Sales force members lead people through the different steps in the process of opening an account until it is completed. Sales advisers have performance indicators, mainly in terms of opening accounts. After opening an account, each customer is automatically assigned to a team that will follow her phone calls. Customer advisers deal with questions asked by clients by phone, chat or email. There is no performance indicator based on sales; but various indicators reflecting customer satisfaction, including response times (with different benchmarks according to the customer profiles). Both services are organised with teams (10 persons each), team managers and managers (in particular for the organisation of online activities such as scheduling and according to the category of customers).

Taken together, these two occupations account for almost half of the growing number of employees in this company. Consequently, most of recruitments (at a rate of about 100 employees per year since 2012) are for *technicians*⁴⁵ of sales transactions and customer services. They are usually recruited full-time with a permanent contract. People are rather young (under 30), having

⁴⁵ The category of ‘employee’ (clerks) was suppressed from the collective agreement of commercial banks in 2000. That reflects the increase of educational level at the entry in the banking occupations (Aubry and Dauty, 2000).

at least a two-year university undergraduate degree. Having previous job experience is not required even if an experience in sales is appreciated. It should be noted that no prerequisite in banking is required.

“This is a difference between us and a traditional retail bank: our advisers do not recommend banking products. Clients manage these themselves using the website” (HR Manager, FR-ONLINE).

The salary received by counsellors is at the low end of the range; apart from a few highly competitive occupations (see below), the situation regarding wages is the same whatever the position in the company. As a unionist said, *“the wage policy reflects the business policy: being a low-cost bank. The wage bill is under tight control”* (Trade union delegate 2, FR-ONLINE). The management highlights the profit-sharing agreement, which is said to be quite generous (around €3,000 annually per employee). One last observation should be made at this point, employee turnover seems too high in sales and customer services. If the HR manager did not want to give figures, she recognised that: *“this kind of job is not sustainable throughout a working life”* (HR manager, FR-ONLINE). The content of the job (quite limited), and time schedules (customers service is open from 8 am to 10 pm, from Monday to Saturday) are difficult to keep up with for a long time. We will return to this issue later.

4.2.2 The integrated mixed-strategy: towards a new hierarchy within customer services (and between employees)

At the time of the field work, customer services at FR-COMMERCIAL were organised as follows: Retail banking activities were covered by two units: one for online activities, the other for the physical banking network (i.e. branches with their customer advisers). Each had its own HR manager (Perez 2017b).

Within online activities, there were two main structures:⁴⁶

- the **online bank**, operating under its own brand (hereafter FR-COMMERCIAL_B); launched in 2013, with around 200 employees (mainly *customer advisors*) deployed across three sites;
- and three **Call centres** (hereafter FR-COMMERCIAL_CRC) which existed before the online bank, with 600 employees, mainly *contact agents* (working exclusively online).

There was a hierarchy in terms of job content, based on recognition expressed in wages.

At the bottom are the *call centre contact agents*. They deal with calls from customers when other units (branches or the online bank) are closed (e.g. Saturdays). Moreover, they answer to clients in case of *“overflow”* (occupied phone lines) in branches and the online bank. Nevertheless, these employees do not have the same prerogatives in terms of job content: *“the perimeter of the transaction is narrower in CRCs than in branches”* according to the Head of Sales of the online bank

⁴⁶ Another could be added: centres for specific demands (saving, insurance, real estate). Their employees are considered as ‘experts’ in a domain and able to answer requests addressed to customer advisors (and eventually directly to customers through video conference equipment).

FR-COMMERCIAL_B (Perez 2017b). They can take messages on behalf of the client and then inform the customer adviser. This work sharing creates tensions between customers and CRCs, as well as between CRC employees and “regular” advisors. Call centre agents are usually young (under 30), with a high school diploma (*baccalauréat*) or a second-year university undergraduate degree (Bac+2), with no previous job experience. As the HR manager said:

“We are looking for salespersons. Banking activities can be taught (la banque, ça s’apprend)! It is not so complicated! It can be taught (by on-the-job training).” “In call centres, they have four weeks of advanced training, with modules on customer routes, products, telephone sales, plus two weeks of ‘nursery work’ i.e. we put them into real situations, with real customers except that they have a coach, or a trainer, who is with them all the time... Then they are placed in their teams, and more training courses are planned, on bank regulation, compliance, etc. topics on which we are obliged to return to often.” (HR manager of online banking activities at FR-COMMERCIAL).

Their tenure is rather low (3 years on average); according to the HR MANAGER, this is due to particularly demanding working hours (see below).

Next in the hierarchy are *customer advisers in the online bank*. When the online bank was launched as an internal unit, the strategy of the top management was to transfer some customer advisers working in branches into this new entity. According to an SNB representative of FR-COMMERCIAL, the will to design the online bank (FR-COMMERCIAL_B) as an internal component of the bank (and not as a subsidiary) was a way to facilitate internal mobility (without employees risking the loss of fringe benefits – like the profit-sharing arrangement – which are often less favourable in subsidiaries). As such, *“it was a political and strategic choice in favour of job quality”* (Trade union delegate SNB 1, FR-COMMERCIAL). In fact, a company agreement about internal mobility within the group FR-COMMERCIAL was signed at the same time.⁴⁷

But this strategy did not succeed.

“When they (management) decided to launch the online bank (FR-COMMERCIAL_B), the first aim was to retrieve customer advisors currently working in local branches. But they could not find takers. Customer advisors were not interested in going into online banking. You should know that they may sometimes work beyond their usual hours, but they would never finish at 10 pm! So, what they (management) did, they asked to the “best” customer advisors in CRCs to join FR-COMMERCIAL_B. At this time, they sold this by saying “you will be like a customer advisor in a local branch! You will have autonomy, you will be able to manage your own customer portfolio”, but, slowly, everybody discovered it was a lie... Even the concerning bonuses!” (Trade union delegate CGT, call centre contact agent in FR-COMMERCIAL__CRC since 10 years).

⁴⁷ *“The 2013 agreement on internal mobility aimed at changing a system. Before 2013, internal mobility meant a wage increase. This was no longer true. FR-COMMERCIAL does not support geographical mobility anymore to facilitate career paths within an employment zone (bassin d’emploi)” (Trade union delegate SNB 1, FR-COMMERCIAL).*

The Head of Sales at FR-COMMERCIAL_B confirmed this statement but gave another explanation:

“We have always wanted to promote internal mobility, especially to save training costs. But, I think it has always been difficult. Why? Because in Paris, the physical network is still recruiting; the natural turnover is rather high. Then, local branches do not want to foster internal mobility towards FR-COMMERCIAL_B. That is why 90% of FR-COMMERCIAL_Bs’ hiring came from external market. This was not what was wanted. It was a requirement.” (Head of Sales, FR-COMMERCIAL_B).

As a result, management asked some call centres contact agents (those who stood out as the best performing employees) to switch to the new brand; this was considered as a promotion. Besides, they had to recruit externally young people with a two-year university degree (as a minimum) and a professional experience in banking activities broadly defined (insurance, credit, etc.), or in real estate.⁴⁸

Regarding mobility from the physical network towards online services, a quite similar situation occurred in the Spanish bank, SP-COMMERCIAL (RegioPlus Consulting, 2017a). Whereas many branches closed, the bank had created a new customer service named “The bank with you”. It involves each client having an online manager who assists her in transactions, can contract products directly through the client and then replace the manager present in the bank branches. This work is similar to that of a branch manager, but through a digital medium. In this context, younger workers of the branches were offered the possibility to become “online managers” in the “The bank with you” programme. They were redeployed in the head offices rather than in local branches. This implied that their working hours changed (from 9 am to 6 pm with a lunch break, instead of the 8 am to 3 pm schedule in branches). They received basic training and a salary supplement for the change of hours (of approximately €100 per month). The bank usually presents this change as career promotion. But the feeling of workers was mitigated. On the one hand, some of them appreciated not dealing directly with the public anymore, which had become more difficult. But on the other hand, the work schedule was worse, and they had difficulties in telephone sales. Sales targets were tough to reach. Nevertheless, in this case, it seems that workers did not have the option of refusing this internal mobility. In addition, the bank’s website offers a chat box service for customer contact, a list of commonly-encountered problems or doubts when using the website of the bank, and telephone assistance.

“We have partial telephone assistance, where each manager can deal with 1,000 people. More workers are being dedicated to this service, while office personnel is declining, though not in the same proportion. That is, if now one person can deal with 1,000 by telephone, I don't need to have five people present in the office. Nevertheless, this is not for everybody: being attended to by phone isn't the same as contact in person”. (Trade union representative, SP-COMMERCIAL).

⁴⁸ The HR manager noted that the training delivered to new recruits from online banking was less substantial than that designed for call center employees. That this would be reviewed to take into account the real profile of the people involved and not the profile initially expected.

What are the main differences in terms of job content, work organisation and finally job quality between call centre contact agents and e-advisers? In reality, there are not so many differences between the two “profiles”.

According to a study carried out for the French Observatory of Occupations and Skills in 2013 (Blanville, 2013), technical skills, know-how and soft skills expected are rather similar in both profiles. But in terms of hiring criteria, previous experience in banking activities (usually through a call centre work) is required for working as an “e-adviser”, while this is not the case in a call centre.

As said previously, the perimeter of activities (job content) is narrower in a call centre where an agent cannot be a full substitute for a customer adviser, *even if she knows the answer*. As the HR manager of FR-COMMERCIAL put it

“the customers are not theirs. They do not have business assets” (HR manager, online banking activities, FR-COMMERCIAL).

However, the organisation of work is pretty much the same in both structures (except for working time schedules; see below): as one employee at a call centre, a staff representative, noted,

“[FR-COMMERCIAL_B] remains a telephone platform. But it is only an ‘aisle head display’. When they communicate on online banking, they only talk about the brand, FR-COMMERCIAL_B”. (Trade union delegate CGT, call centre contact agent in FR-COMMERCIAL_CRC).

Most of employees are hired on permanent contracts even if temporary workers are relatively more numerous in the online bank (FR-COMMERCIAL_B) than in call centres. According to the HR MANAGER, temporary workers are used for peak activity. But for union delegates, it is instead a sign of a lack of long-term commitment to this brand (Perez, 2017b).

Basic salaries are rather similar too. Concerning the variable part of wages, until recently, call centre agents did not have performance indicators indexed to their business (sales) results. But the situation has changed and now, selling financial products seems to be the main objective.

“I have experienced the previous online banking model and the new one. In the previous one, we were not ‘objectified’ in sales matters. When a client called us because of a problem with her credit card, we just tried to help her as the best we could. We also had to call clients to suggest to them an appointment with their customer advisor, or to offer products during a marketing campaign. We had to answer some emails too. Some of us felt more comfortable with incoming calls rather than outgoing calls. But sales performance was not the main goal. Today, it is very different. It is much more aggressive. Answering to incoming calls is now the main activity. Nowadays, we know that, when a client is online, we have to attain our performance indicators. We must achieve a sales bounce (‘rebond commercial’) (...). As I said sometimes, if a client tells us that his father died, we will try to sell him something... whatever (...). We don’t talk about quality anymore. This is how online

banking has changed". (Trade union delegate CGT, call centre contact agent, 10 years of seniority, FR-COMMERCIAL).

If call centres have turned into sales centres, then, the main differences between their employees and e-advisers concerns *career opportunities* and *working conditions* (as we will see later). Finally, the biggest difference is probably between them (people working exclusively online) and customer advisers in local (physical) branches.

4.2.3 Traditional banks as 'expanded' customer advisors

In the three traditional banks that we studied, the role of customer advisors has also evolved, although in a different ways and to a different extent according to the context of the company. We shall leave the question of working conditions, which is not minor, for later.

Traditionally, a customer advisor in a local branch has *her own customer portfolio* for whom she is the main and often the only point of reference for a set of tasks (account management including overdrafts, investment, insurance, credit). The relationship between a customer adviser and her client was mainly face-to-face until recently; relationships were essentially face-to-face, which was seen as an effective way to build trust and a good knowledge of the person's needs (family, work). A last important feature of this occupation concerned *career paths* that were recognised and backed by a formal training system. This training system was managed by the sector, which acknowledged formally-acquired skills. The advisor started as an agent at the counter of the branch (i.e. a front desk officer; *agent d'accueil*), then advised individual clients (with different levels corresponding to increasing business perimeters), then professional customers (SMEs and self-employed professionals), and then possibly worked as wealth managers (*gestionnaire de patrimoine*). The profession has changed in these three areas that defined the occupational identity of a customer adviser.

First, as the work environment has changed (following the economic crisis and digital transformation), the number of branches has decreased, particularly in Spain (-10% in SP-COMMERCIAL between 2012 and 2016). According to the unions, the bank SP-COMMERCIAL avoided layoffs (RegioPlus Consulting, 2017a):⁴⁹

"Of the 132 offices closed over the last year, the posts of the managers have been eliminated. In principle they were not made redundant, they were relocated to other jobs, or retired. Their category was reduced, though not their pay as that is not permitted". (Trade union representative, SP-COMMERCIAL). The most experienced customer advisers were relocated to other branches maintaining their salaries and working hours. According to a union representative, "(P)eople are afraid and don't protest. Around the country, they've just closed 130 offices, which has given rise to a set of changes for 200 people. These changes have not taken into account where

⁴⁹ It was the same in France over the last decade, thanks to the demography that allowed what HR managers name 'natural departures' through retirement. What about recent press releases that have announced plans of branches' closures in FR-COMMERCIAL?

workers live, which could have facilitated closeness to home and made things easier" (Trade union representative, SP-COMMERCIAL).

For persons keeping their job, the average number of clients per portfolio has increased, as has the workload by the way. According to the unions

"Since digitisation started, the number of jobs has fallen. The number of people comprising the branches is very different, and there now exist offices with a single person. Offices which used to have 10 employees now have 3. Before, there was always an administrative head at the offices, but this post has been eliminated because a central company was created to deal with the administrative matters. There is a greater workload for the workers who remain" (Trade union representative, SP-COMMERCIAL).

Pressure on sales indicators has increased too within physical banking networks (in the three traditional banks that we studied here).

Secondly, customer advisors have to deal with the diversification of channels that customers use to contact them. That implies various changes in work content. Face-to-face contact is no longer predominant. Emails have become increasingly important: around 30 per day per customer advisor, 50 after weekends, 2 to 3 hours per day to treat them according our interviewees in FR-COOP (Perez 2017c).

Because "distance work takes more time than when the client is there in person! (...). So, the emails take a huge part of the working time. In addition customers expect an immediate response. We have the emails, the phone calls, the physical appointments; we have all the administrative side afterwards; we have the tasks, the daily monitoring of the customers ... we are not idle!" (Customer advisor 2, 15 years of seniority, FR-COOP).

Moreover, as some customers use on-line banking to improve their banking knowledge and competence, customer advisors are challenged in their own skills (including inter-personal skills). So "faced with increasingly-independent and autonomous customers, professional agents tend to lose certain prerogatives and a degree of power" (Dubois et al., 2011). As a customer adviser testified:

"Today we are tested by the customer. With the Internet, they have the answers before coming to the appointment, they will know if we tell the truth or if we lie. I even learn things about my trade from customers. Two weeks ago, I learned things about the 0% (home) loans that I did not know! They are highly-informed by Internet" (Customer advisor 5, 6 years of seniority, FR-COOP, quoted after Perez 2017c).

It has become more difficult to feel competent. Beyond this, the permanence of jobs is at stake. As the manager of a local branch said about customer advisers: "It's not technology that will kill them it is incompetence." (Head of 'caisse X'; FR-COOP).

Depending on the tools on which customer advisors may rely on, training, work organisation (in particular if work performance is assessed individually or at the branch level), etc. customer advisors may feel being in danger, threatened by a working environment or be well-equipped to face it (see below).

Thirdly, regarding job destruction in banking networks and deep changes within job contents and work organisation, career paths have been blurred. As a union representative at a Spanish bank indicated:

“There was a time when professional promotion was more agile. (Today) vacancies aren't publicised. Promotion is currently stagnating because branches are being closed, based upon the digitisation of the processes” (Trade union representative, SP-COMMERCIAL).

Despite these changes, being a customer adviser still appears as more attractive than working as a e-customer advisor (and even more for call centre contact agents) in the eyes of those concerned. There are several reasons for this because of working conditions and particularly working time schedules (discussed below), but also because of the intrinsic value customer advisors attribute to the business of customer relations: having “their” customers, the opportunity of knowing them in order to better serve them.

So, the new landscape of customer relationships in the banking sector is quite similar in both countries with the significant spread of remote services interplaying with the impact of the economic crisis on organisational choices.

Having looked at client relationships, let us now broaden our perspective to other business lines.

4.3 The need for new skills and competencies: an issue that challenges HRM

Apart from customer services, the digital transformation has brought new profiles, for specific activities such data analysis, business intelligence, web marketing, and some profiles which are very specific to the legal and regulatory changes in the banking industry. For these highly-skilled jobs, it is much more difficult to find staff, and banks and insurance companies compete with each other to attract such personnel.

For the ‘pure players’, these ‘new’ occupations account for one third of their annual recruitment. What does FR-ONLINE do to attract such ‘talent’? The HR manager answered:

“We promote our story, as a former start-up; our famous brand; our size – not too big – where it is possible to do things, etc.; and our parent company (the big retail bank) but only for some people, not all of them!”. Indeed, the HR manager pointed out that applicants in digital banking do not have the same profile as do applicants in a traditional bank. “People feel attracted by the innovative dimension of the product; they are more sensitive to digitisation, etc.; that is why there are very few moves from traditional banks to digital ones. People do not want to move” (HR manager, FR-ONLINE).

For the traditional banks, strategies are a mix of internal mobility with workers who are trained and promoted with corresponding pay rises; external recruitment via head-hunters; and the use of external providers. In case of internal mobility, managers are asked to identify “talent” among their employees and signal them to HRM. For new digital activities that constitute recent occupations, traditional banks had to make big efforts to codify the jobs they needed: this step was necessary to facilitate the work of the HR Management in the identification of the sought-after skills, in the recruitment and, finally the positioning of new recruits in the organisation, especially in terms of their pay scales.⁵⁰

It is doubtful at least *at the firm level* that job creations compensate for job destruction. As Consoli (2005) noted, “in the new competitive landscape rather than expanding their structure by employing system managers, programmers, database administrators and specialists in security, financial institutions needed to look outside the traditional boundaries of the banking firm to obtain such expertise”. In this way, these occupations seem less connected to internal labour markets than to external professional labour markets which have developed (as in the case of corporate Investment banking activities; see de Larquier and Tuchsirer 2013).

In this changing environment, HRM is challenged to recruit and retain the adequate profiles. A common feature to all our case studies is, according to the HR managers, that the traditional banking model is not adequate to the constraints of online activities (i.e. mainly demand fluctuations). Whereas retail banks are somehow archetypical of bureaucratic organisations, the key word is now ‘agility’.

As the HR manager of SP-COMMERCIAL put it

“(W)e are constantly changing our ways of working, to adapt to our customers, settings, global activities...” (HR manager, SP-COMMERCIAL).

Or, at a ‘pure player’:

“Our organisation has to stay ‘flexible’; it is important to be able to move quickly.” (HR manager, FR-ONLINE).

What does this mean for HR practices? The idea is to apply the same principles to employees as to customers: more remote services (new modes of contact with HR services, a greater use of Intranet, etc.), more flexibility (no pre-defined career paths; depending on opportunities etc.).

According to the HR manager of FR-ONLINE,

⁵⁰ For instance, FR-COMMERCIAL created reference guides (*référentiels*) for digital and data professions. In social media, the main competences are: mastering different social networking and digital levers; securing and improving the companies’ digital reputations; designing social media strategies; piloting and coordinating social media activities. Each competency is identified and then broken down at different levels: basic, advanced and expert (Perez, 2017b).

“I am not innovative myself. But I think we will have to adapt HRM to our employees (...). With our clients, we have a remote relationship, but it is extremely personalised. I think it will be the same for HRM in few years.” (HR manager, FR-ONLINE).

The HR manager of the online bank, FR-COMMERCIAL, took a similar line:

“There are no more ‘career paths’ (...). We need to change our state of mind, be more agile with employment contracts, with working time schedules. If we don’t carry out our ‘cultural revolution’ in HR policy, we will miss good profiles and we won’t be able to answer our customers’ needs appropriately. Because our candidates are our clients.” (HR manager, FR-COMMERCIAL).

In addition, she fully endorsed the need for more flexibility pretending that this fits with the wishes of younger employees: *“The younger generations no longer want to enter the Dad’s bank (banque à papa) in which one spends one’s entire career like Dad. That’s finished. It is no longer the model of the younger generations. They want to have choice”* (HR manager; FR-COMMERCIAL). According to her, large companies such as FR-COMMERCIAL are too cautious with labour regulations; *“they do not dare to try new ways of organising work”*; HR management has to move quickly to attract young talent; it is a question of image for the youngest generation, and of efficiency compared with Fintech (Perez 2017b).

According to the union representative at FR-ONLINE, there is still some way to go:

“Here, we are in an expanding market, FR-ONLINE is an innovative company but not in social matters in which we are archaic! For instance, they (top management) refuse to experiment teleworking. We have a new building, but they did not plan setting aside space for relaxing, talking, etc. FR-ONLINE innovates in terms of products and services, but remains very traditional in terms of social matters and organisation” (Trade union delegate 1, FR-ONLINE).

4.4 New players: a bed of roses?

We have already provided some insights into the organisation of work and job quality found in new players in retail banking, particularly online banking. We return here to the situation of start-ups.

4.4.1 Working in a start-up (or a former start-up)

In many respects, the start-up model is associated with the attributes of innovation: skills, creativity, and agility. It is understandable that this model fascinates large banking groups with heavy and complex infrastructures and well-structured internal markets.

Our two case studies are very illustrative of these attributes.

As a start-up, FR-ONLINE is composed of young local students in business and computing studies, who are excited by the development of a new activity: a website/portal of financial information (Perez, 2017a).

“Basically, FR-ONLINE is a pioneer; it is a technical team that has started to innovate. Each weekend, we put news on-line on our website and in the following week, the readership grew! People (employees) were enthusiastic; they always suggested improvements, new ‘streams’ to put online... This ‘pioneer spirit’ still remains in FR-ONLINE.” (Trade union delegate 2, computer engineer, hired in 19th position in the 1990s, started to be a unionist at the company’s turning point in 2002, when the two CEOs and founders decided to sell it, FR-ONLINE).

With slightly more than 10 employees, SP-FINTECH is an SME that has experienced exponential growth (the average size of Fintech firms in Spain is said to be 12). Employees are all graduates, with highly specialised training relevant to the tasks they have to perform. Technical skills at the cutting edge of the domain are the main criteria in Fintech. As indicated above, the selection criteria (like those of remuneration) are based on skills and qualifications, in short, on “talent”, regardless of the characteristics (gender, nationality and so on) (RegioPlus Consulting, 2017b).

Nevertheless, personal networks are useful vectors for attracting candidates. What an engineer and union delegate of FR-ONLINE describes matches with the idealised image of a start-up:

“the oldest were 27 years old; I was 23 at this time. We were a group of friends, doing the same studies, hired at the same time, my colleague was my room-mate, we were all (locally born) and we tried to hire (locally born people) first, for the “state of mind” (Trade union delegate 2, FR-ONLINE).

As a result, diversity is not always there. For instance in SP-FINTECH, the majority of the workers are men (over 75%), Spanish (92.9%) and do not belong to groups at risk of exclusion (100%).

As long as the structure is small, relationships may remain horizontal, even very informal (like buddies). But in our two cases, the CEO has/had clear leadership abilities even if he values the *horizontal nature* of relations between employees. Moreover, as in most micro-SMEs, workers do not have a formal trade union organisation to represent them. The horizontal working structure of the company suggests that workers could deal directly with their manager in case of labour problems, without the need for intermediation.

As one union delegate of FR-ONLINE testified:

“you are super motivated, you work, you do not feel as if you are working. You have ideas. You have the possibility to post them up on the site. If they go down well, you put them online on Saturday. If not, we rectify them, we discuss them. It’s great, we search, something works, otherwise we fix it ... you have a worry, a colleague helps you. We do not count the hours we work, we come on Saturday and if there is a problem on Sunday. The (French) Labour code, we did not care about it. The unions did not care. It worked like that for two years” (Trade union delegate 2, FR-ONLINE).

Employed on permanent contracts, on a full-time basis, workers in the start-up earn salaries that are generally above the average.

"Salaries are better than the industry average, in accordance with the philosophy of the CEO, who is committed to a small team of very good and well-paid people" (Chief Marketing Officer, SP-FINTECH).

Moreover, to maintain loyalty, Fintech firms usually have incentive programs such as profit-sharing and participation devices, so that the better the company performs, the higher employee earnings are. This reinforces the feeling that workers are working for themselves without a formal boss.

Whereas in the French case, the working time schedule is unlimited with no consideration for balancing work and family life, in the Spanish case, the company has promoted elements associated with the *emotional salary* linked to the job structure: flexi-time, a flexible approach to work, options for teleworking, etc. in order to reconcile better work and family (RegioPlus Consulting, 2017b).

"The schedule flexibility is total as long as you meet the deadline: you plan the tasks you have to do. You can work in the morning or the evening, on a Monday or a Sunday." (Acquisition Marketing Officer, SP-FINTECH).

"Workers are more productive as they have the flexibility to work in their more creative moments. In this sense, they can take advantage of the hours of more concentration. However the hours have to be similar to those set out in the agreement and they have to respect the moments of workload." (Chief Marketing Officer, SP-FINTECH).

"I live in Granada and the central office is in Madrid. Thanks to teleworking, I can live in the city I want to, although sometimes communication is more difficult and only goes through ICT." (Backend Developer, SP-FINTECH).

4.4.2 Building or preserving/maintaining a working environment that fosters innovation (as the start-up grows)

As Arnaboldi and Claeys (2009) have observed, "the evidence shows the existence of some technology-specific scale effects, suggesting the need for a pure online competitor to grow larger in order to survive".

This is echoed by the following quote:

"We want to continue growing both in terms of number of e-shops (for which we provide payment services) and of users in Spain. The aim is to increase the number of e-shops with which we work and to achieve an ever increasing repetition of people who finance their purchases with (us)." (CEO, SP-FINTECH).

If these organisational conditions described above explain Fintech firms' successes, what happens when these companies grow? FR-ONLINE currently has 700 employees and is an interesting illustration of such changes (Perez, 2017a).

Whereas for one of the trade union delegates, the remains of the start-up period are mainly organisational (i.e. insufficient organisation and policy regarding mobility, training, etc.), another

delegate highlighted some continuity between the current pure player, FR-ONLINE, and the original start-up, in terms of innovation (Perez, 2017a). He pointed to three main features:

Technology monitoring: *“as web developers, we are always interested in new tools, new languages, etc.” (Trade union delegate 2, FR-ONLINE)*

Involvement/commitment: *“we don’t check time. When a project has to be delivered, everybody has to be here (that means not only those who have participated in it) from 6 pm to... whenever is necessary to get the work done. It could be 10 pm, midnight, etc.” (Trade union delegate 2, FR-ONLINE);*

Improving customers’ experience thanks to technology: *“our concern is to link technology to banking matters, more broadly, to FR-ONLINE’s activities. Our innovative spirit is thinking about improving things for customers. It is not only the prerogative of marketing!” (Trade union delegate 2, FR-ONLINE).*

In answer to the following question: “do you think you have enough leeway to be creative today?” the union delegate (and engineer in FR-ONLINE since 15 years) answered:

“That is very interesting. When we were a start-up, we would ask others what to do. We modified a webpage and then we showed the result to colleagues. Today, it is not possible anymore. We have “projects”, “missions”, with dedicated resources (number of days per person), we have to report on them each weekend... it is heavier... To pretend that we are still doing things as we used to, they (top management) have created a “project”, a kind of hours’ package to innovate, to create something you want to. This package is given to the team. But the problem is that we are always behind schedule on current projects, we usually need more time to finish them... in the end we used this time credit to finish the other projects. Defining a number of hours per project is not a good idea. It is an impediment to innovation. They should trust us and let us manage our time, let us be more autonomous. We could be more creative like that.” (Trade union delegate 2, FR-ONLINE).

Regarding HR policy, an innovative company over time is a company that gains the loyalty of its IT experts (*“It is as precious as gold”*; Trade union delegate 2, FR-ONLINE). He regrets that FR-ONLINE does not make enough effort to keep people in the company.

“I think we should try to keep these persons because we need them for the future. Hiring a new person takes time. They have to understand the environment (our state of mind), the IT system, it is a pity to waste time on this.” (Trade union delegate 2, FR-ONLINE).

He added that people are usually passionate about IT and often work at home on other personal projects. They could be tempted to move elsewhere...

4.5 A cross-case comparison: from job polarisation to job enrichment

As we said previously, technological innovations represent constraints as well as opportunities for banking companies, in a context of flat interest rates. As a top manager at FR-COMMERCIAL recognised: “*digitisation is ultimately an opportunity to reduce our costs*”. In other words, there is no technological determinism and various strategies have been implemented.

According to our case studies and to all the elements we have presented so far, two different positions (even strategies?) are noticeable. The first one leads to the polarisation of jobs, the second one seeks to enrich job content in order to upgrade employees’ skills. These two ‘models’ are presented successively. Then, some factors explaining the adoption of one or the other of the strategies are put forward.

4.5.1 Towards a polarisation of jobs

The first strategy derives from the creation of new units (external or internal) distinct from existing unit(s), and exclusively dedicated to online banking activities. These units include young customer advisors (such as call centre contact agents) who are recruited, with medium-level skills (*Bac*, *Bac+2* in French, i.e. the national high-school diploma (*Bac*) or two years undergraduate study). They are paid relatively low wages, and work exclusively online, with long opening hours (longer than in bank branches), few career prospects (fewer than their counterparts had in the physical network). It is noticeable that the HR policy does not make any effort to retain them. Relatively high staff turnover is tolerated by the organisation. Working online is considered as highly formative *per se*. It may create some opportunities that a worker, individually, can take or not. But the HR policy does not provide specific career tracks for them.⁵¹

By contrast, senior customer advisors work in physical branches with standard opening hours, selected customers, and face-to-face interactions. These positions include some ‘experts’ (in customer relations, data analysis, community managers, etc.) who are hired. They are highly skilled, and HRM makes effort to retain them.

Among customer advisers, the two spheres (online versus physical networks) are separated rather strongly. In traditional banks, the closure of branches makes mobility from the online sphere to the physical network more difficult, even if this is desired by workers. Indeed, job quality in the physical network is often envied by call centre contact agents and e-advisers. For instance, in FR-ONLINE, JQ is systematically compared to employment and working conditions offered in the parent company. Furthermore, the ‘traditional’ employment system in the retail banking sector – including vocational training, career opportunities, etc. – has been eroded by the current technological and organisational changes. But it still seems to be a “model” (i.e. a benchmark) for trade-unionists in these ‘new’ organisations.

Conversely, mobility from the physical network towards the online sphere is rare, although desired by management. For instance in FR-ONLINE, there is very little mobility from the parent firm

⁵¹ For instance in FR-ONLINE: “*there is no local and proactive policy for organizing internal occupational paths*” (Trade union delegate 1, FR-ONLINE).

towards FR-ONLINE, even though the parent firm has announced branch closures. Perhaps this a question of wages (lower in FR-ONLINE), or of image (in terms of occupational identity, working online is considered as less valuable).

On the whole, it seems that a feeling of down-skilling is shared by workers within the category of ‘customer advisers’, because of time pressure and the lack of physical contact.

Moreover, as we said previously, new high-skilled jobs created by digitisation are most often filled by new recruits (professional labour market), rather than through the internal labour market. People working in Fintech firms could be added within this category.

4.5.2 Job enrichment and skills upgrading in traditional retail banking activities

As far as we can judge from our interviews, two case studies are rather illustrative of this strategy: FR-COOP and SP-COMMERCIAL share some of the components of this strategy. Here, the main idea is to develop online services *within* the existing banking network, trying to accompany employees (particularly customer advisors) through changes in:

- New tools helping employees to handle customer communications coming through all channels (emails, phone, etc.) and passing these through a single channel,
- Training to improve their skills,
- Different work organisation.

Indeed, unlike the previous strategy, there is no (such) organisational separation between those who provide remote services and the other employees (within the physical network). Moreover, in FR-COOP, interestingly, most of the experts in IT belong to the company; the bank prides itself on doing everything (as far as possible) internally (Perez, 2017c).

“We try to find as many resources as possible internally, which is a peculiarity. There are very few consultants in our Group. Instead, we trust people in-house. And, when we want to think about forecasts or future projects, we tend to gather a group of directors, rather than call on a large Anglo-Saxon consulting firm. And I think that's one of our strengths as well. We have a lot of working group structures, including the technology professions which rely on the users. There is really a culture too, compared to that. That is to say "How do you see things?" So, we try to find the resources, the idea and the forecasts by relying on our internal knowledge base. And, since we are very decentralised, we can experiment.” (HR manager, Group level, 35 years of seniority within the Group, FR-COOP).

It is slightly different in SP-COMMERCIAL where the IT groups of the central offices have been reinforced with external professionals and in-house employees who are trained and promoted, with corresponding salary rises.

As in other retail banking networks, call centres exist in FR-COOP to receive incoming calls. However, they involve pooling means at the local level: i) they are all based in France, located close to the *caisses* (i.e. group of branches at a local level); ii) the staff of the agencies are periodically seconded to work in these units; iii) new entrants generally work in them for one year, during their

training in the profession. So they are positioned as ‘entry gates’ into the ‘physical’ banking network (i.e. the internal labour market) for all those who have been hired.

In FR-COOP, job enrichment is consistent with the objective (“*the bet*” says the HR manager) to maintain the physical network, favouring a higher quality of the service delivered through different channels (by phone, email, face-to-face interviews, etc.). This implies a HR policy that values internal mobility through substantial training.

“We have a quite specific policy at FR-COOP, probably a little different from other groups. There has been a lot of emphasis on the social protection of our employees. There is a will to retain employees. We are a group in which people pursue a career. I said I had been there for 35 years; I am an example and it is not an isolated case. The idea for us is mainly to recruit young graduates and allow them to develop a career in the group. Little use is made of recruitment of senior staff; it happens for jobs where it is indispensable; but we have a policy of internal promotion.” (HR manager, Group level, FR-COOP).

In this context, the introduction of Artificial Intelligence (AI) through Watson is presented by management as a way to alleviate workload, helping customer advisers.

“The bet we are making (...), which is perhaps original compared to other retail banks, is to say ‘we consider there is a future for a physical banking network, but that it must be associated with all the tools of remote banking, all the non-physical contact possibilities that technology allows.’ That is the challenge.” (HR manager, Group level, FR-COOP).

“Our strategy is to maintain a physical network of collaborators whom we want to be more and more expert. We have tools that can be used to achieve this objective and that they can provide more value. So there should be less and less work on simple and recurring operations, and more and more time should be devoted to customers and on expertise.” (Project Manager, FR-COOP).

According to the HR manager, this has been a longstanding HR policy within the Group and it has succeeded to go through previous substantial technological changes, such as computerisation.

“We have a commitment in relation to our employees. If we can no longer employ them in the profession for which they have been recruited, we must offer something else. (...) But at the same time, everyone understands that this message says ‘the company is ready to keep us, but we have to roll up our sleeves and eventually learn another trade’. (The previous CEO of FR-COOP) had been a pioneer in computerisation (...) There were accountants in each branch. All of a sudden, accountants were no longer needed; the machine did their work. So, we have already experienced important revolutions. At the time, he (the CEO) said, ‘We’ll give you time’. ‘You’re an accountant, well, within 3 or 4 years you’re going to become a salesperson’.” (HR manager, Group level, FR-COOP).

Training is said to be crucial in this environment. While the average training effort (measured as a percentage of the total payroll) is 3.5% in the banking sector in 2014 (Perez, 2016), FR-COOP spends annually around 6% of its total payroll in training. Relatively higher training requirements (in terms of initial training) over the past years (from *Bac* to *Bac+2* on average) have been adopted to facilitate adaptation to changes.

“So we need people with a solid level of education, a very good level of competence, so that they manage possible technological changes as calmly as possible, and we do not know exactly today what these changes will be.” (HR manager, Group level, FR-COOP).

Training is a crucial strategy in SP-COMMERCIAL too. There are two types of training at the bank (RegioPlus Consulting, 2017a). On the one hand, the permanent training offered by the Human Resources department, which is available to all workers in the bank, depending on their profile, job and needs. This training is usually offered online through the bank campus, and each worker follows it during their working hours at their own pace. There also exists the possibility of training on demand, in which a given worker or area may request specific training. These external courses are likewise organised during employees’ working hours.

Another lever of adaptability and responsiveness is based on the management style, which places particular emphasis on empowering employees at all levels of the company. Each *caisse* (group of branches at a local level) is a separate legal entity; the Head of the structure has to take many decisions including work organisation, hiring, etc.⁵² (Perez, 2017c). So 95% of decisions concerning loans are made at the *caisse* level. At the customer adviser’s level, job discretion is also recognised and is highly valued.

“Here, we are still more or less free, we still have a decision-making power that customer advisers do not have in other brands (i.e. banking networks). The decision-making power is largely at the level of the customer advisor. This is still very appreciable because we are trusted. We are trained for that too. The company does not drop us, but trains us!” (Customer advisor 2, FR-COOP).

This management policy also implies that there is no individual performance target to reach. Performance indicators are defined at the *caisse* level.

“We have team goals, the goal being to develop the caisse, each one with its specificities. Nobody sets my goal. It's up to me to sell what I want to sell.” (Customer advisor 5, FR-COOP).

“I joined this group because we do not have individual performance targets. We have targets per caisse, and we are trying to reach them all together.” (Customer advisor 3, 7 years of seniority, FR-COOP).

⁵² This autonomy at the *caisse* level was strongly confirmed by the two directors/Heads of *caisse* we met (Head of ‘caisse X and head of ‘caisse Y’ (i.e. a group of branches on a local area), FR-COOP).

According to the HR manager, this empowerment is consistent with the use of technological tools (including AI) that facilitate both a better decision-making process for employees and control tools powerful enough in order to avoid excessive risks.

The skills upgrading of front desk clerks is a good example that summarises and illustrates this strategy at a local level. While this category has disappeared in most banking networks, the Head of the *caisse* we visited decided to keep this job category. But job content has changed slightly with Watson. As Watson detects ‘intentions’ within emails, ‘simple’ requests such as making a transfer, ordering a credit card, sending a check are automatically transferred to a mail box that is managed by front desk clerks. It saves time for customer advisers. And for front desk clerks, it is more rewarding in a context where there are less customer visits to branch premises.

“It was a bit natural that it would follow. Otherwise, the customer advisers phoned us: ‘there is this, there is that’. We have direct email and we manage it directly. It is also easier for us because there are no duplicates, so no misunderstanding between the customer adviser who called us and ourselves. So we are directly connected to the customer. So it's easier”. (Front desk clerk, 8 years seniority).

4.5.3 Explaining these differences

This comparison between the case studies leads to the identification of two different strategies. So how is their adoption to be interpreted?

At a country level, it is difficult to find some overall explanation, except perhaps the severity of the economic crisis which was much stronger in Spain than in France and which reduced room for manoeuvre in company SP-COMMERCIAL, leading it to adopt new sustainable strategies.

A more relevant factor seems to be *corporate governance*, in particular for explaining the different positions of FR-COMMERCIAL and FR-COOP.

For FR-COOP, organisational and managerial choices are mainly due to the corporate governance as a cooperative bank (Perez, 2017c). This has led to maintaining physical branches as much as possible, using technology to reduce the cost of transactions that have less added-value, and skills upgrading of employees. Autonomy and job discretion were already higher than in other banking networks, and this could help, together with a trusting environment (given the HR policy of no redundancy), to absorb deep structural changes (including at the individual level with shifts in occupations and so on).

As the HR manager said

“I think that being a cooperative enterprise has a number of advantages; we do not have the pressure from shareholders. Shareholders are our customers. Clients do put pressure on us, but not on the return on capital; this is not their problem. It is an opportunity, because it gives us time in relation to our colleagues from other banks, which are listed on the stock exchange; therefore a return on investment is expected. Investors want a return on investment. We are not a charity, but we have less pressure.

So it allows us to organise ourselves. There is this aspect: there is no pressure on behalf of the holders of capital". (HR manager, Group level, FR-COOP).

This probably explains the differences with FR-COMMERCIAL, for which more than 70% of share ownership is held by European and non-European institutional investors (Perez, 2017b). At the same time, profitability is so high in this case, that organisational choices are less a matter of budget constraints than a "cultural" issue. FR-COMMERCIAL is a very top-down organisation, with a complex organisation chart. It is noteworthy that the online bank has been created alongside the usual organisation, based on a "flexible" (agile) approach, in order to speed up implementation.

"When we created FR-COMMERCIAL_B (the online brand), we created it in a bit of a vacuum. They were isolated from the rest of the organisation in order to have a pool of people who were going to work faster than in the traditional bank. There was a desire to create a start-up atmosphere with the idea that if we worked differently, it was the only way to do different things." (Top-level manager at Marketing Digital Bank, FR-COMMERCIAL, quoted after Perez 2017b).

Nevertheless, top management is very careful according to the changing context, trying to organise smooth changes to ensure competition and maintain a peaceful social climate. That is why they made the organisational choice to create an online bank as an internal entity (and not as a subsidiary), to facilitate mobility between the two spheres (the physical banking network and the online banking services). If it has failed so far, the organisation is still changing, and will probably lead to better integration of both spheres in the future.⁵³

"We have not yet decided...this is beyond my level of knowledge. But we have both models. There is a real question about how we organize advisory services. How do we serve our customers (in branches, online) and how much can we charge our customers for this service? Do we deliberately want to push people with higher value for us to local branches, and people with less value towards an online model? Or should we let the customer choose? These are all current questions for us." (Top-level manager at Marketing Digital Bank, FR-COMMERCIAL).

The puzzling case is the Spanish SP-COMMERCIAL (RegioPlus 2017a): exposed to the requirements of its shareholders (see quote from the director of innovation below), the commercial bank seems to be choosing a model of job enrichment for incumbents (customer advisors). Nevertheless, it seems that is more a "switch" from the previous (traditional) model of retail banking to a new one (mainly online banking services), but somehow based on a constant organisational structure (no

⁵³ At the time of the fieldwork, organisational changes were occurring in online banking activities with reconciliation between the online bank and the traditional network, and a clearer position for call centres. As I asked to a top manager from retail activities at FR-COMMERCIAL whether online banking activities would be merged with the traditional banking network, she answered: *"Probably. We wonder if we should keep the brand FR-COMMERCIAL_B, or if we should merge both websites. Until now, we have kept the two brands in order to offer different prices. But unification aims at breaking this dichotomy (between online banking activities and traditional network) that has become less relevant"* (Top-level manager, FR-COMMERCIAL).

online bank has been formally created). Consequently, it needs to be asked whether job ‘enrichment’ (i.e. skills upgrading) is really taking place, or whether jobs with new contents are being created (online transactions instead of face-to-face relations). In this case, do customer advisers believe their skills are being upgraded, or do they suffer from de-skilling (compared with their previous job content, which was mainly face-to-face)? The trade union managers claim that work quality has been lost. What are the current opportunities for upward mobility in this new context? Although SP-COMMERCIAL has made a similar organisational choice to that of FR-COOP, there are still significant differences in the management of employment and the job quality in both companies.

“Access to capital is not a problem for us, though evidently that does not mean that there are no limits. For us, the problem is not the financing, but as a listed company, we must maintain the levels of profitability necessary to satisfy the shareholders.”
(Director of innovation, SP-COMMERCIAL).

In this context companies have emerged, such as the Spanish Fintech firm SP-FINTECH. The company is an innovative business based on a combination of financial services and technology, in which the core business is grounded specifically in innovation. In accordance with the company’s own philosophy, it is a part of the Fintech revolution that finds its strength in mastery of technology and the digital world, and also in attracting talent and in values, with transparency as a central focus. The contracting policy focuses on employing the most qualified and specialised personnel available in the job market. The combination of innovation and talent means that there is a special concern for maintaining a set of high quality standards in the workplace, based on flexibility, participation, transparency and recognition.

Finally, FR-ONLINE is a former start-up that has been growing fast, trying to maintain a low-cost model (one of the cheapest suppliers in the French retail market) that gives it a competitive edge compared with traditional banks. To achieve this goal, its ability to innovate (process, products, marketing, etc.) is a key issue (Perez, 2017a). It needs the commitment of its employees, particularly the more skilled ones. Indeed, the business model requires *standardising a lot of processes* to be economically sustainable. The process of standardisation itself is demanding for employees who are involved in it.

“There are new projects all the time, some new recipe to test... Skilled employees are requested to participate in many meetings in order to improve processes” (Trade union delegate 1, FR-ONLINE).

The HR policy is rather the same for all employees, whatever their skill levels: there is no effort to retain them in order to remain ‘agile’, flexible. But, *being able to retain the appropriate employees* (web designers, webmasters) is a ‘lever’ for integrating innovation and remaining competitive. The top management, according to the union representatives, should neglect this. In this context, the parent company acts as a buffer (for the ‘low cost’ business model), offering a potential sphere of occupational mobility. One of the union delegates confirmed this, saying that

“mobility towards X (the parent) is even easier than internal mobility”; “there is no local and proactive policy for organising internal occupational paths” (Trade union delegate 1, FR-ONLINE).

A last point concerns the impact of innovation on a peculiar dimension of job quality: working conditions. A very salient feature that is *common and cross-cutting* to all our case studies, whatever the strategy that has been implemented to deliver remote services: the worsening of work conditions.

4.6 A common feature: the worsening of work conditions

Our case studies have provided much evidence that workload and work intensity have increased in retail banking, particularly in customer relationship activities. This result echoes Eurofound’s findings that labour intensity is important in this sector (Eurofound, 2014).⁵⁴

Moreover, the provision of off-premise services implies continuity of access and the possibility to interact with an operator as much as possible. Then, the scale of opening remote service provision is greater than in the branch. Hours of work are thus more constraining.

For e-banking advisers (FR-ONLINE, FR-COMMERCIAL_B, SP-COMMERCIAL and call centres), time pressure and extended working time are characteristic of their work. Indeed, their work schedule is quite unusual in the “traditional” banking sector. For instance, in the contact call centres at FR-COMMERCIAL, employees work Monday to Saturday, from 8 am to 10 pm (8 pm on Saturday). In FR-COMMERCIAL_B, work is organised in two teams: one working from 9 am to 5:30 pm and the other from 11:30 am to 8 pm. Moreover, one group of employees works from Mondays to Fridays, and another from Tuesdays to Saturdays. The scheduling is announced two months in advance. Each month, the work schedule changes. This time organisation is said to be too rigid by our interviewees. Management has tried to make it more flexible, giving opportunities to swap individual schedules in a “market”. But this still seems complicated, as customer advisors should have the same skills, no holiday leave during the period etc. The work planning function is said to be crucial for the delivery of remote services. It relies on an IT tool that knows who is logged on and when, and the duration of each work sequence. In this way, it is possible to route phone calls to the available units and, conversely, to adapt the number of employees to the flows.

Young workers in the local branches in SP-COMMERCIAL were offered the possibility to become e-advisors (digital customer advisors). This implies that their working hours change from 9 am to 6 pm, with a lunch break, instead of from the 8 am to 3 pm timetable they had before. By contrast,

⁵⁴ Following the job demand and control model by Karasek, the Eurofound study shows the likelihood of workers in banking suffering from work-related stress. Most groups of workers are found in the ‘active’ quadrant defined by jobs with a high level of work intensity AND a high level of job autonomy. But some groups are rather young (below 35) working in small- or medium- sized establishments, and women between 35 and 49 in large workplaces are in a quadrant of job strain (high level of intensity and low level of autonomy) (2014).

the online managers receive basic training and a salary supplement for the change in hours of approximately €100 per month (RegioPlus Consulting, 2017a).

The Head of Sales at FR-COMMERCIAL_B (Perez, 2017b) made an interesting comment regarding working time:

“Flexibility exists. We state in the employment contract that they have to work on the basis of 39 hours per week, for 5 days consecutively. And the allowed working time runs from 9 am to 10 pm, even if they currently work only until 8 pm. This means that, if I had to... if we would need to work until 10 pm, it would be possible according to the employment contract. It would need smooth social support to explain the decision to employees. But it is flexible.” (Head of Sales, FR-COMMERCIAL_B).

Moreover, working conditions were often mentioned by our interviewees (managers and union representatives) to explain why employees (mainly customer advisors) usually do not stay in online banking. Extending working hours, changing schedules every two months, etc. are less sustainable in the long run, with a family and young children.

“You must know that work organisation in FR-COMMERCIAL_B is very structured. Regarding autonomy, that is not... Work schedules are very strict: you must arrive at this hour, you leave at this time, you must go to lunch at this... With IT tools, management knows exactly how long you have been logged on and what you have done all the day. Perhaps people don’t want to be treated like that...” (Trade union delegate CGT, FR-COMMERCIAL).

The same assessment is made by the HR manager at FR-ONLINE, the online bank, where customer services are open from 8 am to 10 pm, Mondays to Saturdays (Perez, 2017a). The HR manager recognises that staff turnover is high in sales and customers’ services for this reason. But in FR-ONLINE, the online bank, all employees are concerned by excessive workload and time pressure. Workload is the main issue for staff representatives, and is always discussed in Safety and Health Committee meetings and assessed through several expert reports.⁵⁵ A majority of workers reported being overloaded, with detrimental consequences to their work-life balance. They reported not having enough time and resources to do their job properly (computer bugs, etc.), inappropriate performance indicators, time pressure, contradictory requests, boring tasks, etc. and insufficient recognition (bonus levels). According to a union representative, a part of these problems is linked to the rapid growth of the company, and a lack of organisation: *“we are still a start-up; and moreover, people are doing many things here. They have to be multi-skilled (polyvalent), taking on more things than in a bigger firm”* (Trade union delegate 1, FR-ONLINE).

⁵⁵ After the dramatic suicide of a manager in 2012, an independent expert report was requested by the Works Council, targeting working conditions in the company. The final report pointed out that 6 employees out of 10 said they were overloaded and some recommendations were made. Two years later (in mid-2015), a second ‘expertise’ was conducted by the same expert. He stated that the situation had improved, above all concerning communication, and teambuilding, etc. but not concerning the workload.

Currently, the Safety and Health Committee is very concerned with workload and work organisation in this company that could lead to psycho-social risks for employees. Union representatives have managed to negotiate on this issue in order to regulate the use of overtime. In 2011, a collective agreement was signed about working on Saturdays (the “Fireman plan”), followed by a collective agreement concerning working time in 2014. The follow-up of this agreement is ensured by a commission composed of three union delegates and a manager.

The role of unions towards online workers is much more difficult in FR-COMMERCIAL because there is no common representation for online workers within the company (Perez, 2017b). In two out of three sites, call centres have their own staff representatives and health and security committee. But, they do not have their own works council. In the other call centre, as in FR-COMMERCIAL_B, staff representation is merged with other services. In addition, this makes it much more difficult to raise issues that are specific to these workplaces, and to exert an influence on bargaining processes (for instance, wage bargaining is settled at the group level, not at the online bank level).

For different reasons, the situation is not better **for customer advisers in local branches**. Here, the main problems regarding working conditions are time pressure (due to multiple information flows: emails, telephone, etc.), with a workload that is much more difficult to estimate (particularly with e-mails), and under-staffing due to job destruction.

According to a union representative at FR-COMMERCIAL,

“If you talk about job quality, you must know that all these changes have a cost: the drastic reduction of staff in the last three years. The volume of employment has been reduced in retail banking but probably too much (...) Transformation of the work content itself has been misjudged. There are fewer visits in local branches, but more emails. Workload has changed and become too heavy for employees...” (Union delegate 1 SNB, FR-COMMERCIAL).

In the case of SP-COMMERCIAL, customer advisors have to work longer and this is detrimental to reconciling work and family life.⁵⁶ With respect to extension of the working day at the network of offices, the national trade union representative stated:

“extra hours are worked every day. We at the National Federation have made a call to request a system of time monitoring. Most striking is the case of the extended hours at the network of offices, as 70% of the workers work from 8 am to 3 pm, but nevertheless many of them work in the evenings” (Trade Union representative, SP-COMMERCIAL).

Concerning SP-COMMERCIAL, the union representatives noted that

⁵⁶ It was clear from the interviews that many of the employees spend more hours performing their duties than set out in their contracts. But the company was unable to estimate the number of employees (or their share in total staff) as this information is not collected (RegioPlus Consulting, 2017a).

“(T)he bank has an Equality Committee, although the work-life balance is getting steadily worse. The bank creates jobs with split shifts which constrain obtaining a good balance. Colleagues who still work the good banking hours from 8 am to 3 pm suffer constant pressure to work longer without any extra pay. They understand that those who work longer are more valued by the organisation. In addition, the HR department does not help employees to work from home” (Trade Union representative, SP-COMMERCIAL).

As some job cuts have occurred, workloads have become heavier for incumbents. The management may have misjudged the consequences of these cuts. This is the case for front desk officers that have almost disappeared in several banking networks.

As a union representative at FR-COMMERCIAL said:

“in many banks, we have suppressed the “reception” (accueil) function by saying that reception is a job for all of us. This strategic choice to remove the front desk officer has not worked as hoped. The bank completely underestimated orphan and administrative tasks that were done at the reception: scanning cheques, handling mail, a lot of things. Today we share this work, led by the director of the branch who programs half-day reception duty. But it does not work. We were expecting a positive impact on the customer relationship; we are still waiting (...). Clearly, we do not know where we are going...” (Trade union delegate SNB 1, FR-COMMERCIAL).

Another observation was made for FR-COOP (where front desk officers have mostly been kept). It has become much more difficult to assess workloads for customer advisers as much communication takes place via email (Perez, 2017c). With emails, some time-consuming questions are raised (such as insurance quotes or loan simulations). Feed-back for clients leads to a greater splitting up of work. Customer advisers may have the feeling that work never ends. As one employee said:

“There are no longer any breaks (...). Before, at the beginning of the year, we could breathe a bit, update files, be pro-active. Yet now, we just endure work, we are in continuous flow. (...) it is less rewarding.” (Customer advisor, FR-COOP).

Clients expect a quick answer to their emails. At FR-COOP, an internal “charter” (*Charte*) requires customer advisers to give an answer within 48 hours, and the manager can check if it has been done properly. Moreover, with regulatory formalism, advisers must be very careful with what they write (even more than with what they say).

For these workers, union representatives are very concerned too. But social dialogue has become tenser since 2008 in FR-COMMERCIAL, as in all French banking establishments. As a union representative said:

“wage bargaining has failed (...). The company is getting more demanding but offers less to employees” (Trade union delegate SNB 1, FR-COMMERCIAL).

Moreover, the context of branch closures makes workers reluctant to claim for better working conditions. It is particularly obvious in Spain as a union representative testified:

“although the affiliation percentage is high, the fear felt by workers in the sector means that it is difficult to get people to mobilise and to join up.” (Trade Union representative, SP-COMMERCIAL, quoted after RegioPlus 2017a).

Regarding this dimension of job quality (and in contrast to others), the situation in online banking services could appear more desirable for customer advisers than that in the physical network. As a unionist noted:

“whereas online banking was considered as a ‘pet hate’ (bête noire), nowadays, customer advisers in the physical network would like to have such an entity in their area.” (Trade union delegate SNB 2, FR-COMMERCIAL).

According to her, as employees in the physical network feel threatened by branch closures, they realise that the bank is investing in online banking which could become a more desirable working environment. Conversely, another union representative stated that:

“Pressure is lower in online banking compared to within the network, even if autonomy is less. In the physical network, it is very harsh. Today, when people are told that after a call centre, they could go to the physical network, most of them don’t want to go! The pressure is too strong.” (Trade union delegate CGT, FR-COMMERCIAL, quoted after Perez 2017b).

Not all working conditions are worsening: in this digital era, new IT skills are required to develop digitisation in the banks. In this sense, new profiles have appeared. In the case of SP-COMMERCIAL, new external IT profiles have been contracted with very good working conditions. And in SP-FINTECH, the company selects highly qualified personnel in the job market and offers salaries that are generally above the average in order to attract and maintain loyalty from talented and creative workers. To do this, highly specific interviews with a sizeable number of tests are conducted to establish the ability of individuals to meet the needs generated by a potential job.

Another aspect of working conditions relies on appropriate IT tools that can be necessary to do the job. Indeed, while digital transformation leads to organisational changes, one can ask if IT tools help, in return, in fostering working conditions.

Providing remote services requires a high-performance, reliable computer system and a user-friendly and well-nourished website. Banking networks are not equal in this respect. In France, FR-COOP is well-known for having a high performance computer system so that customer advisers feel well equipped and lucky compared to their counterparts working in other banking institutions.⁵⁷

⁵⁷ Nevertheless, at the time of the fieldwork, customer advisers had been recently equipped with tablets to make electronic signatures; none of the interviewees in FR-COOP had used it, either because they did not see its usefulness, or because it did not work when they used it. It should be said that this ‘investment’

In FR-COMMERCIAL, union representatives complained about the website (which both customers and workers do not think is clear enough), and about computer bugs that make IT work fragile in their daily activities (Perez, 2017b).

“Today, we do not have a clear vision of the future for FR-COMMERCIAL_B. I talk with many customer advisors and the feed-back is: we don’t have enough resources to work properly. Human resources, financial resources... even IT tools are inefficient. We have had many problems with computers that have been detrimental to our activity (...).”
(Trade union delegate CGT, FR-COMMERCIAL).

As an expert in digitisation at a trade union said: *“there is a huge gap between the Head of strategy and digital officers and what employees are experiencing on a daily basis: malfunctioning computer applications, erratic organisational changes”*. For him, “being digital” means *“considering employees as key players in delivering a high quality service, and not as only being a “cost-centre”*.

What about Watson? Does it help? According to the Project manager, Watson has been chosen for this purpose.

“The customer advisors complain that they have more and more regulatory pressure, more and more emails, and an increasingly wide product range. Our goal is to give them assistance tools” (Project manager, FR-COOP).

Regarding the email analyser, the idea was to save time for customer advisers by:

- identifying the request(s) – intention(s) – of the customer;
- suggesting a (written) answer according to the request/intention;
- Highlighting an application (within the Intranet) connected to the intention.

According to the customer advisers interviewed, this functionality is not really useful. At this stage of implementation, Watson recognises seven intentions out of ten which is a good score. But, so what? Most of advisors do not use the pre-formatted answers because they want to make their answer more personal. That is part of their job: creating and maintaining a privileged and personalised relationship with their clients.

For instance, *“I used to write my messages, write something personal to each customer to keep him loyal”*. (Customer advisor 3, FR-COOP), or *“I never use pre-formatted responses because I like to put things in my way, shape the emails as I want with the words I choose, even if the client may not notice”*. (Customer advisor 5, FR-COOP) (Perez, 2017c).

was made through the *Crédit d’Impôt Compétitivité Emploi* (CICE), a public measure decided in 2014 by the government in order to foster investments and job creation. Regarding the banking industry, the CICE accounted for €136 million in 2014 and €211 million in 2015 (for instance, FR-COMMERCIAL received more than €30 million in 2015). In July 2015, the SNB union (affiliated to the CGC which is historically a union for managers) called for an end to CICE funding in the banking system and for the redirection of money to SMEs. Indeed, their study concluded that there was a very large windfall effect; the CICE was paying for investments already programmed, such as the purchase of tablets (Perez, 2017b).

For the customer advisers interviewed, the most relevant tool associated with the email analyser is the ability to route the ‘basic’ messages (for instance ordering a credit card) to the front desk officer (rather than a customer adviser). But this decision is an organisational choice which has been made by the manager of the *caisse*.

Regarding the ‘virtual assistant’, comments are much more positive. Indeed, it is a substitute for a database that was judged as quite inefficient. Here, it is really a time saving tool for customer advisers because they can find much more easily the information they need. For customer advisers in small branches, it is really helpful; otherwise, they had to call a colleague working in a specific information platform. In the branch visited, the efficient tool is said to be a substitute for help they obtained from an experienced colleague. As such, this is not necessarily good news.

“It is isolating men and women who work together. Here we are lucky to have a colleague in charge of insurance. And now we are asked to go through a virtual assistant rather than spend 2 minutes in her office next door. These were opportunities for exchanges, for a break, for example to chat about a dossier and learn new things.”
(Customer advisor 3, FR-COOP).

In response to the question: “What would help you to facilitate your work?” a customer adviser replied:

“It’s not Watson that will help us. What we need here, what would help us, is to have two extra customer advisors!” (Customer advisor 2, FR-COOP, quoted after Perez 2017c).

Moreover, the ongoing process of codifying knowledge and machine learning involve professionals and is time consuming.

5 Conclusion

As the 2008 crisis has reminded us, commercial banks are at the core of the circulation of money in any capitalist economy. Thus, this industry is particularly strategic, not only for its employee headcount: around 3% of the workforce in the private sector, mainly employed in retail banking activities. In the aftermath of the 2008 crisis, the retail banking industry has faced key challenges that shape both the implementation of various innovations and the evolution of employment and job quality: new regulations, persistent low interest rates (that affect banking profitability), the changing habits of customers with mobile devices, and new competitors entering the market. In this context, banking networks have had to boost their online business to counter both low-cost internet competitors and a drop in the number of visitors to bank premises. Thus, technological and organisational innovations have been drivers of changes in employment and job quality, as have opportunistic ways to cope with external shocks.

As suggested in this chapter, work activity in the banking industry in the past decade has mainly been impacted by process innovations, strongly supported and stimulated by new technologies (mainly digitisation and AI). Process innovations interplay with organisational changes that have

accompanied these technological changes. Among work activities, the job content and work organisation of customer advisors (the main occupation in retail banking) have been particularly affected.

At the organisational level, two different strategic choices have been made. The first involves creating distinct entities to traditional banks which provide online banking services. It has led to *job polarisation*, with young employees dealing with prospection and online customers on the one hand, and fewer customer advisors for more personalised relationships with high revenue clients on the other hand.⁵⁸ The second choice is based on developing the work of customer advisors in traditional banks so that they provide these online services themselves, leading to *job enrichment*. Their work, which is taking place in a more competitive environment, has been “expanded” in terms of the skills required.

These organisational choices are not ‘frozen’ as one of our case studies suggests in particular. Banks may grope around, looking at their competitors and the evolution of the demand. Nevertheless, the first strategy appears to be used more commonly by ‘pure players’ and commercial banks. Whereas digitisation is said to require more flexibility (‘agility’ is the word in fashion), it tends to rigidify labour markets, occupational mobility between the spheres being difficult (either wished or not). Moreover, this strategy relies partly on a young workforce that accepts extended working hours, sales pressures and work which is generally rather monitored. As several interviewees told us, the banking sector has lost its appeal to young graduates since the financial crisis. As these ‘new’ jobs are ‘entry jobs’ (‘stepping stones’) into the banking sector, it may be asked whether the sector will succeed in attracting motivated graduates in the future.

Another decision is the extent to which banking activities have become standardised. A lot of activities have been progressively standardised over the last decades with digitisation, and back office as well as front office tasks have been affected. This might substitute for some tasks that are considered as “low added value”, such as subscribing a financial product or ordering a cheque book. The extent to which jobs have correlatively disappeared remains open to question. Our case studies highlight that this depends partly on organisational and managerial choice. However, our investigation tends to support previous findings according to which occupations have changed intrinsically. According to the French working conditions survey, 61% of employees in the banking sector said in 2013 that their job involves giving immediate answers to external requests, and could not be fully prescribed, compared to only 35% in 2005. So the number of jobs that could be automated has decreased in this industry over the past decade. Regarding customer advisors, we have shown that the occupation/profession) has changed; dealing with more informed, demanding and ‘fickle’ clients, customer advisors are challenged in their knowledge, know-how and interpersonal skills. Depending on the tools on which customer advisors may rely on, training activities, work organisation and management style (in particular if work performance is assessed

⁵⁸ Nevertheless, it is noteworthy that the average education level of employees in the industry has increased over the last decade: a two-year university degree has become a minimum in most cases. Therefore, the job polarisation is found rather in job content than strictly connected to skill levels.

individually or at the branch level),⁵⁹ etc. customer advisors may feel in danger, threatened by the changing work environment or well-equipped to face it. In this respect, our original analysis of the implementation of AI processes in a banking network shows that a technological innovation may be either helpful to improve the ability of employees, or be a threat or even an impediment to working properly *according to its own vision of quality of work*, and depending on the context.

A salient pattern of this changing work environment that affects job quality concerns working conditions. Time pressure and, beyond that, the long term time dimension of employment (affecting career prospects, the relative importance of seniority, etc.) run counter the creativeness and the meaning of work. However, these two dimensions are important in fostering workplaces that are conducive for innovation. As an expert in digital innovation put it, after working on “*how to work with new technologies?*”, the current challenge is “*how can the work environment foster innovation and company performance?*” (Head of Consulting and Digital strategy at an internal Lab, FR-COMMERCIAL, quoted after Perez 2017b). Such considerations are still very ‘embryonic’ (‘early’) in the companies we have investigated. Innovation is still a top down process (even an external process when a traditional bank acquires a start-up for absorbing its innovation) to which employees have to adapt to. Union representatives position themselves much further downstream, managing the consequences of innovation on employment (for instance digitisation has pushed union representatives to negotiate working time issues), rather than tackling upstream questions (how better workplaces may foster innovation) (see recent academic papers such as Chen et al. 2016). Their rather fatalistic position echoes what David Noble (2016 [1993]) described in his book *Progress without people*: “*What paralyzes us are, in particular, the concepts we have inherited, such as that of technological progress that is necessary and beneficial; and the idea that competitiveness, based on these technologies, would be the surest way to prosperity and well-being*”. In retail banking, technological innovations have created new opportunities (as new constraints too) for major changes in activities and work organisation. But the underlying question is to interpret properly what do customers want and what they are willing to pay. It seems that consequences on employment and job quality therefore depend very much on the response that management gives to this question.

⁵⁹ K. Laaser (2016) showed that performance management systems were implemented in the British banking industry in the aftermath of the financial crisis, and have worsened working conditions particularly “the moral dimension of employment (...) violating lay notions of fairness and justice”.

6 References

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7 List of Case Study Reports and Industry Profiles

| Case studies | |
|--------------------------|---|
| FR-ONLINE | Perez, C. (2017a). <i>French Pure Player</i> . Case study report for WP6 of the QInnE project. Unpublished manuscript. |
| FR-COMMERCIAL | Perez, C. (2017b). <i>French Commercial Bank</i> . Case study report for WP6 of the QInnE project. Unpublished manuscript. |
| FR-COOP | Perez, C. (2017c). <i>French Cooperative Bank</i> . Case study report for WP6 of the QInnE project. Unpublished manuscript. |
| SP-COMMERCIAL | RegioPlus Consulting (2017a). <i>Spanish Traditional Bank</i> . Case study report for WP6 of the QInnE project. Unpublished manuscript. |
| SP-FINTECH | RegioPlus Consulting (2017b). <i>Spanish Fintech</i> . Case study report for WP6 of the QInnE project. Unpublished manuscript. |
| Industry Profiles | |
| France | Perez, C. (2016). <i>Industry profile: Banking industry – France</i> . Report for WP6 of the QInnE project. Unpublished manuscript |
| Spain | RegioPlus Consulting (2016). <i>Industry Profile: Banking industry – Spain</i> , Report for WP6 of the QInnE project. Unpublished manuscript. |

8 Annex – Summaries of Case Studies

Spanish traditional Bank (RegioPlus Consulting, 2017a)

Brief characteristics of the companies' structure and business strategy

| | |
|------------------------------------|---|
| <u>Origin and type of activity</u> | One of the most representative banks in terms of its volume of business in Spain. The global financial group was founded more than 100 years ago and currently has a diversified business offering financial services to customers in more than 30 countries. |
| <u>Number of employees</u> | More than 10.000 workers in Spain (2016). Women make up 54% of the persons employed. |

It moves in a highly competitive market which has undergone an intense transformation in Spain as a consequence of the economic crisis. This prompted the bank to define a new strategy in 2015 based upon 6 priorities, which it has called the *transformation of the bank*: best customer experience, driving digital sales, new business models: supported by the fintech system, optimisation of capital allocation, leadership in efficiency and best team.

The number of digital customers of the bank reached 19% in 2016, with an increase of 18.09% over the preceding year. Similarly, the number of customers using a mobile for different bank transactions stands at 12.4%, or 27.42% higher than one year earlier.

Important innovations in recent past

The bank possesses innovation centres all over the world which represent a fundamental role in the digital transformation which the Group is confronting. These centres foment interaction with the ecosystem of innovation, especially with entrepreneurs, startups and developers. In this, the objective of the bank is to be in constant contact with new ideas and talent as a source to draw on and make headway against the challenges of the financial industry.

The bank has been opting for digital transformation over the last decade, with a long-term strategy of closing branches, and focussing the bank on the new technologies. It allocates around 1000 million Euros per year to investment in the new technologies of the financial sector.

Key findings on interrelationships between innovation, job quality, employment and inclusiveness

One of the most notable consequences of the transition to digital banking is the smaller number of users requiring the bank's customer services at offices and branches. The most direct effect of this innovation is the closure of offices with the consequent reduction or relocation of personnel. The most senior workers in the bank branches have been relocated to other branches maintaining their salary and working hours. Younger workers are offered to become online managers. The volume of work for the office personnel has been rising following the reduction in the number of workers there. Similarly, the technology area department at central services requires more professionals to develop the new products. The new technology engenders a demand for new profiles with great expertise. These profiles, which are usually more senior, imply a different salary cost.

Spanish Fintech (RegioPlus Consulting, 2017b)**Brief characteristics of the companies' structure and business strategy**

| | |
|-----------------------------|--|
| <u>Type of activity:</u> | Financing service for online purchases that enables the two main weaknesses of e-commerce in Spain to be overcome: accessibility and price sensitivity |
| <u>Number of employees:</u> | The company is an SME that has undergone exponential growth over the last year or year and a half, during which it went from having less than 10 workers to more than double that number, i.e. they now employ more than 10 workers. |

They offer a system that combines an instalment payment method with very competitive prices and marketing tools that enable financing to be used as a promotional lever for stores. In fact, this financing system is used by on line sellers as a marketing instrument, since it simplifies the buying process to reach more customers, maximise conversion rates and increase the value of the average order.

The company's strategy for attracting clients, considering that it is a recently created firm and is the smallest competitor in terms of volume of clients in the Spanish market, is based on the quality of the product backed by ease of access and operations: usable check-out, with experience that is also subject to continuous innovation by the company.

The contracting policy focuses on employing the most qualified and specialised personnel available in the job market.

Important innovations in recent past

Innovation is a substantial element in the origins of Fintechs. In this particular company, despite the fact that financing has long tradition in physical shops as a method of payment, the creation of the company was based on innovation that took this process to the online world by adapting the way in which a loan is granted.

The development of predictive algorithms and an “agile working methodology” come from an incremental innovation strategy, which is one that has been adopted from the start by the fintech, which has its main scope of action in areas relating to data analysis and development, and also in the study of information relating to transactions and the possibilities of financing.

Key findings on interrelationships between innovation, job quality, employment and inclusiveness

In accordance with the company's own philosophy, it is a part of the fintech revolution that finds its strength in mastery of technology and the digital world, and also in attracting talent and in values, with transparency as a central focus.

The combination of innovation and talent means that there is a special concern for maintaining a set of high quality standards in the workplace, based on flexibility, participation, transparency and recognition.

French Pure Player (Perez, 2017a)**Brief characteristics of the companies' structure and business strategy**

| | |
|-------------------------------------|--|
| <u>Origin and type of activity:</u> | This company is the main French 'pure player' (online bank). Initially a start-up launched in the late 90's, this company is growing fast, either in terms of clients as of employees. Since 2015, the online bank is the wholly owned subsidiary of one of the biggest French retail banks. |
| <u>Number of employees:</u> | The company has recruited many employees (on a full time basis) at a rate of 100 to 150 persons per year over the past years: between 500 and 1000 persons (+24% since 2012) are employed at the time of the interviews dispatched in two sites. |

Important innovations in recent past

For the company, 'innovation' means 'Being ATAWAD' (Any Time, Any Where, Any Device) but at the lowest price. To solve this problem - being successful at the lowest price -, standardisation and automation of processes are highly important. The company is always on the lock-out for systems and specific skills allowing to improve processes. For this purpose, mergers and acquisitions with start-ups are strategic. The company offers services to clients that other companies (such as traditional banks) cannot offer yet like increasing immediately your authorised overdraft by internet or "easy check" facility and so on. As a previous start-up, the company has kept several features that foster innovation: technical watch habits, sense of commitment ("*we don't look at the clock*") and improving customers' experience thanks to technology ("*not the only prerogative of marketing*").

Key findings on interrelationships between innovation, job quality, employment and inclusiveness

The way the company is innovative, through mergers and acquisitions, is a challenge for HRM and for social cohesion of the company.

The business model needs *to standardize a lot of processes* to be economically sustainable. The process of standardisation itself is demanding for employees who are involved in it; in the mid-term, the employment structure may evolve regarding the standardisation of some processes and job content may be less fruitful/rewarding. For instance, customer services tend to operate as call centers and consequently, the "advice" component of the job is quite weak.

This business model implies *dissatisfaction* with wage policy (lack of recognition) and with internal mobility, and with working conditions (particularly heavy workload). In what extent is it sustainable? Note that dissatisfaction may be (at least partially) compensated by the job opportunities given by the parent company.

Controlling the IT system and *being able to retain the appropriate employees* (web designer, webmaster) are at stake to remain innovative and competitive. The latter condition seems neglected by the top management; indeed, loyalty does not seem to be an objective for the management. It could be detrimental to innovation itself and to the company in the long term.

French Commercial Bank (Perez, 2017b)**Brief characteristics of the companies' structure and business strategy**

Origin and type of activity This company belongs to a group organised around two main activities: 'Retail banking and services' and 'Corporate and Institutional banking'. It is the biggest banking network operating in France regarding its annual revenues (Net banking product). Despite Retail banking contributes with only 15% of the company's Net banking product, 77% of all employees are working in Retail banking and services.

Number of employees As a whole, the group employs more than 100,000 persons all over the world, 30% being employed in France. As our case study focuses on Retail banking for the French market, it concerns considerably more than 10.000 employees in 2016.

Important innovations in recent past

Like the other French banking networks, this bank is challenged on its domestic market with a weak economic growth (and correlatively a low demand of loans/credits) and with persistent low level of interest rates. Moreover, since 2010, the number of local branches has dramatically decreased. This trend illustrates structural changes in retail banking with the changing habits of customers: less visits in the premises of the bank, more remote contacts with smart phone, tablets and so on. As a result, banks have had to adapt by offering applications making visiting more easily on the bank's website and carrying out simple operations (consulting its bank account, making a transfer, contacting its adviser etc.). Therefore, the most frequent operations were digitised. Today, a new stage is underway: digitisation of processes. With the appointment of a new Chief operating officer, a digital transformation plan was announced in 2016 with several points: "Implement new customer journeys", "Make better use of data to serve clients", "Upgrade the operational model", "Work differently". The answer is also "organisational"; the company decided to launch its own online bank as a "brand" (rather than a subsidiary).

Key findings on interrelationships between innovation, job quality, employment and inclusiveness

According to several interviewees, one of the reasons why the online bank of the company has been created as a brand (rather than a subsidiary) was to facilitate internal mobility from the 'physical' network to online banking activities in case of branches' closure. An agreement about internal mobility within the group was signed at the same period that the online bank had been launched. But management failed to recruit customer advisors in the branches. It reflects that working as a e-customer advisor (that is mainly online) is less valuable by employees than working at a local branch with face-to-face appointments and individualised relationships with customers. Moreover, work schedule in online banking activities is larger than in the "traditional" banking sector: employees work Monday to Saturday, from 8 am to 10 pm (8 pm on Saturday), which does not facilitate conciliation between work and family.

French Cooperative Bank (Perez, 2017c)

Brief characteristics of the companies' structure and business strategy

Origin and type of activity: This company is a French cooperative bank. Initially created in the 19th century to serve local business communities by providing financial support at a cheaper cost than commercial banks, cooperative banks are much more decentralised than their commercial counterparts and are owned by their customers. This company has decided to keep local branches as much as possible whereas developing online activities.

Number of employees: More than 10.000 persons are employed by the bank in France.

Important innovations in recent past

The company has implemented a cognitive solution (derived from artificial intelligence) designed by IBM and named Watson. Two cognitive solutions were tested, to begin with: (1) an E-mail analyser: once the intention has been detected, the idea is to equip customer advisors with the link to the application in the mail, which allows the client request to be processed, and to provide answers for the customer advisor in order to respond more quickly to the customer. (2) A virtual assistant that is installed on the customer advisors' workstation; rather than fetching in their database with keywords and wasting time searching for information in paper documents, the virtual assistant types the question in natural language. As one of the biggest branches of the company accepted to test this cognitive solution before its implementation in the whole network, we were able to meet several people involved in this experiment (managers and bank advisors) and question them about the likely changes that this new tool would have on the content of their work and on employment;

Key findings on interrelationships between innovation, job quality, employment and inclusiveness

In this company, the main idea is to develop online services *within* the existing banking network, trying to accompany employees (particularly customer advisors) through changes in: i) new tools helping employees to handle customer communications coming through all channels (emails, phone, etc.) and passing these through a single channel, ii) Training to improve their skills; iii) Different work organisation.

Here, job enrichment is consistent with the objective ("*the bet*" says the HR manager) to maintain the physical network, favouring a higher quality of the service delivered through different channels (by phone, email, face-to-face interviews, etc.). This implies a HR policy that values internal mobility through substantial training. In this context, the introduction of Artificial Intelligence (AI) through Watson is presented by management as a way to alleviate workload, helping customer advisers. Another lever of adaptability and responsiveness is based on the management style, which places particular emphasis on empowering employees at all levels of the company; for instance, there is no individual performance target to reach. This empowerment is consistent with the use of technological tools (including AI) that facilitate both a better decision-making process for employees and control tools powerful enough in order to avoid excessive risks.

CHAPTER 6 – Innovation and Job Quality in the Games Industry in Germany, the Netherlands, Sweden and the UK

Maarten Keune, Noëlle Payton, Wike Been, Anne Green, Chris Mathieu, Dominik Postels, Filip Rehnström, Chris Warhurst and Sally Wright

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1 Introduction

This chapter discusses the relationship between innovation and job quality in the games industry. As a young but rapidly growing industry and closely intertwined with developments in ICT, it is an industry for which continuous innovation is a core characteristic. Following the QuinnE approach outlined in the introduction, we discuss the quality of jobs in this innovative industry in terms of wages, working time, job security, work organisation, education and training, work-life balance and participation and representation. We also discuss the extent to which job quality influences the innovative capacity of firms, and to what extent the various dimensions of job quality matter – or are considered important – for companies to compete successfully in the games industry.

The games industry, and the creative industries generally, are seen not only as an engine of innovation and economic and employment growth, but also as a portentous model of work and employment, with an important role for project-based work, portfolio careers, temporary collaborations, self-employment and entrepreneurship (Kenney and en Zysman, 2016; Florida, 2002; Mathieu, 2012; Rutten, 2014). Nevertheless, whilst there is much research both on the creative input and consumer-focused outputs, there is still far less research on the bit in the middle – the management (as a process) – of creative industries (cf. Warhurst, 2010). In this respect, it is not clear how leading edge the games industry is in terms of work organisation, job design and employment relations, raising a series of questions about its job quality, and which transpose out of this particular industry to other creative industries.

Whilst there is little literature specific to job quality in the games industry, there is an extensive body of literature on the creative industries generally, which provides insights that are likely to be relevant for the games industry. Firstly, the creative industries are noted for being imbued with passion or intrinsic artistic motivation, and the possibility of being creative is considered to be an attractive incentive for working in these industries (Neff et al., 2005; Umney and Krestos, 2015). At the same time, employment is often characterised as precarious and work unpredictable, with job security conceded or traded off to work in these ‘cool’ industries (Neff et al. 2005; Bridges 2017). The model of production is often highly flexible and fluid, expressed in high volatility of companies, a high incidence of self-employment and temporary contracts, wages that are relatively low compared to skill levels, and limited access to disability benefits and pensions (Eikhof and Warhurst, 2013; Westerveld, 2013; Annink et al., 2016). This insecurity not only affects new workers but also more experienced workers, many of whom experience continuous insecurity throughout their working lives. According to some, the insecurity characterising employment and work has been internalised by creative workers as a normal and inescapable feature of these industries. On the one hand this experience is cast as a source of stress and a reason for exit (Umney and Krestos, 2015; Dex et al., 2000). On the other hand it is cited as liberating and adaptive, and providing opportunities for workers to exercise agency over their work, selecting those project that they find most appealing (Lindgren et al. 2014; Morgan et al. 2013). The creative industries are also characterised by having a limited (or no) role for the traditional industrial relations actors (trade unions, employers' organisations and works councils) and where interest representation largely takes place at the individual level – although new types of collectivities are emerging in response to poor job quality (de Peuter, 2014).

As is discussed below, some of these observations on the creative industries generally accord with the games industry but others don't. Aligning with these observations, passion and creativity are key aspects of work and motivation in the games industry and they do lead to workers making concessions about the quality of their employment but, the findings show, this is not always the case and better job quality can

prevail. The relationship between this job quality and innovation is the focus of this chapter. Innovation is a core aspect of the industry and, alongside technological breakthroughs, the main source of innovation, as discussed below, is the creativity and passion-based innovative capacity of its workers (see Høyrup, 2010; Anderson et al., 2014; Wallace et al., 2016). However, for the workers in the industry to utilise this innovative capacity, they need to be willing and able to engage in innovation and to have the necessary capabilities (Wallace et al., 2016; Tidd and Bessat, 2009). Intrinsic motivation can be expected to play a major role here; likewise the terms and conditions of employment, including levels of (in)security and the possibilities for learning and professional development.

The next section of the chapter discusses the research methodology and case studies. Section 2 discusses how the industry is organised and its recent major innovations. Section 3 discusses the relationship between job quality and innovation, closing in Section 4 with a discussion of the possibilities of a virtuous relationship between job quality and innovation in the games industry.

2 Cases and methodology

To analyse the relationship between innovation and job quality in the games industry, we selected four countries where the games industry is relatively well developed: two large countries (the UK and Germany) and two small countries (the Netherlands and Sweden). Our research was conducted in two stages. First, we undertook an analysis of available secondary data for the industry, then complemented this analysis with 26 interviews with national industry experts. Second, we then conducted a series of in-depth case studies of innovation and job quality in companies in the industry, based largely on semi-structured interviews with owners, managers, workers and workers' representatives (where possible). In addition we used websites and other documentation as empirical material. The case study approach is the preferred method of empirical inquiry to investigate a phenomenon in-depth and within its specific context (Eisenhardt, 1989; Yin, 2009). Other QuInnE research (Erhel and Guergoat-Larivière, 2016) has established correlations between innovation and job quality at the national level; our research was intended to explore causation within companies. In this respect, the case study approach is particularly useful for exploratory research and for understanding causation, illuminating a decision or set of decisions, why they were taken, how they were implemented and with what result (Yin, 2009). Our approach allowed us to investigate how job quality and innovation mutually impact each other at the organisational level and the employment outcomes that result from this interaction. While each company case study was written up as a separate case in itself, this chapter focuses on cross-case findings across the four countries.

A total of 14 case studies were completed including 60 in-depth interviews with owners, managers and (self-)employed game developers, and 26 additional interviews with industry experts. Table 1 provides an overview of the cases and the number of interviews done per case. The number of interviews varied considerably across cases depending on the size of the company as well as on access. While the cases are not meant to be representative of the industry as a whole, by doing this selection of case studies, it is possible and appropriate to generalize our empirical findings more broadly than within the specific cases we undertook.

In exploring job quality, we follow the QuInnE approach – an objective, worker-centred, multi-dimensional approach that also enables comparative analyses between industries and countries. It has six dimensions of job quality: wages; security and working time; education and training; working conditions; work-life balance; and employee participation. These six dimensions emerge from the literature as the core

components of job quality and together provide a comprehensive picture of job quality. Specifically for the games industry (and the creative industries more generally) we include creativity, passion and motivation as features of work.

Table 1: Overview on cases and interviews

| Pseudonym | number of persons working | type of product | years in business | number of interviews (+interviewed persons*) |
|---|---------------------------|---|-------------------|--|
| GERMANY | | | | |
| GER-TRIPLE_A | > 250 < 500 | Triple-A games for PC, games for browser and mobile devices (Entertainment) | > 20 | 5 (6*) |
| GER-SERIOUS_GAME | > 10 < 50 | Serious games in health sector | 8 | 4 |
| GER-INDEPENDENT | > 10 < 50 | Entertainment Games for mobile, console, PC / Serious Games | 6 | 3 |
| <i>Industry experts</i> | | | | 3 |
| SWEDEN | | | | |
| SW-AAA_STUDIO | > 250 < 500 | Self-governing AAA studio within a larger computer games publisher | > 20 | 14 |
| SW-MOBILE_GAME | > 10 < 50 | Small company producing games for mobile devices | 10 | 1 |
| SW-PHONE_GAME | > 50 < 250 | Studio in a larger company making games for phones | 8 | 7 (8*) |
| <i>Industry experts</i> | | | | 5 |
| THE NETHERLANDS | | | | |
| NL-GAME_COAL (2 owners creating temporary project-based coalition) | > 10 < 50 | Serious and entertainment games developed for their own product and for clients | 3 | 3 |
| NL-SERIOUS_EST | > 10 < 50 | Serious games developed for clients | > 20 | 3 |
| NL-SERIOUS_ENT | > 10 < 50 | Serious and entertainment games developed for clients | 6 | 1 |
| NL-CARE_GAME | > 10 < 50 | Serious games developed for their own product | 2 | 1 |
| NL-SKILL_GAME | > 10 < 50 | Serious games used to train specific target groups in certain skills | 3 | 4 |
| NL-INDIE_COAL | > 10 < 50 | Serious and entertainment games developed for their own product and for clients | 4 | 1 |
| <i>Industry experts</i> | | | | 15 |

| UNITED KINGDOM | | | | |
|-------------------------|---------------------------------------|---|---|--|
| UK-HUB | 1 Hub Manager | Computer games hub nurturing aspiring games developers | 3 | 5 (7*) (2 Hub, 3 (5*) spin-off co-owners) |
| HUB Spin-off 1 | 2 co-owners (+1 hrly paid contractor) | Independent self-employed mobile game developer | 2 | |
| HUB Spin-off 2 | 3 co-owners | Independent self-employed mobile game developer | 2 | |
| HUB Spin-off 3 | 3 co-owners | Independent self-employed mobile game developer | 2 | |
| UK-STUDIO_MOBILE | > 50 < 250 | Self-governing studio making F2P games for mobiles and tablets within larger computer games | 8 | 8 (9*) |
| <i>Industry experts</i> | | | | 3 |

**number of interviewed persons partly higher because several persons participated in one interview.*

Source: Own compilation based on case study reports (see list of reports in section 7 of this chapter)

3 Characteristics of the sector and forms of innovation

3.1 Characteristics of the industry

Over the past two decades, the games industry has developed into a global industry with rapidly growing markets. China ranks first in the world in terms of game revenues, followed by the US, Japan, Germany and the UK.⁶⁰ According to Newzoo, in 2017 there are 2.2bn active gamers, generating some \$108.9 billion in game revenues.⁶¹ The largest proportion of revenue is now generated from games played on mobile devices (tablets and smartphones, 42%) followed by console games (31%) and PC-based games (27%). The rapidly developing ‘free-to-play’ (F2P) online game market has also grown significantly recently. Games such as *Call of Duty* and *World of Warcraft* outperform Hollywood blockbusters in terms of popularity and profits. Such AAA games require a lot of time and resources to develop, and share the market with smaller games for PCs, tablets and smartphones. In addition to the games financed by large publishers in the industry there are also numerous games produced by smaller independent (indie) companies (Keogh, 2015; Planells, 2015), with Minecraft possibly being the most successful. Indie companies have benefitted from new online marketing opportunities and distribution by download, which gives them the opportunity to develop their own fan base independent from the large publishers (e.g. Bundesverband Interaktive Unterhaltungssoftware 2016). In addition, online gaming and in particular massively multiplayer online (MMO) games are increasingly popular. Apart from the well-known entertainment games, serious games have also grown in popularity recently. Serious or applied games are developed, among others, for educational and training purposes, as medical treatments, for scientific experiments or for marketing purposes (see Ma et al., 2011).

⁶⁰ <https://newzoo.com/insights/rankings/top-100-countries-by-game-revenues/>

⁶¹ <https://newzoo.com/insights/articles/newzoo-2017-report-insights-into-the-108-9-billion-global-games-market/>

The industry is dominated by a small number of very large multinational companies such as Sony, Ubisoft, Activision Blizzard and Tencent. In 2016, the revenues of the top 25 game companies increased by 17 percent to \$70.4 billion.⁶² They have the capacity to produce the large AAA games for consoles such as Playstation or Xbox or the large MMO games, setting them apart from companies making smaller games for computers and hand-held devices. These large multinationals have studios around the globe and organise their production in networks between their subsidiaries. An important part of their production is product- or IP (intellectual property)-based: games are developed for a company's particular product (usually hardware such as a console), series or franchise (e.g. related to a film franchise).

Alongside these large companies, there is a large number of small companies and self-employed workers in the industry. These small players can produce their own indie games (self-driven), with limited development budgets and high levels of insecurity, or work for other companies and publishers (client-driven); the latter often providing more stability in terms of revenue but at the expense of independence. In this segment, production is often based on networks and temporary coalitions of small companies and the self-employed assembled for specific projects. Self-driven businesses can both sell their games to a publisher or self-publish (through or without a platform). Most small companies and self-employed workers pursue a dual strategy of client-driven projects to generate an income while continuing work on their self-driven projects.

The games industry is still a relatively young industry and is extremely competitive. It is characterised by a high failure rate of both products and companies. A large share of games companies go out of business each year and many new ones are founded. The industry bridges the creative industries and the ICT sector (Johns, 2006; Tschang, 2007). It employs, among others, producers, programmers, designers, artists, marketers and business analysts who together design, develop and launch games. Creativity is the key driver of the industry as companies and individuals try to establish new types of games, functionalities, designs, stories, characters and tie-ins. In this way, the industry allows workers to express their creativity and try to attract players to their games. Technological advances in ICT allows game design to develop in terms of its capacity, functionalities, display and memory use etc. As part of the creative industries, the games industry is seen by policymakers as promising in terms of innovative capacity and job creation potential, and in many countries specific government policies are developed to support the industry. Support structures, including education for games programmers and games artists, business incubators for games company start-ups, industry representative organisations, and co-operation schemes connecting companies and research entities have been developed across a number of European countries in the past decade.

For both large and small companies, the games industry is largely a project-based industry, with which a project equates to a game or part of a game. Work is organised around project teams combining the occupational specialists needed for the design and development of a game. Large companies have internal project teams; small companies often include other external small companies or self-employed workers in their teams. When a project is over, teams are often dissolved and personnel reshuffled according to the needs of new projects. In some cases, existing companies disband at the end of a project. For example, 29 per cent of UK games companies that existed at any stage over the five-year period to 2014 closed down (TIGA, 2016).

⁶² <https://newzoo.com/insights/rankings/top-25-companies-game-revenues/>

The games industry has grown rapidly in recent years. Nevertheless, it is still a relatively small industry in terms of employment. Focusing on the countries of the case studies, employment range from 24,000 jobs in the UK to 13,000 in Germany to just over 3,000 jobs in the Netherlands and Sweden (Longen et al. 2016; Tros et al., 2017; Luchinskaya et al., 2016; Mathieu, 2016). However these figures are likely to underestimate employment in the industry because statistics only partially cover subcontracting arrangements, casual and self-employment. In terms of workforce gender composition, the industry is male-dominated (80+%). Within the figure there is compounding occupational segregation: programmers are overwhelmingly male, while women tend to be segregated into art, illustration, and project management functions for example. In the UK, Germany and Sweden there is a strong presence of large global game developers (MNCs), whereas there are only very few such companies in the Netherlands, where small companies and the self-employed play a larger role. Although reliable figures are scarce, it would seem that of the four countries, serious games make up a larger share of the industry in the Netherlands than in the other three countries. It is estimated that almost 50 percent of Dutch games studios are active in both entertainment and serious games or in serious games alone (Tros et al., 2017). By contrast, in both Sweden and the UK it is estimated that only five percent of the industry is active in serious games (Mathieu 2016; TIGA, 2016).

There is growing demand amongst young people for formal education and training in games development. More colleges and universities now offer this education and training, as well as in related areas. Growth has been particularly fast in the Netherlands (Tros et al., 2017). However, it is unclear to what extent this is a positive development. First, doubts are expressed about the value of the skills acquired in formal education and training (Longen et al. 2016) and, in this portfolio labour market, employers often prefer to employ workers who have been developing their skill on their own out of a passion for the industry. Second, in the Netherlands and UK, more people have games-related qualifications than the industry can absorb, leading to an over-supplied labour market. However, for certain specialist skills there are hard-to-fill vacancies, suggesting a skills mismatch in the labour market (see Box 1). At the same time, Germany and Sweden have a challenging general shortage of skilled workers in the industry (PWC, 2012). One of the effects is that the large games companies in Sweden recruit workers from abroad and now have an increasingly diverse mixture of nationalities among their employees (Mathieu, 2016).

Box 1: Specialist skill shortages in the UK mobile games industry

Many games designers are employing a new breed of business analytics trained designers to make sense of the huge data that can be mined from game players.

The managing director of a UK studio (FV2) specialising in making games for smartphones and tablets reported recruitment as the biggest challenge faced by his business. The studio has a number of hard-to-fill vacancies. Roles that are hardest to fill were programmers, business intelligence and monetisation specialists, artists and marketing specialists. There is a particular shortage globally of workers with experience in business intelligence and analytics in general, and more specifically workers with experience in the computer games industry. There is also a shortage of programmers with experience in using Unity software. Because Unity is relatively new, there is only a small pool of UK programmers with the specific programming skills.

The London-based studio competes globally for workers. It has recruited specialist programmers from Russia, China, Singapore and EU countries other than the UK. Just over two-thirds of its workforce are UK citizens, just over one-quarter are EU citizens and seven per cent are non-UK, non-EU citizens who hold UK right-to-work visas.

Recruiting inexperienced workers and then training them internally was not considered viable because it takes a long time to train a specialist and the market changes rapidly. Recruiting from outside the EU is currently subject to fairly tight immigration policies. For example, the studio's managing director said that it took three years for the industry to get the job of a Data Analyst added to the UK Skills Shortage List. While there is uncertainty about Brexit, further tightening of immigration policy may add to UK skill shortages in the industry.

Source: Wright et al. (2017)

3.2 Innovation

The Oslo Manual (OECD/EUROSTAT 2005) distinguishes four types of innovation: product innovation, process innovation, organisational innovation and marketing innovation. All four types are of importance and evident in the games industry.

Product innovation is the most obvious innovation, with new entertainment games entering the market continuously, offering new styles, stories, designs and playing features. Companies offer multiple new opportunities for players to engage in more complex constructive and exploratory activities, allowing them to play around rather than to play out a game, breaking with a linear or hierarchical structure and prolonging the life of the game. This innovation allows players to discover and take credit for discoveries in the game, resulting in so-called 'YouTube moments', as one interviewee in the large Swedish company SWE-AAA_STUDIO explained (Mathieu and Rehnström, 2017a):

"It's a bigger and bigger thing in the game, trying to design games that make it possible for players to create something in it, in part to make the game more long-lived, but even to facilitate what is called YouTube moments, where people can do something cool, or something cool happens, and then they can put it up on YouTube, and this is of course free advertising as well." (employee, SW-AAA_STUDIO).

Continuous innovations are also made in hardware such as consoles and virtual reality or augmented reality devices, or the possibilities of MMO games. Innovations in game engines are also important to

innovations in games.⁶³ Games also have to be adapted continuously to the developments in hardware (phones, computers, tablets etc.). However, neither every new game or version of a game nor every upgrade of a console or MMO platform represents a radical innovation as many upgrades are often only incremental, with minimal added novelties and limited levels of creativity involved.

Another key area of product innovation is serious games for education, health and military purposes for example. Serious games are only in their infancy and radical innovation is likely to occur in this genre in the near future – as well as many incremental product innovations to each game.

Where process innovation is concerned,⁶⁴ the development of game engines has made it easier to develop new games within an existing environment. There is also a shift from the sequential development of games (with a straightforward process of linearly working towards a clearly envisaged outcome) towards more fuzzy-product development, with which only some of the basic ideas of a new game are clear at the beginning and product development becomes a process of discovery of possibilities. Process innovations can also include the increased use by small indie companies of crowdfunding in which consumers finance the development of game projects, thereby enabling small computer and video game developers to work independently of publishers (Longen et al., 2016).

Organisational innovations, which usually centre on HRM and work organisation changes, are also numerous and can be found in the use of semi-autonomous teams, 'scrum' and 'agile' management, knowledge-sharing initiatives, new recruitment/retention policies, or competency mapping exercises. These innovations are discussed in more detail below in the section on the relationship between innovation and job quality.

Finally, the games industry has also been experimenting with a wide range of marketing innovations, including the use of in-game adverts, the creating of hype around new or upgraded games, and the use of social media to attract new players, retain existing players and generate and increase revenue. Marketing innovation and product innovation are often inseparable, especially if the product includes a new way of playing games (see Box 2).

⁶³ Game engines are the core of the software and include graphic effects, sounds and text in the game. Bigger companies usually develop their own proprietary game engines for their exclusive use. Smaller companies often rely on freely available engines (Longen et al., 2016).

⁶⁴ Following the Oslo manual, process innovation refers to the implementation of a new or significantly improved production or delivery method.

Box 2: Inseparability of product and marketing innovations in the free-to-play games market for smart phones and tablets

Rapid adoption of smartphones and tablets has created a new way to play games and on-line app stores provide sites from where to download apps at low or no cost. As thousands of new games flood global app stores every day, it is no longer enough just to make a great game or make a great game available on an app store. Product and marketing innovations are essential for survival in the highly competitive, free-to-play (F2P) games market.

A UK studio specialising in making games for smartphones and tablets launched their first game in early 2010. Six months later, Apple went live with its app store. As the mobile market was changing rapidly, the studio decided to shift from a pay-to-play to a free-to-play (F2P) game. The company was an early adopter of the ‘freemium’ business model by which users can download games for free. While most users continue to play for free, a small number spend money on purchasing additional content. The bulk of development costs are spent on making a high-quality version of the F2P version of their game. The game has three individual add-ons that are relatively inexpensive to make and sold in-game. The studio generates revenue from a combination of advertising and in-app purchases.

A combination of a well-designed game and an array of marketing and advertising strategies are used to drive downloads, retain players and encourage players to make in-game purchases. The first instalment of the studio’s title game had 65 million downloads worldwide. In the first week after launch, the second instalment was downloaded 25 million times. Within a month, it had been downloaded 100 million times, with 35 million downloads made by existing players and 65 million new users.

While the Oslo Manual distinguishes between technological innovation (product and process) and non-technological innovation (organisational and marketing), a complex combination of incremental product and marketing innovation is used to build interest in the studio’s games, to drive downloads, playtime and to generate in-app micro-transactions.

In the highly competitive F2P market, monetarisation is central to transforming a good game into a commercial success. The studio uses a wide range of monetarisation mechanisms to encourage users to pay small amounts for in-game items and services including extra play time, virtual items and content unlocking. A broad range of marketing and advertising methods are used to make their games more compelling and create ‘stickiness’ to the game, including in-game advertising, leader boards, daily events, promotions tied into events in the calendar such as Valentine’s Day, encouraging existing users to invite friends to play the game and generally harnessing the interconnectedness of social networks.

Incremental innovation in marketing, advertising and game design is informed by metrics. Getting the mix right involves constant fine-tuning. The studio employs data analysts, business intelligence and marketing specialists to harvest and analyse real-time big data from within their own games as well as from social networks such as Facebook. Player habits are analysed and the insights gained are built into targeted monetarisation strategies and used to improve the game-playing experience. Today, two-thirds of the studio’s revenue comes from in-app purchases with the other one-third generated from advertising.

Source: Wright et al., (2017)

4 Innovation and job quality

4.1 Creativity, passion and intrinsic motivation

Within all interviews, worker creativity featured heavily in both job quality and innovation in the games industry. Innovation, and in particular product innovation, depends on new ideas and skills. This innovation

is rooted in the creativity and the passion of the programmers, artists, musicians, designers and others working in the industry. Creativity is also a core element of the intrinsic work motivation and occupational identity of workers in the games industry. Workers want to be able to express their creativity, to follow their passion, to make ‘beautiful cool things’, to be part of the development of new exciting games, of creating ‘fantastic products’. They often depict work as their hobby and as being fun, and they are often game fanatics themselves, ‘we play the games we make’, said one, and working in the industry is often considered a privilege. There is therefore a strong link between intrinsic work motivation as part of job quality, with the possibility of expressing creativity and the innovation needed within the industry.

Games companies try to appeal to this work orientation in the way that they brand themselves as employers. The Swedish SW-AAA_STUDIO presents itself as a creative and passionate workplace in an open, friendly and inspiring work environment with highly talented teams from around the world. It underlines its commitment to enriching players’ lives with memorable experiences full of surprise, fun and adventure as well as opportunities for learning and self-discovery (Mathieu and Rehnström, 2017a). A line producer at SW-AAA_STUDIO describes the ambition of creating games that allow the player to create things beyond what the game designers and developers could conceive of, termed “emergent gameplay”:

“Then suddenly you get to a level where one system meets another system, and it becomes fantastic, people [players] get ideas that they can combine things so that this process takes place, these kinds of breakthroughs can take place ... we want to build what is called emergent gameplay, if you don’t have emergent gameplay you can only do things in a particular way, ... you build a system that the player can then explore – OK, I can manipulate the ecosystem, it appears that I can impact the ecosystem, what happens if I do this? And you [the player] can get effects that we maybe could not have designed, it just happens. Minecraft is a perfect example of this, it’s just building boxes that you can combine and then people build, and in the end they build robots that themselves harvest and build houses.” (line producer, SW-AAA_STUDIO).

This creativity and passion-based occupational discourse is omnipresent in the industry and there is little doubt about the creative aspirations of the workers. At the same time, there are some caveats. First, creativity is not necessarily a pervasive aspect of all work in the games industry. Some argue that often only at the start of new projects is creativity salient, after which game production becomes strongly path dependent and requires repetitive actions, ‘when the proletariat largely colour in the boxes’ (Mathieu, 2016). Indeed, a lot of hard work is needed to make a game. Depending on how it is organised, this work may not always appeal to the intrinsic motivation of the games workers, even though the project it contributes to may very well do so. Also, producing upgrades, downloadable content (DLC), or sequels of games may be less inspiring than working on entirely new games.

Second, only a few ideas for games or aspects of games make it to actual production or to the market, and even fewer become a success. Within large companies, ideas are constantly generated but most are discarded. Also, only few indie-ideas make it to functioning games and even fewer of these games sell well. In many cases, therefore, creative and passionately developed ideas remain just that – ideas. The resulting frustration can negatively affect the motivation of workers in the industry. As one illustrator for a Dutch indie observed, there are two types of people in the indie segment: those who expect immediate success after the launch of a game and quit when this hope does not materialize, and those who are willing to keep on working at their game’s reputation and awareness among consumers (Been et al., 2017a).

Thirdly, with the games labour market being a portfolio labour market, workers do not only want to work on the best, most innovative and advanced projects out of intrinsic motivation, they also often feel they have to work on these projects to advance their careers.

Fourthly, where companies work for specific clients, the client may set clear limits to creativity by imposing to the characteristics of the game that it wants. This imposition may again limit the creative autonomy of the workers as well as their motivation. This situation seems to be the case more in serious games production, in which the creative and fun elements are often of less importance. In the case of the Dutch company NL-SERIOUS_ENT, it became the reason to switch to entertainment games only: For the strongly creativity-oriented management and core employees, the short serious games projects were too strongly oriented towards transmitting a message and too little towards fun. Also, the clients want substantial influence on what the product looks like and what it does, something which creatives do not like. Here is where the clients' requirements and the company's management and workers' interests and objectives clashed. The latter felt they did not have enough space to be creative, to make "really smashing games" that were fun to make and to play. Being able to be creative and to make "really cool products" is considered a major element of job quality in this sector and working in the serious game market put job quality under pressure (Been et al., 2017b).

Nevertheless, the serious games segment, still in its infancy, can also offer new sources of motivation. For example, in the Dutch serious games company NL-CARE_GAME, in developing games for the healthcare sector, intrinsic motivation is directed less towards making fun games and more towards making a contribution to the wellbeing of the games' target groups (Been and Payton, 2017a). It was repeatedly emphasised that both employees and collaborating partners share this motivation and interest, with a 'love for the target group'. The CEO of NL-CARE_GAMEO was convinced that this shared motivation contributes to 'getting somewhere'. Serious games can also result in fun, albeit a slightly different kind of fun:

"You get to think up new things, try things out, and then you create something, and something happens and other people get to enjoy what you've come up with. I wouldn't know what would be more fun than that." (CEO, NL-CARE_GAME).

Companies benefit strongly from the high intrinsic work motivation of their workers and these workers' drive to innovate and develop great products. Virtually all the companies in the four countries reported both high levels of job satisfaction among their workers and strong identification of these workers with the product. A first reading seems to suggest a virtuous circle between innovation and job quality in the industry. However one of the challenges of the industry is to organize work in a way that allows creativity to flow and innovation to emerge, but doing so in an economically efficient way. Paradoxically, even with high intrinsic work motivation and job satisfaction, some companies reported high labour turnover. Across the industry, a key concern is the retention of good workers. It might be that there is an unevenness across the dimensions of job quality within the games industry, a point that we discuss below.

4.2 Interest representation and identity

Collective forms of interest representation (trade unions, collective agreements, works councils) are a key feature of job quality because they provide workers collective forms of power and influence over employment and working conditions as well as work organisation and company strategies. These collective

forms of interest representation can, to some extent, make up for the power differences between employers and individual workers.

In the games industry in the four countries under analysis here, the role of collective interest representation is extremely limited. There is virtually no role for trade unions or collective agreements: a collective agreement for the industry existed in none of the countries and none of the companies had a company collective agreement or were covered by any other collective agreement, and no trade unions were active in any of the workplaces. This lack of presence is particularly surprising for Sweden and the Netherlands, where collective agreement coverage is very high (89% and 85% respectively), with trade union membership in Sweden also high (67%) (see Table 2). Furthermore, there were no works councils in the companies, which is striking in Germany and the Netherlands, where works councils exist in most companies, except for the smallest ones. It was only in GER-TRIPLE_A that an employee council (not a works council as defined by law) was found, which was introduced following employee dissatisfaction with the way management communicated and the lack of transparency about company decisions. One Dutch CEO, however, did mention that she may have to think about strengthening employee representation in the future to comply with the law that does demand works councils in most companies.

Table 2: Coverage of collective agreements and trade union density 2014-2015 (%)

| | Coverage collective agreements | Trade union density |
|-----------------------|--------------------------------|---------------------|
| United Kingdom | 29.5 | 25.7 |
| Germany | 57.6 | 17.1 |
| Netherlands | 84.8 | 18 |
| Sweden | 89 | 67.4 |

Source: ICTWSS

At the industry level, there are also no trade unions for the games industry. There are several representative bodies for the industry's companies or the industry generally but they tend to focus on the exchange of information and experiences within the industry, supporting business development and innovation or representing the industry vis-à-vis the government and the rest of the economy and society, as well as abroad. The biggest sector organisations in Germany are the games industry associations BIU (*Bundesverband Interaktive Unterhaltungssoftware e.V.*) and GAME (*Bundesverband der deutschen Games-Branche e.V.*). The BIU represents 85 per cent of the German market and covers around 55 per cent of employment in the German games industry according to its own figures. The Dutch Games Association has about a hundred members (see Box 3). In Sweden, there is one national industry association/interest group, the Swedish Games Industry [*Dataspelsbranschen*], which plays a bridging role between industry actors, the wider business community, politicians and the general public, lobbying for positive conditions for gaming and the gaming industry. It has two sub-organisations: *Spelplan-ASGD* (Association of Swedish Game Developers) whose primary focus is improving the business conditions for game development in Sweden and the Nordic countries; and ANGI (Association for the Nordic Games Industry) which is a Nordic branch association for publishers and distributors. In the UK, the most noticeable organisations are Ukie (*UK Interactive Entertainment*), a trade body that supports the UK's games and interactive entertainment industry, and provides its 289 members with a collective voice; and TIGA (*the Independent Games Developers Trade Association*), a non-profit trade association representing the UK games industry.

Box 3: The Dutch Games Association

The *Dutch Games Association (DGA)* is the industry association of the Dutch games industry and was founded seven years ago. The association has around hundred members. DGA's members are game-related companies and educational institutes. DGA supports the industry through i) intensifying collaborations between its members, ii) initiating business opportunities, iii) representing the industry with government and abroad, iv) supporting game education, v) stimulating applicable innovations, vi) serving common interests and vii) guiding talented start-ups. DGA is more a business organisation than an employers' association. Compared to other industry organisations in the Netherlands, it focuses mainly on the support of activities and innovations at the local level, including cooperation with other industries and educational institutes. Recently, DGA also started to work towards strengthening the industry as a whole and developing the relationship with 'the outside world'. Regarding their representative functions, DGA is a voice with government, lobbying for the interests of the game industry in the Netherlands. It does not bargain with trade unions and does not conclude collective agreements.

Source: Tros et al. (2017)

At industry level, there does not seem to be a strong sense of labour and capital or workers and employers, rather most workers seem to identify with the industry and to subscribe to an occupational identity. Hoose (2016) argues that most employees in the games industry do not regard (industry-wide) collective representation of interests, e.g. by trade unions, to be useful because they do not see any fundamental difference of interests between employees, employers and freelancers in the games industry. The company case studies show that in many studios a sort of 'start-up' mentality prevails among workers and management, which sees the company more as an organic entity than a polarised worker/management type of organisation. Also, companies often employ young workers who are generally less inclined to join trade unions. Questions about trade unions and interest representation surprised many of the interviewees; "get real" some responded. As an operating manager at NL-SERIOUS_EST stated (Been and Payton, 2017b): "Those people want to build things. The last thing they want is a meeting. [...] Just please let me work." "Cause that's what they enjoy." There is of course bargaining between employers and employees but which happens primarily at the individual level.

The absence of collective agreements can also be linked to the ways of working in the industry and in particular to the sometimes excessive hours of the 'crunch' periods. This point was illustrated in the reaction of a producer in GER-INDEPENDENT to the question as to whether a collective agreement existed:

"Ha, very funny. If we had one of those, we may as well close down. [...] It's impossible. Every now and then we have the dreaded crunch times, which means working overtime to finish something by the deadline ... if we had a collective agreement that regulated this overtime in some way, the company simply wouldn't exist." (producer, GER-INDEPENDENT).

There is thus very limited collective voice in the games industry. Some consultation does exist, but tends to occur at individual or team level. In fact, in Sweden, employees reported a high degree of consultation on projects, immediate work environment, and wages and career progression – although little or no consultation on company strategy. Similarly, at the GER-SERIOUS_GAME, co-determination is not rejected but informal ways are seen as sufficient by the managing director:

"I'm a fan of codetermination, I think it's great, basically. I'm not one of those who says "Oh God, please not", but I do think we've been pretty successful at establishing quite a good level

of participation here ... And the team is not yet so big and they have a very great deal of self-determination. Very self-organised.” (HR manager, GER-SERIOUS_GAME).

Still, in terms of job quality, the lack of collective voice and representation would seem to weaken the bargaining position of workers towards their employer, particularly for workers with low individual bargaining power. However if workers do not perceive differences of interest, they may not see the benefits of collective representation. As the industry matures it remains to be seen if this lack of collective voice and representation leads to lower job quality, for example compared to that in other industries and if this situation would negatively influence the capacity or willingness of workers to innovate. When intrinsic work motivation is strong it may not make much of a difference. We revisit this issue in later sections.

4.3 Wages and pensions

Workers’ wages or income from work for small entrepreneurs and the self-employed in the games industry are often relatively low when compared to similarly skilled worker in general and the IT sector, with which the games industry often compares itself. Although reliable data is missing, the issue of lower pay was often raised by employees, stating that they receive around 30 per cent lower wages than the IT industry. As an illustration, in the German games industry, the gross salary for graduates working in game development is €2,400 per month and around €2,900 for game designers. Both these figures are significantly below average gross pay in Germany (in 2015 €3,612 for full-time employees) and even further below the rates paid in the IT sector (although pay levels may be affected by the low average age of workers in the games industry). Wage setting is done on an individual basis and wage levels depend on the type of job (e.g. a programmer earns more than an artist), skills, experience, and the general portfolio of the individual, although the differences between occupations tends to be lower in smaller companies. In the large multinational companies like GER-TRIPLE_A, the parent company sometimes provides the parameters for wage setting of different categories of workers (Postels 2017a). Also labour market conditions play their part. For example, when the Swedish SW-MOBILE_GAME opened an affiliate in the city where SW-AAA_STUDIO was already established, it used higher wages to attract employees. SW-MOBILE_GAME continues to capitalize on paying higher wages, as a HR manager at the company stated:

“I had an indication last week that there were people here who were in [recruitment] processes with other games companies, but they couldn’t come close to matching the wages that they have here, because SW-MOBILE_GAME is ahead of the pack.” (HR manager, SW-MOBILE_GAME).

At the same time, SW-AAA_STUDIO is known to pay relatively lower wages compared to its local competitors because it is a large company with attractive projects, as a HR manager admits *“we don’t have the highest wages.”* (Mathieu and Rehnström, 2017a). What makes the company attractive is the opportunity to work on high recognition games like the ones the employees like to play, but also to do high-budget, technically and creatively sophisticated work involving creative high-stakes risk-taking as the following exchange between two developers shows:

Developer 1: “It’s a creative challenge, how to develop the game itself at the same time as you develop the technology, usually you make the assumption that if you can solve the problem that no one else has solved before to get things to meet, then you have to believe that the rest can be done, then you might have to steer things in a different direction.”

Developer 2: “Sometimes you have to do that, say that this is absolutely key to for this game, it has to be good, no one has done it before, we don’t really know how it will go but it has to go, so we hope it works. Then for a year you really hope. You don’t do stupid things, but sometimes you have to take the risk, you cannot just take the safe and secure options all the time, then it would be too boring.” (Game developers, SW-AAA_STUDIO).

A Swedish industry expert and former executive at a AAA company now working in the mainstream IT sector states that AAA companies in Sweden are “*far more advanced [than the mainstream IT sector] with regard to things like technical innovation and how to work in an attractive manner with the other bits. I noticed when I moved here [to a mainstream IT company] that the level of technical knowledge was much lower than at [a Swedish AAA company] and so you have to compensate somehow ... here we have to pay more for the same level of technical competence.*”

Again, it seems that wages are often not the main motivator for workers and that they are willing to trade receiving higher pay for working on a ‘cool’ job. ‘You do not work in the game industry to get rich,’ was an oft-repeated phrase amongst employees. Examples abound of individuals who used to work in IT but moved to the games industry where they earn substantially less but where the work supposedly is much more rewarding. Indeed, lower wages are tolerated in the games industry because of the prevailing high intrinsic motivation (Hoose, 2016; Thompson et al., 2016). Relatively low wages do not seem to diminish motivation and the willingness of workers to deploy their innovative capacities to the full. Wages were rarely used to stimulate innovative behaviour, although there are some companies experimenting with giving employees a stake in the specific products they have been working on. For example, UK-STUDIO-MOBILE in the UK recently introduced a profitability bonus scheme as well as an employee share ownership scheme, where the employer matches shares up to a certain limit.

Wages can be particularly low in small companies and especially in start-ups, which also tend to employ interns at low or no pay to lower wage costs. It should also be noted that the income of owners is often also poor as little money tends to come in to the company during the start-up stage and, where relevant, employees or contracted self-employed have to be paid first. For example, none of the owners of the spin-off companies in the UK-HUB case were yet able to pay themselves a regular wage and some of them held second jobs while others took on contract work to tide them over until their games are released or until they secure financing (Wright and Green, 2017). Likewise, the four owners of Dutch NL-INDIE_COAL earned below the level of the Dutch minimum wage because the company was barely making any money (Been et al., 2017a). The owners of NL-SKILL_GAME paid their two employees slightly below the Dutch average wage but were unsure whether they would be able to pay themselves anything at the end of the year (Been and Payton, 2017c). Low income for the owners of start-ups is however mainly seen as an inherent risk of being an entrepreneur and a start-up rather than an industry-specific issue. Expectations were of course that this situation would change as the company grew, and there was always the promise of a ‘big bang’ – of a game becoming very successful. Venture capital and subsidised office space in incubators can help to overcome or soften income-related difficulties. Also for the entrepreneurs therefore, low income from work was not an impediment to innovate; instead they hoped that their innovations would eventually provide them with a better income.

In this relatively young industry, both in terms of the age of the companies and the workers, pensions were often not seen as an issue. Anecdotally, the first Swedish games industry worker retired recently with a pension. Indeed, few workers and even fewer entrepreneurs and self-employed have occupational pension plans or had given thought to setting up a pension plan. Nevertheless, in some companies,

pensions have become an issue. For example, in NL-CARE_GAME, a survey was conducted among the employees to find out to what extent employees felt a need for a pension plan, how much they were willing to pay for it etc. Younger people showed little awareness of the need for a pension plan but the need for a pension plan was still felt pertinent as older persons joined the workforce and who were used to being covered by a pension plan. The CEO also wanted to offer a plan “*because it’s important to me to take good care of our own people*” (Been and Payton 2017a). A pension plan was due to be introduced shortly covering all employees. Undoubtedly, when the average age of the workers in the industry increases over coming years, pensions will become a more important aspect of job quality than is the case currently.

4.4 Working time, crunching and job security

Working time in the games industry traditionally has been characterised by two peculiarities: long hours and ‘crunch’ periods in which extremely long hours are worked as important deadlines approach (IGDA 2004; Prescott and Bogg, 2011). These long and sometimes extreme working hours are detrimental for job quality. In an online survey by *GamesIndustry.biz*, 54 percent of respondents reported average working weeks of over 40 hours and 20 per cent cited ‘crunching’ as the worst part of working in games (Batchelor, 2017). As with other creative industries (Eikhof and Warhurst, 2013), for women with families, such work patterns make the games industry unattractive or impossible to work in and there are few women with children working in the industry (while there are many men with children) (Prescott and Bogg, 2011).

There was some evidence in our case studies of such working patterns. One of the owners of NL-INDIE_COAL claimed that crunching, described as working day and night, over 80 hours per week, is common practice in both small and larger companies in the industry (Been and Payton, 2017a). He argued that crunching is especially prevalent during the last phase of game development, right before launching. One of the co-owners of a start-up in the UK-HUB too acknowledged the crunch but recognised its downside (Wright and Green, 2017):

“Sometimes ‘crunch’ becomes a necessary part, or what is seen as a necessary part. Some of the best games are made from teams who do work long hours and so it is hard because sometimes the evidence shows that, you know, you do that sort of thing and you make a better game but then I know there’s the moral side of it.” (Co-Owner, UK-HUB).

The UK-HUB leader also made the point that he thought that the culture long working hours involved an element of voluntarism, as it was linked to the quest for creative excellence:

“We crunch because we want to, we want to make our games brilliant ... I want to be the one who sat there at 7, 8 or 9 because I want to finish this, because I want to make it really, really good ... I would be there until I got the best out of my project or whatever I was doing. I’ll just finish this piece of art, I’ll just finish this animation. Whatever it is. Or get it to a position to where I can continue it nicely the next day. And I think that is the creative driven to make stuff brilliant. Just get it done. Got to get it done. Want to ... I don’t think you can force creativity. You know, that spark of brilliance ...” (co-owner, UK-HUB).

In this line of argument, long and excessive working hours are an inevitable part of working in the games industry and essential to innovation and the production of new games. However, many of our case studies contradict or at least nuance this view. In many cases, crunch periods and long working hours simply do not exist or the companies are actively engaging in organisational innovation, reconfiguring their people

management to try and eradicate or at least diminish both the crunching and the long working hours. As a senior management official at SW-MOBILE_GAME states (Mathieu and Rehnström, 2017b):

“We cannot win over the big production companies, we cannot win over the media industry top jobs that many of our workers have the competence to get, but by and large the people who are here are here because we have a good work environment and they want to work with games. We don’t over-work, we don’t survive on overtime, we don’t survive on an unhealthy work-life balance, this is really important for us. Of course sometimes there is a natural deadline for a marketing campaign, or ‘oh, we’ve promised Apple something’ but generally, things should take the time they take and we should work right, and hard, but we don’t live on people having their bed at the office. And this leads to people applying to us, in the games industry, because it’s important that people have lives also.” (senior manager, SW-MOBILE_GAME).

An external regional expert in Sweden corroborated this, stating that many employees sought employment at SW-MOBILE_GAME because they ‘offered higher wages, normal office hours and no overtime.’

The alternative argument offered by such companies is that having to resort to crunching and long working hours indicates a company that is poorly organised and inefficient. Crunching may also undermine rather than help product innovation as it is a sign of poor planning and of last-minute attempts to fix a game. Furthermore it was argued that crunching and long working hours can undermine the quality of the output, especially in programming, which requires high concentration. *“After six hours you’re completely spent”* stated a freelance programmer in the Dutch NL-GAME_COAL, *“I don’t believe it when a programmer says he can work eight hours a day all week long. [Because of] the concentration you need to actually write good, efficient code”*. As a result, many companies are innovating their work organisation and management to rationalise and stabilise production and reduce crunching. One means for doing so is by using Agile management and Scrum to better manage work processes and workloads (see Box 4).

Box 4: Introducing Scrum at Serious Games

The core innovation at Serious Games in recent years was the introduction of Scrum. Scrum is an iterative and incremental agile software development framework for managing product development. It is a holistic and non-sequential approach based on self-organizing teams and frequent face-to-face communication. Before Scrum was introduced, the product development process was based on project plans and used the traditional linear waterfall method. This method runs through a series of phases: definition, basic design, technical design, building, testing and integration. A new phase starts only when the previous one is finished and errors or mistakes lead to a return to the beginning. Many managers in the games industry judge this method to be too rigid. Furthermore, it was claimed that valuable ideas were sometimes lost following this method. Using its new framework, Serious Games created a space in which ideas could be articulated and structured. This innovation had positive effects on job quality. Employee satisfaction increased and employees reported less work overload and better planning of upcoming tasks. Furthermore, the introduction of the ideas board created an opportunity for articulating ideas and incorporating them into the planning process. Objective criteria such as the relatively low salary remain however unaffected.

Source: Postels (2017b)

NL-SERIOUS_ENT introduced Scrum five years ago. Until then, the company had worked with Waterfall but realised that this project management tool was too rigid for their organisation, which was in need for further professionalisation. Introducing Scrum resulted in more efficient organisation of work and a better overview of how much work needs to be done, when and by whom. It allows the company to avoid excessive crunch periods and to operate fairly regular working times (Been et al. 2017b). NL-SERIOUS_EST and NL-CARE_GAME also have had fairly regular working time, with long hours as exceptional. At SW-AAA_STUDIO, even though crunch and more intensive work periods towards the end of projects is seen as almost ‘inevitable’, the studio tries to lessen its occurrence by proactive planning and work cycles. At GER-TRIPLE_A, the crunch problem had virtually disappeared (Postels, 2017a). According to the HR manager:

“I can’t say it doesn’t happen at all here but it happens considerably less often than it used to. Our producers have significantly improved project management and time management is better, so that these typical crunch times as used to be case in the past – it’s not like that anymore. Things have changed a lot. We have a clear time management system and see to it that we get everything finished within the set time frame. And before we see quality suffering, we say ‘Then let’s give it a bit more time’.” (HR manager, GER-TRIPLE_A).

The technical director summarised the issue, linking it to the need for the industry to mature:

“The games industry has been a bit of a joke for a long time. We have to grow up. So that we can say ‘We’re no longer a company operating out of someone’s garage like we used to’. Regulated working times, everything that other industries have had for long time, we have to introduce all that into the games industry. That’s what [the parent company] or [TA] offers. All these things: regulated working times, no overtime, hardly any crunch times. These are all positive things.” (technical director, GER-TRIPLE_A).

At the UK-STUDIO_MOBILE, there was no crunch and no or extremely rare need for overtime. While some staff had experienced crunching working for previous employers, they all believed that a combination of good planning (including the use of Agile tools to allocate and prioritise tasks) and a genuine commitment

from the senior management to work-life balance helped explain why there was an absence of a long working hours culture and no crunch (Wright et al., 2017).

Thus, while long working hours and crunching still occur regularly in the industry there is increasing recognition that they might be impediments to working effectively and to innovation. As a result, many companies are adopting organisational and process innovations to reduce or eradicate these problematic aspects of job quality. These companies show that it is possible to be successful with no or limited working time excesses. As some of the UK employees signalled, there is also the linked issue of work-life balance. Most people working in the industry are young and work-life balance issues have less resource with them. However as their life stage changes and more workers start having, or think about having, a family, they question if it is possible in this industry to have a family. As a result, work organisation, working time and adjusting work to family needs were starting to be discussed in many companies.

A similar point can be made about job security, particularly the use of temporary or permanent jobs by companies. Work in the games industry is often seen as flexible and insecure, both because of the high rate of failure rate amongst companies and because of it being project based. Indeed, a number of examples of such insecurity were highlighted in some of the smaller companies and among the self-employed (see Box 5). Nevertheless, many counter examples also existed. Apart from national rules and regulations, the division between companies offering more or less job security is determined by three factors. First, large companies tend to offer higher job security than small companies as they are more able to stabilize their demand for labour and compete for the highest skilled workers. In Germany, only the large Triple A company provided workers with secure jobs, contrary to the other two smaller German cases.

Second, in Sweden, almost all employers in the games industry offer secure, permanent jobs, and a major argument used for this is the tight labour market. In SW-AAA_STUDIO, a HR manager states that the tight labour market and the need for qualified employees permeates all aspects of the company: *“That’s just how it is, it’s the top priority today – recruitment. In all of our processes.”*, adding that permanent contracts are not just necessary to secure requisite labour, but also because the work process requires employment stability. Similarly in the UK, in order to attract and retain skilled workers, Studio almost exclusively offered full-time, permanent contracts (Wright et al. 2017). This labour market argument does not hold for Germany however, where the labour market is also tight but only one out of three companies offer substantial security.

Third, the philosophy of the company or owner(s) values matter. For example, in the Netherlands, NL-GAME_COAL adheres to an organisational model in which the three owners are the core of the company, which is upscaled according to the needs of the projects, with freelancers and interns then being used. NL-GAME_COAL has never had employees and was not planning to have any in the future. It searches for the necessary skills and experience in its networks and creates temporary coalitions for the duration of its projects. By contrast, NL-SERIOUS_ENT, which has four owners, has a group of around ten permanent employees that have been with the company for many years. Projects used permanent staff in the first instance and only when certain skills were needed out with these employees or when workloads became too heavy were freelancers hired. Both companies regarded their organisational model as the optimal one and both were reasonably successful. Both highlight the importance of company culture, informed by owner values, in determining the contracts offered to workers. It also shows that there are several organisational models that are available, that companies in the same industry have different models, that

this difference is driven by choice and that some models provide more security and hence higher job quality for workers than others.

Box 5: Precarity in the UK computer games industry

After completing a degree in computer science, the owner of UK-HUB spin-off 1 has worked in the computer games industry for almost ten years. Just after graduation a friend told him about vacancies to work on *Harry Potter and the Order of the Phoenix*. He applied and was offered a six-month temporary contract as a scripter (junior programmer). His contract was then extended until the game was finished.

It was just good to get any role in the games industry really and especially at big companies ... to get that on your CV was really good ... But you are worried that when the contract runs out you might not be able to get another position.

He then went to work for a large studio where he was employed on a fixed term contract for a year and a half. He then left to join a small company that was making games for children; this time on a permanent contract. He then returned to the large studio where he had previously worked, starting back as a contractor but being made permanent after a short time. He worked at this large studio for three years until the project he was working on was cancelled and he was made redundant.

He then got a new job with a global publisher. After initially being told that he could continue working on his own independent project outside of this work, he was soon told that he would either have to stop working on the game or hand over proprietorship. He resigned from the company and went to work for another company as a lead designer. He worked for this company for two years and then left by choice to work full-time on developing his own game. He moved back in with his parents so he could save money and he used some of the redundancy payout he had received earlier to invest in his own start-up.

Source: Wright and Green (2017)

4.5 Education and training

As discussed above, product innovation in the games industry is largely employee-driven, based on the creativity and passion of the workers. Apart from the motivation of workers to engage in such innovation, they also need to strengthen their capabilities (knowledge, skills and competences) through continuous learning to keep up with the latest technologies, techniques, software, formats etc. In this relatively young and rapidly developing industry it is however problematic to rely on traditional forms of learning in which the content of what is to be learned is known in advance and can be taught in standardised programmes (Engeström and Sannino, 2010). Part of the learning process is to find out what has to be learnt and how skills and technologies can be put to innovative use. This is one of the reasons why employers do not necessarily see graduates of games studies as the best candidates to hire. They often value learning by doing, by playing and by experimenting.

For workers, learning has individual and workplace dimensions. The individual dimension concerns how and to what extent the individual is interested in learning and to what extent s/he engages in learning independent from the workplace. Here, in line with the pervasive discourse on intrinsic motivation and desire to engage in creativity, workers related many stories about games industry workers engaging in all kind of learning activities in their free time, practicing skills, experimenting, doing online tutorials,

interacting with peers in online games communities, playing games etc. Being intrinsically motivated therefore appears to lead to individuals having the desire to develop their personal capabilities and hence to spend part of their private time learning.

The workplace dimension concerns workplace learning – the way learning is fostered and organised in the workplace, and how it relates to innovation. The working environment can be placed on an expansive-restrictive continuum, depending on the features of the environment or work situation which influence the extent to which the workplace as a whole creates opportunities for or barriers to learning (Evans et al., 2007; Høytrup, 2010). The characteristics of an expansive learning environment are shown in the left-hand column of Table 3; a restrictive environment would be the mirror image hereof (Høytrup, 2010: 150).

Many, though not all, of the case study companies can be located closer to the expansive than to the restrictive environment. This location is unsurprising given that an expansive learning environment is related to the employee-driven mode of innovation prevalent in the games industry (Høytrup, 2010). In most cases learning is recognised as a basic part of work and innovation, and workers are offered time and resources to strengthen their capabilities. Table 3 provides examples for the various elements of an expansive environment found in the case study companies. They testify to the positive attitude towards learning in most games companies. Nevertheless, it is mainly in the larger companies that the more formal structures for learning exist while in the smaller companies learning by doing and self-learning are more important. This latter approach, of learning by doing and through self-learning is also prevalent among the self-employed and freelancers.

Though most learning even in the largest Swedish companies is in daily work and experimentation, the larger companies have more formalised (and expensive) training and competence development activities. SW-AAA_STUDIO for example took about 20 of its developers on a weeklong study tour of an ecological environment half way across the world to gain first-hand experience of the type of natural environment a games project under development is staged in. SW-MOBILE_GAME has two formal education academies for its employees – one oriented towards occupational skills, and one oriented towards learning more about the company and its processes, in addition to an annual conference for all employees in the company, at which peer-to-peer learning seminars are a central activity.

Table 3: Elements of expansive learning environments found in the games industry

| Characteristics of expansive learning and an expansive learning environment | Examples from the case companies |
|--|--|
| <i>Participation in multiple social entities inside and outside the workplace</i> | <ul style="list-style-type: none"> – Encouragement of peer-to-peer learning within and outside the company through collegial seminars and systematic critique and review, informal learning by doing and cooperating, learning from and participation in online and offline networks – Participation in conventions and events (games-related and non-games related, e.g. if games are marketed in a particular sector such as health) – Presence in creative hubs – Holding multiple jobs, e.g. in a games company and in education |
| <i>Planned time off the job, including time for reflection</i> | <ul style="list-style-type: none"> – Structurally half a day or more per month reserved per worker for training purposes – Brainstorm sessions organised during and after working hours facilitated by the company – Widespread use of scrum, with time for reflection after each sprint – Regular meetings and Information exchange across projects to improve skills – Use of time between projects for learning through virtual projects |
| <i>Organisational recognition of, and support for, employees as learners</i> | <ul style="list-style-type: none"> – General attitude, see other categories |
| <i>Teamwork valued</i> | <ul style="list-style-type: none"> – Widespread teamwork on projects with multi-skilled, multidisciplinary teams – Preference for presence at the office as opposed to tele-working to ensure face-to-face collaboration – Expecting innovation from particular configurations of creative individuals |
| <i>Managers as facilitators of workforce and individual development</i> | <ul style="list-style-type: none"> – Providing the facilities necessary to work with least possible distraction – Shielding workers from the messiness of game development |
| <i>Bottom-up approaches to innovation</i> | <ul style="list-style-type: none"> – Expecting innovation to come from the creative individuals and their configurations into creative teams – Co-creation processes with clients and end consumers |

5 Discussion: Job quality and innovation: a virtuous circle?

Innovation is a central characteristic of the games industry. In all four areas of innovation, continuous incremental steps and occasional radical innovations are made and being innovative is central to being competitive in this industry. Innovation is closely linked to the ability and willingness of the workers in the industry to be innovative. Here the issue of job quality comes into play. First of all, the majority of people working in the games industry is highly intrinsically motivated, is looking for ways to express their creativity, and has passion for making beautiful, fun and innovative games. Sometimes this passion also specifically includes contributing something good and useful to society, important in the case of games with an educational or societal purpose and for many of the serious games. In this sense, working in the games industry, and especially working on the more interesting, innovative and societally important games, can be seen as an important aspect of job quality.

There are however limits to this dimension of job quality. Creativity is not necessarily a pervasive aspect of all work in the games industry as there is a lot of routine work as well, both in game development and in testing. Another important dimension of creativity has to do with the fate of creative activities and outcomes, as many ideas and potential innovations never make it to production or to the market, and the influence of clients may limit the possibilities for expression and lead to frustration. Also, other aspects of job quality influence the ability and willingness of workers to be innovative. The factors we examined are collective interest representation, wages and pensions, working time and job security, and education and training.

Collective interest representation is very limited in this industry, there are no trade unions active, there are no collective agreements and there are only few examples of worker representation within the companies. There seems to be little interest in changing this however among the workers, who often do not perceive the employment relationship as a relationship between opposing interests. Wages are generally decent in the games industry, with the possible exception of interns, certain owners of small companies and certain freelancers. Still, they are below the wages in comparable jobs in for example IT. There is evidence that there is some sort of ‘voluntary’ wage penalty for working in the games industry compared to comparable work with comparable skill levels in other branches (Baumol and Throsby, 2012; Throsby, 1994). This is similar to what is found in other creative industries (Mathieu, 2012), where the attractiveness of just being able to work in these industries leads to wage suppression. In the games industry, in many cases, this wage suppression appears to be important but not to be extreme, due to competition for skilled talent and the lucrative and expansive nature of the industry. Also, pension provisions are very limited for now. To some extent the relatively low wages and almost inexistent pension provisions can be explained by the fact that this is a young industry with young workers, who are more interested in what they do than in their wage, and even less interested in pensions. Also, there is a general discourse in the industry arguing that you do not make games to become rich but because you like it. This is likely to change however when the industry becomes more mature, when the workers become older and establish families (and even get to retirement age) and when labour markets are tight as today in Sweden. Hence, the relationship between wages and the willingness to work in the sector and to be innovative may change in the future.

Where working time and job security are concerned, the traditional discourse that the games industry thrives on long working hours, crunching and high insecurity seems to be contradicted by many of our cases where these characteristics are argued to be signs of immaturity and lack of professionalisation. In these cases, it is argued that workers are happier and more productive and innovative when they work normal working hours and feel secure in their jobs. Many organisational innovations have been made to create workplaces where this is practiced and where job quality is high in this respect. They show that choices in terms of strategy can be made and that there is more than one path to competitiveness. Indeed, even in an industry characterised by project-based work, portfolio careers, temporary collaborations, self-employment and entrepreneurship high job quality in terms of working time and job security is shown to be possible. Finally, where education and training are concerned there is a general agreement that learning should be part and parcel of working in this industry and that opportunities for learning should be created. Large companies do this in a more organised and formal sense than small companies however.

There seems then to be good arguments for a virtuous circle between innovation and job quality in the games industry, where high job quality, especially in terms of working time, job security and training opportunities result in high innovative capacity. A number of our case studies can be seen as examples of

such virtuous circles pointing to a high innovation – high job quality model. At the same time, this argument does not work for collective representation and only to a limited extent, for now, for wages and pensions. Also, in various companies this virtuous circle is not the aspiration and bad job quality is seen as a fact of life in part of the industry, pointing to a second model based on high innovation and low job quality. For the moment, workers seem to accept this because of their drive to work in the industry and to be creative and innovative. It remains to be seen however for how long this high innovation – low job quality model will survive when the industry further matures, the workforce ages and organisational innovations leading to higher job quality prove their worth.

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7 List of Case Study Reports and Industry Profiles

| Case studies | |
|-------------------------------|---|
| GER-TRIPLE_A | Postels, D. (2017a). <i>Triple A</i> . Case Study Report for WP6 of the QulnnE project. Unpublished manuscript. |
| GER-SERIOUS_GAME | Postels, D. (2017b) <i>Serious Games</i> . Case Study Report for WP6 of the QulnnE project. Unpublished manuscript. |
| GER-INDEPENDENT | Postels, D. (2017c). <i>Independent Games</i> . Case Study Report for WP6 of the QulnnE project. Unpublished manuscript. |
| NL-CARE_GAME | Been, W. and Payton, N. (2017a). <i>Caregame: a serious games company in the health sector</i> . Case Study Report for WP6 of the QulnnE project. Unpublished manuscript. |
| NL-SERIOUS_EST | Been, W. and Payton, N. (2017b). <i>SeriousEst: an established serious games company</i> . Case Study Report for WP6 of the QulnnE project. Unpublished manuscript. |
| NL-SKILL_GAME | Been, W. and Payton, N. (2017c). <i>Skillgame: a serious games company out to train</i> . Case Study Report for WP6 of the QulnnE project. Unpublished manuscript. |
| NL-INDIE_COAL NL-GAME_COAL | Been, W., Keune, M. and Payton, N. (2017a). <i>Indiegames: two independent games companies and their coalitions</i> . Case Study Report for WP6 of the QulnnE project. Unpublished manuscript. |
| NL-SERIOUS_ENT | Been, W., Keune, M. and Payton, N. (2017b). <i>SeriousEnt: an entertainment games company gone serious (and the other way around)</i> . Case Study Report for WP6 of the QulnnE project. Unpublished manuscript. |
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| Germany | Longen, J., Postels, D. and Wefelmeyer, C. (2016). <i>Industry profile: Games Industry – Germany</i> . Report for WP6 of the QulnnE project. Unpublished manuscript. |
| Netherlands | Tros, F., Keune, M. and Payton, N. (2017). <i>Industry Profile: Games Industry - The Netherlands</i> . Report for WP6 of the QulnnE project. Unpublished manuscript. |
| Sweden | Mathieu, C. (2016). <i>Industry Profile: Games Industry – Sweden</i> . Report for WP6 of the QulnnE project. Unpublished manuscript. |
| UK | Luchinskaya, D., Green, A. and Wright, S. (2016). <i>Industry Profile: Games Industry – Sweden</i> . Report for WP6 of the QulnnE project. Unpublished manuscript. |

8 Annex – Summaries of Case Studies

GER-TRIPLE_A (Postels, 2017a)

Brief characteristics of structure and business strategy

The company Triple A (TA) is a German games developer that was founded more than 20 years ago. TA is one of the few developers in Germany that produce triple A games for PCs. The company also develops games for browsers and mobile devices. For almost 15 years, TA has been part of a group that employs some 10,000 workers in many studios worldwide. Since project teams form the basis of the company's organisational structure, there are no clearly defined departments. Production teams generally consist of between 30 and 40 people. Projects are coordinated with the aid of an agile project management system.

Important innovations in recent past

According to the employee representative, the collapse of sales in the browser games/ free-to-play segment, in which the company had hitherto specialised, made TA employees increasingly fearful of redundancies. In response, management introduced so-called 'bridging' or 'virtual' projects. These projects give employees an opportunity to retrain in new areas. For example, virtual games or virtual upgrades to existing games are developed, which are then subsequently assessed to see whether or not they can be used.

TA has recently put in place structures for managing exchanges of knowledge between the various actors in the studio. Various formats were introduced:

- Regular meetings: These meetings are intended to improve communications and the distribution of tasks and/or problems within the company but without creating a strong departmental structure. These meetings are held every six weeks and are attended by all members of the individual project teams.
- Online learning platform: The company introduced a world-wide training system in the form of an online learning platform. This comprises a large data bank with tutorials, teaching units and workshops that are supplied by the parent company

Key findings on interrelationships between innovation, job quality, employment and inclusiveness

The technical product and process innovations - the use of engines, the switch from browser /free-to-play to PC games development and the associated change in the business model (co-dev, move away from free-to-play to sales of PC games) have not had any direct consequences for job quality (working time, remuneration, autonomy/leeway in decision making). Even VR has not to date had any obvious consequences.

The most significant challenges that can be identified at TA are a) employment stability and b) the organisation of knowledge acquisition/training and internal knowledge exchange. Firstly, stability is being promoted by setting up so-called 'bridging' projects (virtual projects) and training programmes. Secondly, a 'bottom-up' approach has been adopted in order to improve knowledge exchange and the organisation of the innovation process.

Nevertheless, TA also pays low wages, as is common practice throughout the industry. Under these circumstances, TA benefits from the intrinsic motivation of its employees, who are keen to work in this more creative sector rather than in better paid positions in the IT industry.

GER-SERIOUS_GAME (Postels, 2017b)**Brief characteristics of structure and business strategy**

Company Serious-Games (SG) is a German limited liability company founded in 2009. It develops serious games in the health sector. The company employs a little less than 50 people on one site. It started with two projects: one on phantom pain (in adults) and one on learning difficulties (in children). The products are sold online in app stores. Of crucial importance to SG is the fact that it develops its products in close collaboration with universities, which makes it a distinctive player in the market. It is one of the few companies that offers serious games as learning or training aids for children whose entire contents are based on an academic study. SG has adopted a niche strategy (its 'hedgehog' strategy) in the small serious games market. This has involved seeking out a very small and narrow customer base from which the company can eventually expand. In this way, the target group remains manageable.

Important innovations in recent past

The management of innovation at SG has changed in recent years with the introduction of the agile project management system. SG was forced to adapt its project management practices to new demands. They introduced Scrum which is an iterative and incremental agile software development framework for managing product development. Fundamental to Scrum is the basic idea that software projects cannot be planned precisely over a lengthy period of time. Instead, the development process is divided into two to four-week cycles. Scrum structures the development process; at the same time, however, the company was faced with the problem that new ideas were getting lost. This is why SG has also introduced the ideas board into its product development process. Once in each sprint, each department presents its new ideas.

Key findings on interrelationships between innovation, job quality, employment and inclusiveness

SG clearly illustrates the challenges for working and employment conditions and for innovation that can arise in the course of the consolidation that takes place as a start-up gradually evolves into a stable company in a developing industry with few formalised structures or established routines to regulate work organisation or the negotiation of working and employment conditions. The core innovation at SG in recent years was the introduction of agile project management (Scrum). This has had positive effects on job quality. Employee satisfaction has increased and employees are reporting less overloading and better planning of upcoming tasks. Furthermore, the introduction of the ideas board has created an opportunity for articulating ideas and incorporating them into the planning process. SG has adapted more effectively to changed production processes, principally by shortening its production cycles. Process management has been decentralised and devolved to the team. At the same time, it can be said that there has been a reduction in work intensity at SG. However, it is a requirement of agile project management that team members are able to establish a permanent balance between quality and adherence to schedules when working under the time pressures that are an inevitable concomitant of short production cycles. It should also be noted that this innovation has had an impact only on the subjective criteria of job quality. It is clear that 'post-material' values, such as autonomy, meaning, creativity and cooperative working, predominate. Objective criteria such as the relatively low salary structure remain unaffected by the innovations that have been introduced.

GER-INDEPENDENT (Postels, 2017c)**Brief characteristics of structure and business strategy**

The company Independent (ID) was formed in 2011 as an independent games studio (a Gesellschaft des bürgerlichen Rechts or non-trading private company). ID started from a game idea developed by the three founders as part of their final-year degree project. Their idea won them regional grant funding, which ultimately enabled them to implement the project. To start with, the aim was to turn their idea into a game ‘without any long-term plan’ (producer). Over time, the project grew and the number of employees increased, so that they now employ more than 10 people at two locations. As well as their main project, ID is also contracted to develop apps (including serious games) for various organisations. The company follows two business strategies: a) the company’s own projects financed with their own capital, funding from the publisher and commissioned projects and b) commissioned projects – usually for public institutions – to refinance the company’s own projects.

Important innovations in recent past

As ID won more contracts and employed more staff, it was forced to change its process management system. At the beginning, projects were organised following the waterfall approach. They therefore attempted to introduce a Scrum approach. Scrum is a project and product management model for agile software development. The Scrum process was adapted to the needs and requirements of the team so that they now use a mixture of the Scrum and waterfall methods. However, the introduction of the Scrum method is still not complete.

The second important innovation concerns working time. ID introduced timekeeping records. A special piece of software was installed that staff have to run at the start of their working day. It records the total working time spent by staff on each project and also covers hours spent in meetings. Additionally, they introduced flexitime arrangements, which only became possible with the introduction of time tracking. For a few months now, staff at ID have had the option of taking time off in lieu of overtime.

Key findings on interrelationships between innovation, job quality, employment and inclusiveness

The core innovations at ID concern time. A key focus here is on the planning and implementation of past and future projects. ID introduced a version of Scrum, adapted to its requirements, as a project management tool. The aim is to improve future project planning by systematically recording time spent on the various development stages. Ideally, this will mean that projects are completed on time without time pressure, and that crunch times – a typical problem in the industry – will be reduced.

Another focus is on staff working hours. In this context, ID introduced a stand-alone time-tracking tool. This tool not only provides planning certainty for project management, but is primarily intended to create transparency about staff working hours to combat the overtime culture. In this context, flexitime arrangements were recently introduced so that staff can take time off in lieu of overtime. At the time of the interview, it was not yet possible to tell whether the introduction of the working time tools will actually have an impact on employee working hours.

The comparatively low pay structures are unaffected by the innovations that ID has introduced. Nevertheless, ID is attempting to compensate for the poor financial aspects with good working conditions: from a pleasant workplace and a good atmosphere to time off in lieu of overtime

NL-GAME_COAL (Been et al., 2017a)**Brief characteristics of structure and business strategy**

The core company of this project-based coalition consists of the two founders of a company originally established by three friends to develop an educational entertainment game with the purpose of conveying a particular message. They have been engaged in both developing their own games and, to generate money, work-for-hire projects for external clients. The company has never had employees, but it recruits extra people through informal networks as needed for projects, thus forming project-based coalitions typical for a large section of the Dutch games industry. At the time of the interviews, the company had been subcontracted by a larger games company for a relatively large-scale project for which they subcontracted some fifteen self-employed freelancers and interns. It is the largest project they have been contracted for so far, which meant they were able to contract more freelancers as opposed to low- or unpaid interns, pay what were described as going hourly rates, and offer a relatively long period (eight months) of fairly constant work. It also meant a significant improvement of the company owners' own earnings, who had experienced very meagre years since the founding of the company.

Important innovations in recent past

The major upscaling of the coalition around the core company and attracting a project manager for the project were the most important innovations in the recent past. Although temporarily upscaling itself has been common practice, upscaling to the extent that they have for this project is unique in the core company's history, with notably an increased use of experienced freelancers as opposed to interns. The freelancers were taken on to guarantee higher quality of work than possible with interns and the project manager was attracted to shield the rest of the team from the changeable and chaotic external circumstances (e.g. delays in the delivery of content from third parties) and create some calm in the working process and work environment. The interviewees further described several product innovations they were implementing in their own games (not for the project).

Key findings on interrelationships between innovation, job quality, employment and inclusiveness

To begin with the product innovations, these were generally described as unique conceptual functionalities or messages being conveyed through games. The former, and to a lesser extent the latter, also imply technological innovations to be built into the games. Two important conditions were described for these innovations to take place: first, an independent business model in which there are no financiers who can reject unorthodox and therefore risky (in terms of market) innovations. Second, the long lead time for the completion of such innovative games during which no income is generated requires a low burn rate for the companies (or individuals) developing the games. This makes such developers unwilling to employ people. Consequences of these conditions are low and volatile income and virtually no employment-related social security coverage (i.e. unemployment and disability insurance, pension), in particular for early career workers. This then has adverse effects on inclusiveness because it excludes those with care responsibilities at home and those lacking a social support network (the "I can always move back in with my parents" option).

The social innovations found in this case study, i.e. upscaling using mainly properly paid freelancers and the addition of a project manager, were good for job quality in terms of pay, the longer period of safeguarded income, relatively stable and normal working hours, and learning through skills transfer between coalition members. The innovations were most importantly made possible by the higher available budget associated with the large project. The acquisition of a large project, however, is contingent on the survival of a company (or freelancer) long enough to build up a convincing portfolio and sustained and successful networking for acquisition. This survival period is often characterised by low job quality as described above, and as evidenced by the high death-rate of small companies in this sector, many entrepreneurs do not actually make it so far.

NL-INDIE_COAL (Been et al., 2017a)**Brief characteristics of structure and business strategy**

IndieCoal is a small independent entertainment games company, a business partnership of four people who met during formal education in a games-related programme. It has existed for four years and recently launched their most important product, an independent entertainment game with a societally relevant message. Income was generated in the meantime through subsidies and project work in serious games for paying clients. Nonetheless, earnings are still below minimum wage, there is no coverage of unemployment and disability insurance, and there is periodic excessive overtime (crunching). Their goal as a company is to create independent games with a strong visual element and use of storytelling to convey a message. They launched their latest game without a publisher but do not exclude the possibility of going through a publisher in the future, as it may help them with marketing. At the time of the interview they were struggling with the business and marketing part of the launch of their main game after having had to let go someone who had been working on marketing on a no-cure-no-pay basis.

Important innovations in recent past

No major innovations were described for the company itself, but an important technological innovation in the sector as a whole was described to have taken place between about five and ten years ago: the simplification of programming and the lowering of technical skill requirements for making games. In the words of our interviewee, this made the games industry less elitist and much more accessible. It led to a mushrooming of small games companies in the Netherlands which later became known as the “Indie bubble”. The simplification of the technical side of games making was moreover accompanied by an increase in formal education programmes related to games-making and the popularisation of the games industry as a “hip” industry, making it attractive for young people. The bubble burst as the sector became overcrowded and resources became scarce.

Key findings on interrelationships between innovation, job quality, employment and inclusiveness

The increased accessibility of the games industry in terms of technical requirements, the “hip” image of the industry and the large offer of formal education programmes (both at secondary vocational and tertiary levels) resulted in a large influx of predominantly young people into the sector in the form of micro-companies, mostly independent (i.e. non-funded) business partnerships, of which this case is a prototypical example. These dynamics has eventually led to an overcrowding in the sector accompanied by high competition and high death-rates among companies, and have had obvious negative consequences for job quality among start-up companies: low earnings (not uncommonly below minimum wage and occurrence of no-cure-no-pay arrangements), no coverage of employee insurances (unemployment and disability) and pension plans, severe working time fluctuations and regular occurrence of excess overtime (“crunching”, especially in the final phase of game development), and low job and income security. Partly, this pattern is facilitated by the fact that many people working in these start-ups are young, with few responsibilities in terms of care and fixed costs (mortgages). Income is generated through subsidies and project work for clients, but eventually most companies are faced with such dilemmas as going through a publisher (which means giving up some autonomy) or not, spending more time on project work or own work, or even folding or persevering. As also mentioned in the earlier case, this tends to exclude persons with care responsibilities and those lacking a social support network functioning as a back-up for subsistence.

NL-SERIOUS_ENT (Been et al., 2017b)**Brief characteristics of structure and business strategy**

SeriousEnt is one of the earliest successful serious games companies in the Netherlands, established by four friends, three of whom had studied game development together. Its size has fluctuated over the years and at the time of the interview they employed about ten people, of whom one in a supportive role and the rest in games development. Even within serious games they have always leaned towards the entertainment side, and have recently decided to try to move away from serious games to more purely entertainment games. This change was most importantly decided on to bring back the fun in the work, to appeal to what the founders originally established the company for. Job security is now high, with most employees having been part of the company for many years. Wages were described as near-competitive and other working conditions were also said to be high, with much room for employee input and generous arrangements for e.g. parental leave and a personal budget for work-related purchases (e.g. training or specific hardware).

Important innovations in recent past

The most important recent innovations have been a change in work organisation over the past five years or so and the more recent shift in the business model. The change in work organisation was realised by introducing the Scrum method of working on projects and by efforts to improve communication within the company. For both, external support was contracted in the form of consultants. Although the work process did improve, both the work and the end products were experienced as less fun. In order to bring back the fun, considered an essential element of job quality and the reason the company was once established, a shift in business model was decided on: from a project-based serious games model to a dual model of combining project-based entertainment-flavored serious games (the “cash cows”) with working on entertainment games to be sold to publishers or end consumers. Intrinsic job quality rose as a consequence, entertainment games allowing for “letting the creativity flow” and implementing “crazy ideas”. However, it also meant the dismissal of about two thirds of the workforce to bring it back to a small core whom the directors considered capable of being truly creative, further necessitated by the slowdown in cash flow.

Key findings on interrelationships between innovation, job quality, employment and inclusiveness

This case illustrates how in the creative industries, including the game industry, it is the creativity of the workers that is considered the key ingredient for success. Also, workers are often highly intrinsically motivated and give a high importance to being able to express their creativity. It is therefore vital that the company provides interesting projects to work on and a work organisation and working environment that allow creative workers to express themselves, including substantial autonomy. In this sense high job quality is a precondition for good performance and also for innovation in products. The innovation in the business model can then be seen as an improvement in job quality that allows for creativity and satisfaction. At the same time, this is only true for part of the original workforce of 30. More than half of them were dismissed, because of less available work but also because they were not deemed fit for the more creative and autonomous work of entertainment games. Hence, in the creative industry there seems to be a divide between the highly creative, intrinsically motivated and autonomous workers and those who are “basically good at doing the same trick over and over again”.

The innovation in management with the introduction of Scrum has improved communication and cooperation in the company, reduced the need for excessive overwork, and reduced the incidence of “bugs” in the end products. At the same time, it has structured the work more tightly, which leads to some tension with autonomy and fun, i.e. between efficiency and creativity. This tension is a core issue for the creative industry where high job quality is required to allow for creativity, but where efficiency is required to be able to find clients who can or want to pay for the product.

NL-SERIOUS_EST (Been and Payton, 2017b)**Brief characteristics of structure and business strategy**

SeriousEst is a serious games company working with a project-based business model, developing products on-demand for specific clients, both in for-profit and non-profit sectors. It is one of the oldest serious games companies in the Netherlands. It directly employs some forty persons, the vast majority involved in games development and a few persons in managing and supportive roles. High intrinsic job satisfaction and employees' high intrinsic motivation were emphasised most in terms of job quality, but job security is also high, wages are near-competitive and there is full coverage of employee insurances (unemployment and disability) except for the self-employed who make up between 10 and 25% of the total workforce at any given time. Challenges were described as the fluctuation in project flow and how to get the most out of employees' talents. Employees talked about a high workload and unpaid overwork, although it was not described as problematic.

Important innovations in recent past

Two innovations stand out, both of them organisational but partly motivated by the company's observations on what are conditions for product innovations. First, in the last four to six years the company has become more critical in its hiring and retention. In the hiring process, candidates are questioned more explicitly on their identification with the company, warned that you do not join this company to get rich, elaborate portfolios are prioritised over formal education as proof of intrinsic motivation, and more people are involved in the hiring process. In retention, there are regular reviews of 'who gets picked first/ last' when putting together project teams and those who are 'picked last' are engaged early on in a personal conversation about their place in the company. The second innovation was the appointment of a formal HR manager who then proceeded to formulate a personnel policy explicitly directed at increasing employees' autonomy and expression of craftsmanship, as these were found crucial for product innovation. The most important concrete policies were a system of self-reporting workload to improve the use of employees' slack time and a major effort at mapping employee skills and interests in order to better match them to projects, fostering more ownership over projects, and improve opportunities for learning by doing.

Key findings on interrelationships between innovation, job quality, employment and inclusiveness

Tapping into individuals' skills and motivations is seen as the major source of product innovation, further enhanced by putting together interdisciplinary teams and matching employees to the projects they are most skilled and motivated for. The social innovations described above are therefore primarily aimed at capitalising on this, with an emphasis on making sure the company has the employees with the appropriate skills, talents and motivation, and maximising employee autonomy and ownership over projects. This seems to result in an overall high intrinsic job satisfaction, with employees who are willing to sacrifice wages for interesting work (that is to say, they could earn more doing duller work elsewhere) as well as voluntarily engaging in unpaid overwork. In combination with the constant fluctuations in project flow, however, high intrinsic motivation and project ownership do seem to lead to high workload and regular occurrence of overwork. High autonomy was also mentioned as causing some starting employees to 'flounder'. The periodic performance reviews may further lead to stress, although this was not reported.

The fluctuating workload was further cited as a reason for keeping wages lower than the same employees might be paid elsewhere, the irregular occurrence of end-of-year bonuses, and structural use of self-employed persons. An alternative business model based on major investors or takeover by a larger company would lessen the financial pressure and potentially allow major innovations that were said to be highly capital-intensive, but has been rejected so far in order to retain the company's autonomy. Although it may improve extrinsic job quality, such a business model was also feared to lower the intrinsic job quality so importantly experienced by the employees.

NL-CARE_GAME (Been and Payton, 2017a)**Brief characteristics of structure and business strategy**

Caregame is a young start-up that develops and sells several ranges of serious games designed for specific target groups in the care sector. The games are played using a specific piece of hardware, also sold by Caregame. This means their business model is not project-based but rather product-based, being able to sell the same products to multiple clients. Additionally, Caregame provides services such as installation, training users/ consumers, and follow-up services, a so-called product service system. At the time of the interviews Caregame employed nearly 30 people, of whom about a third were involved in games development. Job quality is high, with high intrinsic job satisfaction, fairly high job security, near-competitive wages, and applicability of employee insurances (unemployment and disability). On the other hand, workload was described as on the high side, there is no pension coverage yet, and no structures for education and training.

Important innovations in recent past

The major innovations in the recent past were a product innovation targeting new target groups in addition to the original single target group, and two social innovations: organisational changes related to employment expansion, the formalisation of working conditions supported by a contracted HR consultancy, and the introduction of software integrating several departments of the company. Further employment expansion is still expected in the near future, most notably with an HR professional. Challenges associated with the implemented innovations are the lack of knowledge about the market involved with the new target groups and the associated market risks, most keenly felt with regard to the responsibilities attached to an expanding workforce.

Key findings on interrelationships between innovation, job quality, employment and inclusiveness

The CEO interviewed for this case study frequently quoted the high intrinsic motivation present in all employees of this company, to such an extent that as individuals they were willing to sacrifice higher wages (especially those hired in the initial start-up phase; later wages were made more in line with the market) and as a company they prioritised contributing to the lives of their target groups over market considerations. The latter has actually allowed for some of the product innovations to take place: extensive game development for new target groups took place before it was established whether the market was large enough for it to be profitable, an innovation less likely to take place in a more commercially-minded enterprise.

The expansion of the workforce was made possible by the commercial success of the initial product. The expansion included some game developers but mainly non-games development staff (e.g. in finance, marketing, sales, and services). This has resulted in a much more diversified workforce in terms of gender (more women), skills (especially business and service skills), and age (more older workers). The inclusion of more business skills and knowledge into the company was highlighted as necessary for the company to survive amidst more aggressive competitors, and is thus expected to contribute to continuing job security and safeguarding of primary and secondary working conditions.

The formalisation of working conditions initiated in cooperation with the HR consultancy has made personnel policy and secondary working conditions more transparent, predictable, and thereby probably more accessible. In line with this development, there are talks about making available a pension plan. The integration of software across departments (e.g. customer relations, finances, HRM) was initiated in order to decrease the workload for the office manager in particular, but also across departments by eliminating excessive copy-pasting between Excel files. It was also implemented to curb employment expansion; the CEO shows high willingness to be a good employer in terms of working conditions and job security and therefore responds at the same time to the market insecurity felt due to persistent budget cuts in healthcare by trying to limit expansion.

NL-SKILL_GAME (Been and Payton, 2017c)**Brief characteristics of structure and business strategy**

Skillgame uses games to teach people a set of specific skills. It sells trainings complete with custom-made games, in other words: a product service system. Clients are mainly NGO's, public and semi-public institutions. The company started some three years earlier as a project on the side for the two founders who worked outside of the games sector. The first years went into thinking out the philosophy, and the first game was actually developed over the course of 2016, for which a games company was contracted. By the end of 2016 the project had become too large to do on the side, and the company became the founders' main occupation. They also then switched from contracting game development work to producing the games in-house. At the time of the interviews they had two employees working on a new game and one self-employed freelancer who had worked on the previous game and continued to work on customising it for clients. The employees were very satisfied with both intrinsic and extrinsic job characteristics. The founders were not generating an income for themselves yet. The major challenges now are establishing and gaining market presence.

Important innovations in recent past

The decision to produce the games in-house was a major organisational innovation which was accompanied by starting to phase out the older subcontracted game in the trainings and developing a new one. Producing games in-house meant employing game developers, one programmer and an artist/ game designer. The co-founder expressed a preference for employing rather than contracting people because he feels employees will identify more with the product, philosophy and idea of the company, which he finds important. He also thinks good working conditions (decent pay, challenging work, opportunities for professional development) benefit the quality of the work. For the new game production, the company furthermore implemented the Scrum method of working in which they are assisted by a senior manager in the software industry who is paid on an hourly basis for his services. The self-employed games developer continues to work with the company as the old game is still being used for trainings and customised for each client.

Key findings on interrelationships between innovation, job quality, employment and inclusiveness

The hiring of two games developers for the in-house production of games has certainly improved working conditions. Compared to the self-employed worker, the employees enjoy much higher subjective job security as well as higher earnings and coverage by employee insurances. Both employees expressed high satisfaction with being in paid employment rather than being self-employed because of the security and the fact that business and acquisition activities are not necessary: it allows them to focus on the work they enjoy doing. At first sight it seems atypical for a games company so young to hire employees rather than work with freelancers, but it may be related first, to the fact that the co-founders came from outside the games sector, and second, to the product service system business model (see also Caregame) which is product-based rather than project-based, which tends to generate a more stable turnover because lead times are shorter and it may be easier for potential clients to assess the added value of the product.

The change to in-house production and the introduction of Scrum further seem to have significantly improved the work process. The workflow has been fairly continuous for the two employees so far and there have been no instances of crunching, whereas the freelancer has experienced instances of crunching even recently: spending eleven or twelve hours a day building games in real-time as the founders were giving a training using those games. Although this also had to do with late delivery of content from the clients, the use of Scrum allows for a more structured work planning and those involved learn through the process how much time certain tasks take. The early stage in which the new game's development is still in makes it difficult to determine whether the improved working conditions and work process have also led to improvements or innovations in the product.

SW-AAA_STUDIO (Mathieu and Rehnström, 2017a)**Brief characteristics of the company structure and business strategy**

SW-AAA_STUDIO is a large AAA game development studio in Sweden. The company is part of a larger games company, but started out as an independent studio (i.e. it was not opened as a subsidiary studio in a larger company) and despite being owned by other companies the studio has retained its own image, culture and to a certain extent, operational autonomy. In addition to developing games of its own, but especially games based on acquired IP, the studio has also developed a game engine, which is the platform for its recent games and is shared with the rest of the parent company. The studio has developed highly successful projects, and is currently developing another major investment acquired IP project that will provide economic stability for the studio for the foreseeable future. The studio is continuing to grow, and has difficulty hiring sufficient staff despite being an attractive employer. The studio operates as both a lead and support studio on the parent company's projects, and currently is ramped up to be lead on two major projects. Face-to-face interaction within and between cross-functional workgroups is important to the company, and thus co-location and physical proximity for the staff is important.

Important innovations in recent past

SW-AAA_STUDIO has developed its own game engine (developed and maintained at the studio, but is the property of the parent company). This technological innovation is important for several reasons: 1. It symbolically demonstrates the technological prowess of the studio; 2. It gives the studio two "feet" to stand on, game development on the one hand, and platform technology on the other, leading to a broader variety of work tasks and occupations employed at the company, as well as a higher volume of work; and 3. That in game development many more creative solutions are possible as the technological base for the game can be created or modified to meet custom requirements. In other words, the game engine increases creative freedom in development in part because given solutions are not readily available along the contours of a standard game engine, as well as because there is direct contact with the creators of the game engine. Needless to say, the development of a game engine is a tremendous investment, but the benefits are believed to outstrip the costs. That is important both on a symbolic level as well for their own productions of games.

Organisational innovation also takes place. The completion of a major project as lead studio has led to an internal evaluation of what worked well and less well. While still based on an Agile model, the management structure has been changed to afford more operational autonomy and initiative to individual work-groups, which now have a more cross-functional composition. These are clearly seen by the game-developers as positive developments allowing them to work more comprehensively and autonomously within their own groups.

Key findings on interrelationships between innovation, job quality, employment and inclusiveness

A major finding of this case is the importance of being able to develop a new work method based in the experience from previous projects. This is facilitated by a sufficient degree of operative autonomy from the parent company (i.e. work-organisation is a matter for local management decision-making) and that there is consultation between management and employees on how to optimize the development process – showing worker involvement in organisational management decision making, resulting in more capable and operationally autonomous workgroups. Another central finding is the importance of technological capacity alongside game developmental capacity. The creation of a game engine at the studio is leveraged in several contexts, and even played a role in bringing a major external IP project to the studio. A further central finding is the motivational dimension of working on large, high-recognition games similar to the games the employees play in their leisure time. This provides an incentive to work for this company and extend discretionary effort, but it also means that "playing" similar games on one's leisure time is also a way of learning more about what has been done, hasn't been done and could be done in the games they develop during their worktime – i.e. a leisure to work innovation potential spill-over.

SW-MOBILE_GAME (Mathieu and Rehnström, 2017b)

This case study only contains one face-to-face interview. It is therefore a small case study, but it plays a significant role in the total understanding of the computer games cases in Sweden as it is an independent company and thus a contrast to the other two cases which are studios in larger games companies.

Brief characteristics of the company structure and business strategy

SW-MOBILE_GAME is a small company with just over 10 employees. The main focus of their production is games designed for handheld devices, primarily based on manual dexterity. The products are available for both iPhone and Android and a game is being developed for Apple TV. SW-MOBILE_GAME has its roots in the mobile phone industry and began to create games in the early days of games to handheld devices, which gave them certain “first-mover” advantages. Despite being a small company, there is a high skill level among their employees, and this plays a leading role in the company’s strategy. By developing technologically sophisticated products the company impresses the reviewers writing reviews and promoting games at vendors and review sites (App Store, Google Play, etc.), it meets the demands of a discerning playing public, and probably most importantly (and highlighted by the CEO) it keeps the employees motivated and makes recruitment and retention possible, as the employees want to work on technologically interesting projects. The company’s aim is not to put out as many games as possible, though it produces one per year on average; instead their focus is to put out high quality games that players can play for a longer period of time.

Innovation-Job quality connection

The company has from its founding been technology-heavy and hires highly educated engineers. Like the other two Swedish companies, both of which are much larger studios part of parent corporations with thousands of employees, this company also builds its technological base more or less from scratch and adopts it to the host platforms its games can be played on. Like the other two Swedish cases, the primary form of innovation is new game development and technological development simultaneously to facilitate the construction of the games envisioned. As the CEO states, it is the technical challenge of building these technologically sophisticated games that make working at this company attractive.

The centerpiece for the company is a high-quality, technologically sophisticated game, which may not sound revolutionary, but the orientation is unusual, as most games are built on standardised technologies around a payment model, and at this company the game comes first, then a payment model is integrated into it. A further innovation is a foray into developing a game for Apple TV. While this is a new platform, it is in keeping with the founding strategy of the company of being early in developing games for new game environments, just as moving from iPhones to Android once was.

With regard to organisational innovation, the company has gone from working on a single project involving everyone at the company to now having two projects going at the same time, but also tries to allow people to move fluidly across the projects, with the only divisions among employees being that between two different technical specialisations – graphic artists and programmers. But otherwise, the company has retained its flat structure, where everyone (including the CEO, but excluding the CFO) are engaged in development work.

Key findings

The main finding of this case is how a small, highly technologically oriented company can continue to put what essentially is job quality – the opportunity to work on technologically sophisticated products (despite the availability of cost-saving options) – at the heart of its business model. This, according to the CEO, allows the company to continue to produce technologically sophisticated products that impress reviewers and lead to positive publicity and placement in vendors’ features sections, find users who spend extended periods of time with the games, and most of all, attract and retain highly educated and motivated employees. This functions as an advanced technology based virtuous circle, ensuring product innovation via high job quality.

SW-PHONE_GAME (Mathieu and Rehnström, 2017c)**Brief characteristics of the company structure and business strategy**

SW-PHONE_GAME is a medium sized studio and is part of larger company with 10 studios in several countries across the world (which in turn is owned by a larger publisher). It develops free-to-play games with purchasable premium functions for handheld devices that can be played on almost any format. The company's business strategy is based on a mass play strategy (millions of players across the globe, with only a small, but cumulatively lucrative percentage who pay for premium functions). It also leverages its past successes, capitalizing on highly successful hit game franchises and embedding adverts for its new games in them. It seeks to create new hits via a development "churning" strategy with high investment in new game development, very few of which get past the prototype stage and then as mentioned, exposing players of existing games to new games developed by the company (embedded marketing). The company extensively uses analytics from the user-data generated by the playing of its games. The studio has between 50-100 employees, most of whom are working with game development and some in support functions for the local studio and global company. The studio started in 2010 after the company had launched its most successful game. The parent company saw the need for expansion which resulted in several new studios of which SW-PHONE_GAME is one. The studio is located in the city chosen largely due to the existence of skilled labour and skill pipelines in the region (vocational and tertiary education institutions). The studio relies on their own technical and knowledge infrastructure with a high level of peer-to-peer learning; with all development being done within the company's studios. Though the studio has a degree of operative autonomy, it is highly integrated into the parent-company's web of studios, in distinction to SW-AAA_STUDIO for example (SW-AAA_STUDIO was an independent studio acquired by a larger company, SW-PHONE_GAME started as a subsidiary, so founding, as well as corporate strategy can play a major role in this condition).

Important innovations in recent past

SW-PHONE_GAME develops innovation on several levels and both in game and organisational development spheres. The company has the goal for their products to be available to everyone and almost any device. The games must be able to be played on a poor quality mobile telephone network for example. These technical requirements entail that the company develops its own technology infrastructure and engine, compatible with the various host platforms (i.e. Android, Apple, Windows, etc), investing highly in technological R&D, which is shared across the company. In other words, in new game development there is also a basic need to develop novel technological solutions that can deliver new games with new features playable on multiple platforms with limiting technical requirements. While this is a recurrent need for all the company's products, the solutions are unique for each product. Technology development is shared between the local studio, and the other studios in the company. Another parameter is that all games are free to play and a player must be able to finish them without spending any money, though one can also make purchases within the game to gain advantages. Product innovation is largely a result of the abovementioned "churning process" where a large number of small workgroups develop ideas then prototypes for new games within the same genre as the company's previous games. As the business strategy is oriented towards blockbuster hits, very few of these projects, essentially R&D investments, are realised.

SW-PHONE_GAME (continued)

Organisational innovation primarily takes the form of attempting to structure and “regularize” what essentially is an Agile, start-up like production process. Rather than imposing a top-down structured management model which would be met with a high degree of resistance within the studio and probably the broader company, the studio attempts to develop tools that are based upon a locally perceived need and voluntary adoption and application.

Key findings on interrelationships between innovation, job quality, employment and inclusiveness

The case study of SW-PHONE_GAME provides knowledge about a medium sized studio struggling with a number of challenges: trying to maintain an optimal, familiar size – not too big, not too small, continuing to develop existing franchise products while also trying to produce a new blockbuster (and thereby dealing with chronic frustration of not seeing one’s ideas realised), trying to regularize and normalize processes and procedures without creating the impression that the company is going corporate and crushing creativity. In essence, a process of going from a familiarity based management structure to increased routinisation and facilitative but directive leadership without quelling creative motivation. The unique dimension of this case is that these processes take place within a highly integrated parent company structure. This means that most innovations are shared and dissipated through co-creation and diffusion throughout the wider company, making them on the one hand harder to see as unique and distinct from the perspective of the individual studio, but also more pervasive.

SW-PHONE_GAME also has a relatively high number of female employees (ca.25%) and a fairly high foreign-born population and a progressive attitude towards sexual orientation and expression, which is linked to the nature of the games developed and the open climate of creative and social tolerance within the studio. A link between the social and creative/innovation climate was posited.

UK-HUB (Wright and Green, 2017)**Brief characteristics of structure and business strategy**

UK Hub is based in a university located in the east of England. It was set up in 2014 to provide specialist entrepreneurial support to aspiring games developers before and during the early stages of business start-up. It provides the developers with the chance to learn from experienced games developers and to bring their game ideas to market. In the three-year period since set up, three cohorts of more than 50 participants have completed the 40-week training programme and five start-up businesses have been spun-out out of the UK-HUB.

In terms of the overall picture of job quality, a ‘risks versus rewards’ decision-making process was clearly evident among the workers who had spun businesses out of the hub. On the one hand, the co-owners of the small businesses all experienced insecure or precarious income, long working hours and relatively poor work-life balance. On the other hand, the level of perceived intrinsic job quality was high as they found their jobs interesting, challenging, varied, collaborative and creative. None of the owners of the spin-off companies were yet in a position to pay themselves a regular wage. Some hold down second jobs while others have taken on contract work to tide them over until their games are released or they secure financing. They all reported working long hours and viewed long hours and ‘crunch’ as an inevitable part of working in the industry. Perhaps more interesting, the culture of long working hours involved an element of voluntarism, as it was linked to the quest for creative excellence (i.e. intrinsic job quality). None of the companies were large enough yet to hire permanent employees, however several start-ups have engaged contractors from time-to-time to work on specific tasks.

Breaking into the games industry can be extremely difficult, even among those who have completed degrees in relevant fields. Employers prefer to recruit people who can demonstrate that they have already been successful in making their own games. That is, employers tend to ‘buy in’ skills at the point of recruitment, as new recruits are expected to already have a portfolio of work. The small number of large studios and the rapidly changing nature of games development makes it difficult for people to get work experience. Another main barrier faced by the spin-off companies is access to capital. While UK policy makers see the creative industry as a key sector for economic development and important to local and regional innovation, it is difficult for small start-ups to access grants or funding. They typically have to prove their success before they can access funding. Further to this, the market is highly competitive and they have to compete with large, well-resourced multinational publishers.

Important innovations in recent past

The way the UK Hub operates – including how it is led – is regarded as an innovation in itself. Hubs are nothing new and neither is entrepreneurship training. However, the innovation in UK Hub lies in how it combines provision of tailored training with provision of specialist mentoring. In combination, the novel practices enhance innovative capacity, foster creativity and entrepreneurship, contribute to local economic development, shape work practices and stimulate employment generation.

Key findings on interrelationships between innovation, job quality, employment and inclusiveness

This case highlights how computer games developers identify as creative entrepreneurs and that they place high value on the sense of (perceived) autonomy they derive from working for themselves. The independent game developers choose – albeit a constrained choice – to sacrifice pay and job security in order to pursue their creative ventures. For innovation to occur, it is important to create the right

UK-HUB (continued)

environment, culture and networks to foster entrepreneurship and creativity. The emergent creative, collaborative and supportive environment of the hub is linked to the philosophy, commitment and enthusiasm of the hub leader, who shares insights about the industry and freely provides access to his external networks.

Similar to the UK computer games industry as a whole, ethnic diversity is low and people from traditionally socially excluded groups find it difficult to enter the industry. Workers in the hub spin-off companies are highly skilled, degree-qualified, young and predominantly male. The hub leader is trying to improve diversity by not restricting participation in the training programme to people with previous experience or to university alumni. He engages with local high schools and vocational colleges to promote the games industry as a career and he attends industry events, such as events organised by (UK) Women in Games. He has identified parts of the creative industry that tend to attract more women such as designers, artists and musicians and he hopes to attract them into computer gaming. Whether the hub is judged as being successful depends on the metrics used to evaluate its results. As an investor, the university may look for quick results in terms of the number of new business start-ups and how many jobs these businesses can generate. The hub leader has a more modest long-term vision, perhaps consistent with the notion of 'patient capital'.

UK-STUDIO (Wright et al., 2017)**Brief characteristics of structure and business strategy**

Opened in 2009, UK Studio was acquired by a European multinational games publisher in late 2013. The studio has around 60 employees and is now focussed on developing exclusively free-to-play (F2P) games for smartphones and tablets. It has created IPs for apps that have been commercially successful in the global apps market. The studio has one main premium title with two app versions (one for Apple iPhone and Google Androids and another for older handsets such as Nokia). It also has a number of other sports-related games, but these games have not been as successful as its premium title. It is also working on other (not yet announced) F2P projects. It has also been collaborating with Google on developing a virtual reality (VR) game. At present, 90 percent of the studio's income is generated outside of the UK where one third of revenue is generated by advertising and two-thirds from monetarisation via in-app purchases.

The studio aims to be an attractive employer in order to attract and retain its skilled workers and job quality is very high. The studio almost exclusively uses full-time, permanent contracts and there is a strong preference for doing so. The studio recognises that the base pay may be lower than other UK competitors however it offers a range of financial and non-financial benefits that means the overall remuneration packages are competitive. In terms of working time arrangements, 'crunch' is considered avoidable, where long and unsociable working are discouraged. The work is varied, interesting and highly skilled so the workers have high intrinsic job quality. However autonomy and discretion are mediated by the use of agile/scrum software that is used to allocate and monitor tasks. At the same time, good planning means that workloads are carefully managed. The studio has invested heavily in the physical and psychosocial aspects of working conditions.

One major challenge faced by the studio is difficulty in attracting and recruiting workers for a number of specialist roles such as programmers, business intelligence analysts and monetarisation specialists. While the studio recruits in the UK and globally for highly specialised roles, it has had to resort to bringing in contractors for the hard-to-fill roles. To attract workers, the studio has introduced a profitability bonus, extra annual leave and an enhanced maternity leave package.

A second challenge relates to the rapidly changing nature of the mobile games market. Launch of the Apple iPhone was a major development, followed by Google Android. A single global marketplace developed very quickly. Soon thereafter, on-line app stores were established. The studio moved quickly from a pay-to-download business model to a new 'freemium' business model to respond to the market.

A third challenge relates to access to capital. Prior to being acquired by the parent company, the studio was limited by access to capital. Thus, one of the main attractions of selling the independent studio to the publisher was because it opened up substantial access to capital for advertising. Another major benefit of was that the publisher has large, dedicated resources for business development. As a result, the studio has been able to access new markets that it would not have been able to do on its own. For example, the publisher's development team were instrumental in the studio's title game breaking into the Chinese market. The game has since been downloaded 30 million times and more than 800,000 players in China.

Important innovations in recent past

The market for F2P mobile game apps has developed very fast and has undergone a number of changes that have shaped the innovation processes at play in the studio. The company has implemented a number of technological innovations, both in terms of products and processes. The company has also implemented a range of related non-technological innovations, in terms of marketing and organisational innovations.

UK-STUDIO (continued)

The main innovation relates to the studio's decision to change its strategy from pay-to-play to free-to-play (F2P) business model. This new business model involves producing a high quality, F2P version of the game with three individual add-on products. The add-ons are inexpensive to make and are sold in-game, with the studio becoming an early adopter of monetarisation via in-game micro-transactions. The new business model was adopted to drive customers to paying products after they download the free game. Various, product, process and marketing innovations were all necessary when shifting to the new business model.

Key findings on interrelationships between innovation, job quality, employment and inclusiveness

The shift to F2P has meant the company has had to cope with changing skills requirements. The critical role played by monetarisation via in-app purchasing means that programmers, data analysts and marketing staff all need highly specialised skills. The studio typically 'buys in' these specialist skills but it continues to experience difficulties in attracting and retaining staff. A range of monetary and non-monetary benefits have been introduced to increase its attractiveness as an employer.

Availability of capital from the parent company has been vital in giving the studio the time to produce high quality games. Public support, by way of a recently introduced UK tax relief scheme, has made the UK an attractive destination for investment and was considered extremely important for the studio. As global publishers increase their presence in the mobile games market, it calls into question the long term viability of independent studios (and self-employed games developers). As millions of apps appear in the app stores every day, patient capital, large marketing budgets, business development expertise and sophisticated monetarisation and social media strategies are all vital to success and survival. It seems that the early days of one person developing a huge success (aka Minecraft or Candy Crush) are over.

The use of Agile/scrum software to manage the production process appears to have been done very effectively by the studio, in particular in avoiding 'crunch'. The software alone cannot fully explain how this studio avoids long and unsociable working hours. The senior management team has embedded work-life balance into its culture. A range of initiatives have been implemented to improve the inclusiveness of its workplace. While all staff benefit from these initiatives, the studio aims to be an attractive place for women and migrants (albeit highly qualified, university-educated) to work. While the company has a higher proportion of females and foreign workers than found in the UK computer games industry as a whole, the studio does not recruit from other traditionally 'vulnerable groups' such as the low-skilled, unemployed or mature workers. The computer games industry is a new industry so it has not come to grip with issues surrounding an ageing workforce. As the industry matures, computer games companies may need to look at strategies aimed at increasing the 'stretchiness' of jobs in order to retain older workers.

CHAPTER 7 – The digitisation of warehousing work. Innovations, employment and job quality in French, German and Dutch retail logistics companies

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1 Introduction: the embeddedness of disruptive innovations

The storage and distribution of goods has been the target of fundamental changes in the past which can be linked to two major trends: on the one hand a more longstanding ‘supply chain revolution’ aimed at reducing inventory costs and supply chain response time; and on the other hand the emergence of new distribution channels through e-commerce. The innovations adopted by logistics providers in order to address these challenges have numerous and in some cases profound implications for employment levels, work organisation and job quality. While they also affect the job profiles of management jobs and to some extent create new opportunities for more highly skilled employees, the bulk of employment in these companies is in manual routine jobs in the area of goods reception and storage, order picking, packing and shipping goods to the ‘points of sale’ (stores) or to the final customer. These occupations will be the focus of our analysis; it is also these jobs where the current innovation dynamics yield (or are expected to yield) the most disruptive effects.

In terms of employment levels, the mid to long-term expectation is one of extensive automation, making many of these jobs redundant and fundamentally changing the employment structure in the retail warehouses. According to the study by Frey and Osborne, most workers in transportation and logistics are likely to be substituted by computer capital in an initial wave of ‘computerisation’. “As computerised cars are already being developed and the declining cost of sensors makes augmenting vehicles with advanced sensors increasingly cost-effective, the automation of transportation and logistics occupations is in line with the technological developments documented in the literature.” (Frey and Osborne, 2013: 41). In fact, while the use of robots and other ‘autonomous’, sensor-based technologies is still rather limited in retail warehouses, a broad range of fully and semi-automated warehousing technologies that substitute for manual tasks has been increasingly deployed in retail warehouses over the last two decades.

However, as other authors have stressed, tasks are not to be equated with jobs. While for some of the tasks manpower may be substituted by machines, the extent to which jobs will be destroyed depends on the task profiles of occupations and on their adaption to the changed technological environment (e.g. Autor, 2015; Arntz et al., 2016). Moreover, the study by Frey and Osborne focuses on technical feasibility and neglects the economic viability of technological solutions. Thus, the development of low-skill service sector jobs, such as those, in retail warehouses depends not only on the ‘susceptibility’ of tasks to computerisation, but also on companies’ decisions on the extent to which they invest in automation and how they adapt job profiles and work organisation. Besides profitability assessments, these company decisions are in turn influenced by a range of external factors, such as *labour supply levels and structure* (including changes due to e.g. demographic change or immigration) and most notably *institutional constraints*, such as strong employment protection or employee participation rights. These constraints may make companies choose less disruptive innovation models by imposing limits on companies’ ability and willingness to make jobs redundant and by encouraging them instead to implement technological solutions at a slower pace, or choose technologies that are compatible with maintaining employment levels, make better use of employees’ skills or even require upskilling – thus to choose alternative modernisation paths that might be equally economically viable and socially sustainable.

By comparing companies in different institutional and labour market contexts, which are however exposed to similar technological and market pressures, we aim to investigate, firstly, *if* companies do differ with regard to innovations (extent, pace, the way they are implemented); secondly, *why* they do or do not differ – e.g. how this is related to organisational patterns of conflict resolution; and thirdly, what is the cumulative *effect* on job quality, employment levels and inclusiveness.

We thereby seek to embed innovation dynamics analytically in the wider economic and institutional context. Many evaluations of the impact of digitalisation on jobs in the logistics industry focus on the potential implications of new technologies, even though mostly in a non-deterministic manner, pointing to choices for human resources strategies (see e.g. Delfmann et al., 2017; Ittermann et al., 2016). In ‘real world companies’, however, these changes take place in conjunction with other economic trends and institutional constraints, such as the marketisation of the logistics function, that shape the extent and pace of innovations and exert their own impact on job quality. We are interested in these ‘real world’ dynamics, in order to assess not only the *potential* but also the *likely* implications of innovations in the current economic and institutional environment; and in order to weigh the effects of innovations against overall changes in job quality, employment levels and inclusiveness.

The focus of our research is on companies or business entities whose core business is to operate warehouses and provide transportation services to retail companies. Research was carried out in France, the Netherlands and Germany, resulting in six case study reports in total that constitute the main basis for the findings presented in this chapter. The analysis also draws on three national industry reports (Jaehrling, 2016, Gaborieau and Gautié, 2016; Koene et al., 2016) written prior to the case studies, based on statistics, documents, literature and expert interviews. While the institutional framework in these three countries differs slightly (see below), the companies are currently exposed to similar market pressures and innovation dynamics. In order to understand the interactions between innovations and job quality in our qualitative company sample, it is necessary to shed some light on this broader environment in which innovation processes take place at the company level. Therefore the first section below (2) deals with the relevant market trends in which innovation processes are embedded. The next section (3) describes the key innovation dynamics in the industry to which the companies in our sample have to respond in one way or the other. The following section gives an overview of the key characteristics and innovation strategies in the companies in our sample (4), after which we turn to an analysis of the interactions between innovations, job quality and employment at the company level (5).

2 Economic trends embedding innovation dynamics: changes in the retail supply chain

2.1 Retail logistics transformation and ‘lean logistics’

The term retail logistics, as used in the literature, usually refers to the management and operation of the distribution of goods on their journey from a manufacturer to a retailer and further on to the final customer (*‘distribution logistics’*), as well as the *‘reverse logistics’* tasks that encompass taking care of waste, recyclable goods, reusable bottles/packages, and returned goods. Since the 1980s, the retail supply chain has seen a profound transformation that shifted control over these tasks from manufacturers to retailers (Sparks, 1998; Fernie, 2001; Hamilton et al., 2011). Buying and distribution became “a headquarters function in retailing” (Fernie and Sparks, 2004: 16), and retailers transformed from “passive recipients of products, allocated to stores by manufacturers in anticipation of demand” to “active designers and controllers of product supply in reaction to known customer demand”. (Fernie and Sparks, 2004: 6). In a first step, pioneered in Europe by some large British grocery retailers, retailers started to centralise their store deliveries by channelling an increasing proportion of their supplies through their own distribution centres (DCs), instead of relying on direct deliveries from manufacturers to the stores (Sparks, 1998; Fernie and Sparks, 2014). Thus the business entities that are the focus of this chapter, national and regional distribution centres, emerged as a result of this retail logistics transformation. The effect was a significant reduction in lead times and stock holdings. For instance,

at the beginning of the 1990s, inventory levels at the British food retail chain TESCO had decreased to just about 25% of the levels in 1980 (Sparks 2014: 155).

From the 1990s onwards, additional measures were implemented with the overall goal of further reducing inventory costs and ‘time-compress’ the logistics processes, in accordance with the ‘lean’ principles that were extended to the distribution chain from the late 1990s onwards (Jones et al., 1997; Womack and Jones, 2005). By implementing just-in-time (JIT) principles, retailers for instance began to demand more frequent deliveries of smaller quantities, both in primary distribution (factories to DCs) and in secondary distribution (DCs to shops). In order to rationalise primary distribution, retailers also started to take control over transport flows from suppliers to the DCs (see Sparks, 2014 on Tesco/UK; Prümper, 2002 on Metro/GER) and increasingly sought to integrate their primary and secondary distribution networks in order to optimise vehicle utilisation. Concepts like Quick Response (QR), Efficient Consumer Response (ECR) and Collaborative Forecasting, Planning and Replenishment (CFPR) sought to foster closer collaboration and information exchange between suppliers and retailers in order to avoid over-stock or out-of-stock situations and support the overall transformation from a supply-driven to a demand-driven supply chain. Basic technologies for this software-based integration of the supply chain is Electronic Data Interchange (EDI) and Standard Barcodes such as the European Article Number (EAN). The changes in the supply chain up and downstream of DCs also impacted on the ‘intralogistics’ processes within warehouses. For instance, the adoption of JIT principles has increased the share of products being ‘cross-docked’, i.e. moved directly from inbound to outbound trailers without being stored in DCs, thereby minimizing the costly inventory function of DCs, including labour intensive tasks such as storing, retrieving and picking goods (Rodrigue et al., 2017: 230ff). Additionally, the processes involved in the inventory function, i.e. within regular DCs, have been rationalised as well, strongly supported by automation. This primarily involves the use of computer-operated storing, sorting and picking technologies, and the introduction of warehouse management systems (WMS) to keep track of location and product flows in the warehouse.

The profound and partly disruptive ‘computerisation’ or ‘digitisation’ of warehouse work thus started in the late 1990s, as part of a more general ‘retail logistics transformation’ that was strongly informed by, or at least conformed to, ‘lean’ principles. While the ‘lean’ concept is not restricted to the overall goal of reducing costs, and has also come to compete with other concepts such as the ‘agile’ supply chain, the focus on efficiency gains has been quite dominant (Ferne and Sparks, 2004: 10). The retail logistics transformation depicted above is far from complete, as many of the above mentioned concepts and instruments have been adopted only partially and slowly by retailers (see e.g. Fernie 2014 on ECR concepts); consequently, they continue to make up a good deal of the current technological and organisational changes in DCs. In the same vein, core features of the lean model of the supply chain – the primary focus on low costs, the goal of minimising inventory, and efforts to “reduce lead time as long as it doesn’t increase costs” (Harrison et al., 1999, quoted in Fernie and Sparks, 2004: 10) – continue to impact on current innovation dynamics at company level. Thus the trend towards e-commerce, which is often regarded as creating the need for a more flexible and ‘agile’ supply chain, does not simply replace the lean management concept but rather overlaps with it and continues to orchestrate innovations and job quality (see Wright and Lund, 2006; Newsome et al., 2013).

2.2 Marketisation and the role of (third party) logistics service providers

The business entities that are the focus of this chapter, national or regional DCs, were the outcome of a process that shifted control over logistics processes to retailing firms, the new “channel captains” (Ferne and Sparks, 2004: 6). This does not necessarily mean, however, that these entities are owned and operated by retail companies. In fact the retail logistics transformation also opened up new market

opportunities for independent logistics service providers. The strong growth of the transport and logistics sector in many European countries result in part from the trend towards outsourcing the logistics function formerly provided in-house by manufacturing and service sector firms to independent ‘third party logistics (3PL)’ providers. In the retail industry, however, this trend seems to be less pronounced than in other segments of the economy. A survey among British retailers in the mid-1990s revealed that outsourcing was of “marginal significance” and that retail managers seemed to be little inclined to change that, as they wished to maintain control over the logistics function (Ferne 2014: 52). By contrast, transport was more likely to be outsourced than warehousing services. Today, 3PL providers are certainly not ‘marginal’ any longer in the retail logistics industry, not least as their use is facilitated by substantial progresses in the software-based integration of the supply chain. Still, available statistics and surveys for our three countries largely confirm that outsourcing is more frequent for transport than for goods storage and handling and has not yet become the dominant practice for the distribution centres of large retail chains (see Jaehrling, 2016; Gaborieau and Gautié, 2016).

Nonetheless, the as yet limited level of outsourcing does not mean that the relationships between retailers and many of their (in-house) logistics service providers has remained untouched by the general trend towards marketisation. The vertical disintegration of the firm through outsourcing is but one form of marketisation – broadly defined as an intensification of price-based competition at the level of transactions (Greer and Doellgast, 2017: 195f). Other measures used by retail companies, such as the treatment of internal logistics departments as cost centres or the transformation of logistics departments into legally independent subsidiaries owned by the retail company, can be considered as alternative forms of marketisation, as this increases transparency over costs and comparability to other service providers on the market. Even though the longstanding relationship between in-house or quasi in-house DCs and their ‘owner-client’ might shelter them somewhat from the threat of being replaced easily by other, cheaper (or better) logistics providers, the existence and dynamic growth of the 3PL segment is bound to put cost pressure on in-house providers. As Ferne (2014: 52) notes of British grocery retailers who kept their logistics service in-house, “clearly retailers not only wished to maintain control over the logistics function but feel that their staff could provide customer service at lower costs”. The pressure on prices is likely to be high particularly in settings where sectoral or company collective agreements for in-house providers offer higher pay levels than those for logistics service providers – and this is typically the case in our three countries under study. Moreover, price-competition is not only nurtured by pull-factors (pay gaps), but also by push factors, since price-competition in the retail industry has increased due to the expansion of discounters such as Aldi and Lidl across Europe, and also due to e-commerce (higher price transparency, lower barriers to market entry, new global players such as Amazon). Overall, therefore, in addition to the ‘lean’ principle, the trend towards marketisation puts additional pressure on warehousing costs, and contributes to a structurally asymmetrical relationship between retailers and their logistics service providers.

In principle however, current trends in the retail logistics environment also offer logistics service providers opportunities to step up their position in the supply chain, or at least to avoid too strong a dependency on one or a few large retailers. As the effective and efficient management of logistics tasks is increasingly viewed as crucial to retailers’ business successes, they are more dependent than before on reliable and well-functioning relationships with their logistics providers. The greater internationalisation of sourcing and distribution in retail, and the increasing integration of the primary and secondary distribution networks add to the volume and complexity of the logistics tasks and offer opportunities for logistics service providers to “capitalize on these market opportunities” (Ferne, 2014: 54). Finally, logistics companies can also seek to diversify their clients, by offering their logistics infrastructure and expertise in warehousing and transport services to other retailers, possibly with a more diverse product range.

The growth of e-commerce (see below) is a particularly important factor impacting on supply chain relationships. Firstly, e-commerce enables manufacturers to sell their products directly to the customer, thereby reducing the role of retailers (and their DCs). At the same time, manufacturers selling their products on their own have become potential clients of logistics companies operating DCs. Secondly, e-commerce is linked to the market entry of a large number of online retailers that do not have a long history of in-house logistics and thus ‘sunk costs’ that might keep them from contracting out the logistics tasks (Fernie, 2014: 51). Finally, as Xing et al. (2016) argue, most traditional retailers also have little or no home delivery experience and need to develop new logistical solutions. Buying external expertise and avoiding too high capital investments in the new logistics infrastructure can therefore motivate retailers to contract out the logistics tasks for their online sales, E-commerce is thus fostering outsourcing, and at the same time facilitating the DCs’ strategy of expanding their customer base. Still, there are also a number of risks and costs to be considered for retailers (Xing et al. 2016: 338f). This might help to explain why, even if outsourcing is more common for the e-fulfilment processes (Xing et al. 2016), there is no straightforward tendency among retailers to ‘buy’ the logistics services, as evidenced not least by the large network of company-owned DCs operated by Amazon (MWPVL 2017). By contrast, Morrisons, one of the four largest supermarket chains in the UK, decided in 2014 to contract out its logistics services for online purchases to its competitor Ocado, a large online-only supermarket, which operates a nationwide network of depots. To make things even more complex, since 2016 the same depots have been used to deliver Morrisons’ groceries (which is acting as a wholesaler here) to Amazon customers, as this is the solution chosen by Amazon in the roll-out of Amazon Fresh in the UK.⁶⁵ This example very well illustrates the strategic choices available both to retailers and their logistics service providers. Also, new competitors from the group of postal companies and parcel carriers (such as DHL) have entered the business of providing warehousing services and are at the same time potential cooperation partners for retailers and logistics companies, for instance when it comes to last-mile delivery.

At any rate, both for external and in-house providers, e-commerce has brought with it new logistics tasks and requirements and is forcing logistics service providers to innovate, as will be discussed in the next section.

3 Key innovation dynamics

3.1 E-commerce: the ‘e-tailing revolution’

From a logistics perspective, the ‘e-tailing revolution’ (Fernie et al., 2014) has profound implications, most importantly because it requires retailers to set up ‘business to consumer’ (B2C) distribution channels, where individual items are shipped from the retailer directly to the final consumer – in contrast to the traditional ‘business to business’ (B2B) channel, where goods are shipped in larger quantities from distribution centres to the points of sale (shops). Some products (books, music, video games) have even become available in digital format and can be downloaded directly from the retailer’s or publisher’s shop, thereby completely replacing the tasks carried out by distribution centres and reducing demand for these services. Overall however, the increasing share of online shopping is boosting the demand for logistics facilities and services dedicated to online purchases and imposing important **changes on the physical distribution network**.

Two main fulfilment models can be distinguished (Fernie and Sparks, 2014): the *store-based model*, where online orders are assembled in local stores and then either collected by consumers (‘click and

⁶⁵ ‘Amazon starts UK fresh food delivery’, The Guardian, 9 June 2016

collect') or delivered to their home; and the *dedicated order model*, where online orders are assembled in distribution centres and then directly shipped to the final customer. The first model makes use of existing distribution networks, as purchased items pass through traditional DCs to shops, whereas the second model requires specific facilities where the merchandise can be stored and picked at the item level. Most of these facilities have so far been built as separate e-fulfilment centres, run by either retailers or logistics service providers (Jones Lang Lasalle, 2013; Fernie et al., 2014). Traditional mail order companies, as well as retailers selling large appliances, already operated this kind of facilities, whereas they are completely new to the food segment. Here, they are often labelled 'dark stores', as the interior resembles conventional supermarkets rather than warehouses. Besides this new type of distribution centre, other types of logistics facilities are becoming more important: in the dedicated order model, a large proportion of sales is channelled through the parcel hubs and sorting centres of large postal companies and parcel carriers, such as UPS or DHL. One very important challenge in both modes is the so called 'last mile' to the final customer. In order to avoid the costs and inconveniences of failed home deliveries (due to the absence of customers), retailers and parcel carriers have experimented with a number of 'unattended delivery systems' (Fernie et al., 2014), including e.g. putting up lockers or operating collection points located near residential locations, or in much frequented places that require little additional travel for consumers, such as train stations (e.g. Weltevrede, 2008 for the Dutch B2C market), or the car parks of hypermarkets, a model much used by French grocery retail chains (Gaborieau and Gautié, 2016). The customer convenience and the costs associated with these 'last mile' delivery systems are viewed as key factors for both the attractiveness and cost-effectiveness of online shopping. Finally, the e-tailing revolution has also boosted demand for reverse logistics services, as retailers in the non-food segment in particular have to handle a large flow of returned goods; this includes the retrieval, checking, repackaging and redistribution of the returned merchandise (Fernie and Grant, 2015).

Apart from boosting demand for logistics services and changing the physical distribution network, e-commerce has also further increased **pressures to reduce lead times**⁶⁶, albeit for different reasons: While in the 'lean' paradigm, reducing lead times was primarily pursued as a means to reduce inventory levels and save costs, in an e-commerce environment reducing delivery times is pursued as a means to attract customers and thus expand market shares, even if this comes at the price of considerable costs. This is much more in line with the 'agile' model of the supply chain which prioritises speed and flexibility over costs (Harrison et al. 1999). In this respect, Amazon can clearly be termed an innovation leader. It is offering same-day delivery (Amazon Prime) in many large European cities (currently in the UK, Germany, France and Italy) and has even begun to offer same-hour delivery (Amazon Prime Now) for a small selection of items in some of the largest metropolitan areas (Berlin, Munich, Paris). With the roll out of 'Amazon Fresh' in the UK (2016) and Germany (2017), the e-commerce player has begun to expand its high speed delivery service to the perishable grocery products segment. Amazon's foray into the grocery sector was seen as a serious threat to established players in both countries and has already triggered reactions, such as the recent decision by Tesco in the UK to expand its own same day delivery services across the UK.⁶⁷

The trend to ever shorter delivery times is a response to the expectations of online shoppers, who have come to develop an 'any time, any place' mentality (Fernie et al., 2014: 221). However, quick delivery is but one of many customer expectations, and as surveys among online shoppers reveal, other

⁶⁶ The term lead time in the logistics context denotes the "time it takes for an order to be fulfilled, which includes preparation, packing and delivery to a designed location" (Rodrigue et al., 2017: 231)

⁶⁷ 'Tesco to extend same-day online delivery service across UK - Service will cover more than 99% of UK households, says supermarket as fears grow over Amazon's foray into groceries market', The Guardian, Monday 24 July 2017.

features such as the option to choose a specific delivery date may be even more important (Xing et al. 2016: 343). Thus logistics service providers, whether in-house or external, have to make important strategic choices about which expectations to prioritise and how to balance the different goals and expectations, most notably time, costs and quality of the logistics services. Besides ‘delivery speed’, there are also increased requirements to adapt logistics processes more flexibly to stronger fluctuations in demand (see 5.3).

3.2 Automation and digitisation

As explained above, the automation of intralogistics processes was triggered by the retail logistics transformation. However, e-commerce has pushed the need for automation even further, notably because of the strongly increased volumes of individual items to be shipped directly to the end customer and the correspondingly high throughput requirements (ten Hompel and Schmidt, 2007: 16). There is not (yet), however, a uniform trend towards fully automated warehouses; rather, the pace, extent and type of automation depend on a number of factors, including the characteristics of the stock handled in warehouses (e.g. size, weight, standardised/non-standardised package, diversity of stock). Across countries, it has become common, among business experts and those working in the retail logistics industry, to make a distinction between three types of warehouses, according to their degree of automation: *conventional*, *semi-automated* and *automated* warehouses.⁶⁸

Conventional warehouses: Tasks are mostly performed manually, supported by forklifts and other electric vehicles on which the pallets with picked items are mounted. Pickers work with different order picking technologies (see ten Hompel and Schmidt, 2007: 30ff). ‘Paper picking’ – where operators pick items based on computer generated lists – has increasingly been replaced by the use of barcode or RF scanning devices; followed since the second half of the 1990s by ‘pick-by-voice’ and ‘pick-by-light’ and most recently ‘pick-by-vision’ (data glasses). Pick-by-voice seems currently to be the most widespread technology, at least in the food segment. Pickers wear headsets and communicate orally with a software system to receive and confirm picking tasks; basic requirements are a Warehouse Management System and check digits placed on a label positioned at each pick location.

Semi-automated and automated warehouses: A clear-cut distinction between the two terms is rarely explicitly given, but a common core meaning of ‘semi-automated’ is that only part of the different process steps in a warehouse are automated and a high proportion is still performed manually. Thus technologies may include man-aboard vehicles which move horizontally and vertically in the aisles between high racks, but the item is still picked by a human operator. Other technological solutions involve so called ‘goods-to-person’ systems, where un-manned vehicles, conveying systems or carousels move goods to a point where they are collected by human operators – as opposed to the ‘person-to-goods’ systems in the conventional warehouses where pickers walk or drive through the warehouse and collect the items. In some instances, the term semi-automated is also used to refer to warehouses that combine fully automated solutions for certain process steps (e.g. Automated Storing and Retrieval Systems (AS/RS)) with conventional solutions for other steps such as picking. By implication, fully automated warehouses involve technologies that operate with a minimum of manual labour and where more or less all tasks, including the most labour-intensive tasks of picking and packing, are replaced by a large interconnected system of machines based on conveyor systems and carousels. Examples include the ‘Order Picking Machine’ by WITRON (<https://www.youtube.com/watch?v=DNyFyFJ6CWk>).

⁶⁸ But see ten Hompel and Schmidt (2007: 20-45) for a more detailed and accurate account of the wider array of technological solutions for receiving, storing, retrieval, sorting, picking and packing items.

To varying degrees these systems help to significantly raise productivity in warehouses by reducing error rates and/or increasing picking efficiency. To date, however, fully automated and even semi-automated warehouses are far from being the rule in current retail DCs; they are more widespread in certain non-food segments (pharmaceuticals, media), but less so in the food segment. This is despite the fact that *“The business case for automation in Europe has always been stronger than in North America because of land constraints, higher labor costs and labor availability issues”* which makes it easier to justify the investment into automation economically (MWPVL 20xx). However, fierce price competition in the retail sector and the trend towards marketisation in logistics might be a factor that slows down the automation process in Europe, because a concern for long-term cost savings (by substituting for manual labour) has to be balanced by companies against the high investment costs required in the short term. Moreover, factors often invoked as disadvantages of automated systems, apart from their high investment costs, is their lack of flexibility in the face of a strongly varying quantity and type of products, due to varying consumer demands, seasonal products, the high diversification of products and ever shorter product life cycles.⁶⁹

One important element in the current debate on the digitisation of the economy and the corresponding technological and organisational changes for logistics processes (e.g. ten Hompel and Kerner, 2015; Zijm et al., 2016; Kersten et al., 2017; Heistermann et al., 2017) is robots and other sensor-based autonomous and decentralised coordinated modules (such as the warehouse robots developed by KIVA for Amazon). These are considered better suited to catering to the much increased demands for flexible and individualised order processing. However, their use in European retail DCs is very limited so far, including in the DCs in our sample. This is probably due not least to the rather recent and ongoing technical progress here. Moreover, where companies have only recently invested in the type of large-scale automation with firmly installed equipment described above, they are unlikely to be among the first to switch to these alternative technological solutions. Still, they are likely to be incorporated into European DCs over the mid-term as well. Their interaction with job quality and employment levels, however, can to date be studied *empirically* on a very narrow basis only. The technological developments described above (‘conventional’, semi-/fully automated solutions) are thus of greater relevance to recent and ongoing innovation processes at company level and will therefore be a major issue in our empirical analysis.

Finally, another very important trend is the progress in information technology (e.g. ‘track-and-trace’, advanced WMS and Enterprise Resource Planning (ERP) systems), which enables firms to control and monitor the flow of goods both within and across different segments of the supply chain ever more closely through the collection and exchange of real-time data and the use of predictive analytics based on ‘big data’ (although this is still in its infancy in the retail industry (Kersten et al., 2017)). Along with other factors, this increases the interdependency between processes in distribution centres, retailers, transport companies and suppliers and has implications in particular for the internal resource planning (5.3), as we shall see.

⁶⁹ An example illustrating the difficulties in implementing automated solutions in a food DC is the British supermarket chain Sainsbury (cf. Fernie and Sparks, 2014: 17ff).

4 Innovation strategies at company level – an overview

4.1 Selection criteria and key characteristics of case study companies

The following analysis draws on six case study reports.⁷⁰

FR-MEDIA is the subsidiary of a large French retail chain selling cultural and electronic products. The case study covers a semi-automated DC servicing shops (DC1) and a separate DC which is dedicated to e-commerce (DC2). (Perez and Gautié, 2017)

FR-FOOD is the subsidiary of one of the top 10 large French food retailers; it operates around 30 distribution centres servicing supermarkets across France. The case study draws on interviews in several regional conventional and one semi-automated DC which started operation in the past 5 years. (Gautié and Perez, 2017).

GER-FOOD covers two DCs operated by two different subsidiaries owned by two of the top 10 large German food retailers. Both DCs under investigation are regional, conventional DCs, but the works councillor of DC2 provided information on another semi-automated DC in the region that started operation a few years ago (Jaehrling, 2017a).

GER-FCMG is the logistics division of a large German retail chain selling fast moving consumer goods. The case study focuses on one of the national, semi-automated DCs servicing shops across Germany (Jaehrling 2017b).

GER-FASHION is a subsidiary of a logistics holding which in turn is a subsidiary of an e-commerce retailer in the fashion segment. The case study focuses on two semi-automated DCs: one returns centre (DC1) and one national distribution centre (DC2) (Jaehrling, 2017c).

NL-MEDIA is an independent logistics provider that started its business in the books segment but has moved into additional product segments (other media products, healthcare and fashion) over the past years. The case study focuses on a national, semi-automated DCs that is servicing both shops and individual customers. (Keune and Koene, 2017).

The table below provides an overview of the main characteristics of the case study companies and the number of interviews carried out in each case. The interview data were complemented by secondary data such as press releases, company statistics and brochures retrieved from corporate websites and/or other internal documents made available by interviewees. Researchers also took part in a plant tour in at least one warehouse in each case study company, lasting between one and three hours. Moreover, the analysis draws on additional interviews with industry experts carried out as part of the case studies. These included representatives from business associations, trade unions, and academic experts based at universities and other institutions in applied research, or professionals in institutions devoted to occupational health and safety.

⁷⁰ A seventh case study report (NL-FOOD) could not be finalised, due to difficulties in getting access and the delay of scheduled interviews. A summary of this case is nevertheless added to the Annex.

Table 1: Characteristics of case study companies

| Pseudonym | characteristics of company | number of employees in company and in DC | female employment | immigrant background | average age of employees | Number of interviews + number of DCs included in research |
|--------------------|---|--|--|--------------------------------|---|---|
| GER-FASHION | - Subsidiary of e-commerce holding - predominantly B2C - predominantly fashion | Company: > 2500 DC: 501 - 2500 | High (> 60%) | Low (6%), increasing | increasing share of those aged 50+ | 13 interviews in 2 DCs (3 ER; 8 MA ; 1 TU; 2 EXP)** |
| GER-FOOD | - 2 subsidiaries of 2 different retail chains - predominantly B2B (shops) - predominantly food | Companies: 501 - 2500 DCs: 51 - 500 | Low (10-20%) | n.a. | High (44 y picker; 49 y truck drivers in DC 1); increasing in DC2 / decreasing in DC1 | 7 interviews in 2 DCs (2 TU, 2 ER, 1 MA, 2 EXP)** |
| GER-FMCG | - Logistics department of retail chain - predominantly B2B (shops) - Fast moving consumer goods | Company: > 2500 DC: 501 - 2500 | Low (10-15%) | n.a. | n.a. | 3 interviews in 1 DC (1 ER; 1 TU, 1 MA)** |
| FR-FOOD | - Logistics department of retail chain - exclusively B2B - predominantly food | Company: > 2500 DCs: 51-500; 501-2500 | Low (15% in one DC) | Low (2% in one DC) | High, (48 y in one DC); increasing | 14 interviews in 6 DCs (5 E/ER; 3 E, 6 MA)** |
| FR-MEDIA | - Subsidiary of cultural and electronic products retail chain - B2C and B2B (shops) | Company: 501 - 2500 DC : 501 - 2500 | Low, but increasing | High (>20 countries of origin) | High (~41 y) | 5 interviews in 2 DCs (3 MA, 2 E/ER) ** |
| NL-MEDIA | - Independent logistics company - Predominantly B2B , increasingly B2C - Shifting from serving one product segment (Media) to multiple segments | Company: 501 - 2500 DC : 501 - 2500 | 35%, increasing due to new segments (50% in fashion) | n.a. | Stable over period 2011-2015 | 9 interviews in 1 DC (7 MA, 1 ER, 1 TU)** |

Source: Compilation based on case study reports (see list of reports in section 8 of this chapter)

** MA = Management; TU = (external) Trade Union representative; ER (= elected employee representative); E = employee; EXP = External experts

In selecting the cases to be investigated, researchers took into consideration the broad industry trends and structures described above, and aimed to include companies covering different types of logistics processes that could be expected to make a difference with regard to innovation dynamics. The case selection therefore targeted companies servicing different *segments of the retail industry*, namely the food/drugstore goods and the non-food (fashion, media) segment. These two segments are characterised by different market shares for e-commerce, which has spread much faster in the non-food segments. In the food segment, on the other hand, it has for a long time been restricted to a limited range of products in the three countries under study. Moreover, the two segments also correspond to a well-established distinction between ‘fast moving consumer goods’ (food, drugstore goods) and ‘slow moving consumer goods’, which are characterised by differences in terms of profit margin, shelf life and turnover rate – key features impacting on warehousing processes. However, e-commerce and other trends are blurring the differences between the two segments, as exemplified by the strategy of setting up separate DCs for slow moving items within the same product segment.

Our company sample also reflects several broad trends in the industry. Our focus is mostly on **large logistics companies servicing large retail chains**. Thus the business entities in our sample employ at least 1000, some even more than 2500 employees, usually spread over several warehouses. This mirrors the trend towards strong market concentration across countries and goods segments. Large retail chains are dominant players in all three countries, in both food and many non-food segments. This is matched by the companies operating the distribution centres: these tend to be large business entities as well, often with a very few or just one retail chain as their (dominant) customer.

Another common feature is that, with the exception of one case (NL-MEDIA), all business entities in our sample are owned by retail chains, i.e. are **in-house or ‘quasi in-house’** (legally independent subsidiaries) entities. The trend towards fully outsourcing logistics services to 3PL providers is thus mirrored only to a limited extent by our company sample. Some of our companies do themselves outsource part of their warehousing operations, or even part of their DCs, but the bulk of work is performed by their own employees. Thus, by predominantly focusing on companies providing (quasi) in-house warehousing services for large and established retail chains, our cases can be considered as typical of a quantitatively important segment of the retail logistics industry; but in terms of generalizability it has to be borne in mind that we have only limited evidence on independent 3PL providers. As argued above, the marketisation of the logistics function has also helped to change the relationships between retailers and their in-house logistics providers; thus the differences might not be as significant as might be expected when judging by the formal organisational status.

A third common feature is linked to the large size of the companies. Unlike many small and medium-sized companies, the large companies in our sample are covered by the **full array of country-specific institutions governing the employment relationship**, at both company and industry level. This does not make these companies representative of the whole industry or country, as many companies operating in the same segment are not (any longer) covered by these institutions. However, it does mean that at least in our companies the institutional framework matters and might make a difference with regard to the innovation/job quality nexus – compared to companies not covered by these institutions. It should be stressed however, that the industrial relations systems of the three countries share many similarities, and recent trends tend to further minimise previous differences – as for instance a common trend both in countries like France (‘state-centred’ model of industrial relations) and in Germany and the Netherlands, (‘social partnership’ model) towards the decentralisation of collective bargaining, through the conclusion of company-level collective agreements and/or the inclusion of derogation clauses in national labour laws and in sectoral or cross-sectoral collective agreements (European Commission, 2015). In our context, the most important differences between France, on the one hand, and Germany and the Netherlands, on the other, relate to the greater

fragmentation of trade unions according to their political allegiance in France, which also translates into a more fragmented landscape of employee representatives at company level. Partly as a consequence, labour relations at the company level tend to be more adversarial in France, similar to other countries belonging to the ‘state-centred’ cluster (European Commission, 2009: 49).

Finally, in terms of **job quality**, all companies – with the exception of FR-FOOD – have a reputation for providing ‘better-than-average’ working conditions, compared to competitors in the industry. This judgement is based on both external documents and press reviews and a self-evaluation by the management and /or employee representatives we interviewed. The most visible indicator is that the companies are covered by collective agreements (even where this is no longer a standard for the industry, as in Germany and Netherlands) that provide for higher wage levels than in many DCs operated by 3PL providers.

The **employment structure** also has similar features and trends. Employment in food retail warehouses is largely male dominated, while this is not consistently the case in the non-food retail warehouses. A common feature across almost all cases is the relatively high average age of employees. Finally, with regard to employees with immigrant backgrounds, their share is substantial in several warehouses, but can be as low as 2% in other cases as well (FR-FOOD), due to specific local labour market and demographic situations (rural area). Overall, following the definition used in the QuInnE project, the segment of low-skilled jobs in retail warehouses can be classified as relatively ‘inclusive’, in the sense that these jobs are more accessible to members of social groups that are exposed to higher unemployment risks. In some of our cases, their share among employees has even increased in recent years, for reasons linked to innovation processes, as we will explain further below.

4.2 Business and innovation strategies at the company level – a short description of 6 cases

Faced with the market structures and the innovation dynamics described above, the companies in our sample have made different strategic choices over the last 10-15 years. The table below gives an overview of the different dimensions of change identified above; a more contextualised description is provided by the short portraits in the Annex. Overall, all the companies have adopted a broad range of changes, including marketisation (use of 3PL, internal outsourcing) and changes to the physical distribution network that have accompanied the process innovations in warehouses (automation and the introduction of B2C distribution processes). In terms of product, or rather service innovations, they consisted mainly of faster and more flexible deliveries to consumers (both shops and individuals), but in some cases also an expansion of the services delivered to customers (see NL-MEDIA and GER-FASHION).

Table 2: Innovation strategies in case studies over the last 10-15 years

| | Marketisation /use of 3PL | Expansion of customer base | Introduction of B2C ; expansion of services related to B2C | Changes to physical distribution network | Automation |
|--------------------|---|---|--|---|--|
| GER-FASHION | Conversion into legally independent subsidiary in order to be able to expand customer base | Yes; new external customers in same segment (fashion) | B2C already in place (former mail order company) Expansion of services: developing online-shops, finances, customer call centres | Consolidation/Centralisation → closing down 1 DC Off-shoring parts of fulfilment to Eastern European countries Separate DC for external customers | High investments in (semi-)automation; some sensor-based modules in new DC for external customers |
| GER-FOOD | Increased use of 3PL in transport (~50%) | No | DC1: yes, dedicated e-fulfilment DC DC2: no, but retailer owning DC2 runs store-based B2C distribution (with network of Parcel carrier) | DC1: Restructuring: separate DCs for slow moving / fast moving products DC1 + DC2: Closing down of several small, old DCs and re-location in 'geo-optimal' location | DC1: conventional DC, pick by voice introduced early onwards DC2: Conventional DC, pick by voice introduced early onwards |
| GER-FCMG | Network of decentral cross-docking DCs run by 3PL since 1980s New E-Fulfilment DC operated by 3PL-Provider | No | Yes, dedicated e-fulfilment CD | Several new large regional DCs, following expansion Re-structuring: separate DCs for slow moving, fast-moving + seasonal products in different DCs | Large-scale semi-automated order picking in national DC |
| FR-MEDIA | Transportation is fully subcontracted to a 3PL; some experiments to re-insource last mile delivery | No | Yes: in 1998 a warehouse (DC2) is dedicated to e-commerce for small cultural products (books, CDs, games). Semi-automated in 2012 | Five-year strategic plan in 2011 in order to modernise logistics, renewing the industrial equipment for the DC1 dedicated to shop, and semi-automation of the DC2 for e-commerce. Better links between the two DCs (same storage location). Recent closure of a third WH. | DC1: modernisation of the core "machine" (the "wheel" or "wardrobe") in 2015. DC2 : High investment in 2012 in semi-automated solutions. |
| FR-FOOD | Some subcontracting to 3PL, but limited so far; drivers are successively outsourced (retiring in-house drivers not replaced any more) | No | No | Intense restructuring in the recent years, with a strategic plan of re-localisation of warehouses ("optimal geolocalisation"), | Intensive use of pick-by-voice Big investment in semi-automated warehouses in the recent years |
| NL-MEDIA | From task performance objectives to financial performance objectives towards shareholders. Cooperation with parcel carriers for last mile delivery | Yes, new customers for digital distribution of media; new customers in fashion and healthcare | Yes, driven by requirements e-commerce in media since 1999. Now also selling point in health sector. | Central warehousing location, increasingly cooperation with logistics providers for optimisation logistics streams in B2B and B2C | Early investments in automated warehousing (before 1999). Extended automation for sorting and B2C packaging following growing requirements e-commerce |

5 Innovation-job quality linkages at company level

The implications of the supply chain transformation, including the accompanying technological and organisational changes, for job quality in warehouses and other segments of the global transport chain have attracted increasing attention in both media and sociological research (e.g. Lund and Wright, 2001; Wright and Lund, 2006; Bonacich and Wilson, 2008; Jaffee and Bensman, 2016, Newsome et al., 2013; Sowers, 2017). The distribution centres at Walmart (food) and Amazon (non-food) – which in their respective core segments can be termed innovation leaders – have figured prominently and regularly in media and academic reports that have highlighted, among other things, the negative impacts in terms of increased work pace caused by enhanced systems of performance monitoring and control and the external ‘casualisation’ through the use of temp agency work and subcontracting (e.g. Weil 2014). Many studies have, however, also highlighted the opportunities for successful union strategies in warehouses and other nodes in the transport chain, as they can capitalise on the increased vulnerability of firms in an increasingly integrated supply chain (Bonacich and Wilson, 2008). Thus ports and distribution centres are potential “chokepoints” (Jaffee and Bensman, 2016) and logistics workers in these facilities occupy a powerful “brokerage position” (Sowers, 2017). However, empirical studies “demonstrate wide variations in how the powerful position occupied by logistics has actually been translated into concrete gains for the workers” (Sowers, 2017: 11).

Part of the explanation for these contradictory findings can certainly be found in the supply chain transformation. As Newsome et al. (2013:14) conclude from case studies in grocery DCs in the UK, the strong dependency on retailers who dictate terms and conditions tends to translate into an “increasingly coercive ‘factory regime’. The new forms of power and governance are innovative, although constraining for the owners and workers of supplier firms.” Since retail DCs still have some discretion as to how exactly to achieve the performance targets imposed by retailers, strong employee representatives at the plant level can make a difference, as evidenced by one case where “the machinery of collective workplace regulation curtailed some of the worst excesses of these requirements” (Newsome, 2010: 203).

Against this background, it should be interesting to analyse how these changes are implemented in the environment of ‘state-led’ (France) and ‘coordinated’ (Germany, Netherlands) market economies, with their traditionally more extensive institutional framework for collective and legal workplace regulation. To date, research on warehouse work is strongly focused on English-speaking countries such as Australia, the US and the United Kingdom, and there are only a very few studies on these dynamics of change in European countries (e.g. Martinez et al., 2015; Davezies, 2008; Gaborieau, 2016). If in fact the institutional framework does make a difference, we should expect that both management and employee representatives transpose these changes in a more sustainable way.

5.1 Innovation models, employee involvement and labour relations

According to Delfmann et al. (2017), the digitisation of the economy also poses challenges to the conventional innovation model in logistics. The development of business ideas connected to ‘logistics 4.0’ would require a higher speed of innovation, ‘agile’ planning methods, the launch of products and services at an early stage, even though this might be accompanied by higher uncertainty regarding their practical and economic viability, and accordingly a greater role for venture capital in financing these innovations. The conventional model, by contrast, is characterised by long times to market, detailed milestone and work package planning and time-consuming review mechanisms, and this, according to the authors, continues to be the predominant model: “Although development processes have become ever faster in recent years, the aim has always been to only bring logistics technologies and services onto the market when they have reached a high degree of maturity. Innovative logistics

services are in turn often developed in collaboration with pilot customers as value added services (contract logistics) and require the individualised, customer-specific bundling of different logistics services, something that generally involves a greater depth of integration. (...) This applies in similar fashion to logistics service providers, who make sometimes considerable (up-front) investments in assets – often based on customer specifications. The durations of the contracts often differ from the amortisation periods of the investments. As a result, the establishment of logistics business relationships is often accompanied by classic and generally very time-consuming microeconomic review mechanisms (e.g. market analysis (...), forecasts, business cases and investment and cost efficiency calculations)” (Delfmann et al., 2017: 10).

In fact, this description captures quite well the innovation model across the companies in our sample, at least with regard to innovations involving large-scale automation and major restructurings of the physical distribution network – such as the closing down and/or re-location of warehouses. The decision to implement these changes and develop feasible solutions is taken in a process predominantly involving managers and planning departments at the companies’ headquarters, in close cooperation with other actors in the supply chain, in particular the retailers, and – in the case of automation – manufacturers offering the technological solutions. As the logistics processes are tailored to the needs of retailers, their expectations and specifications are highly influential, as illustrated in particular by the two companies in our sample with external customers.

- In NL-MEDIA, for instance, a major client has been a major initiator of innovations and has been demanding all kinds of changes in the way NL-MEDIA works, ranging from the ongoing move towards 24/7 operation to the company’s online capabilities (Keune and Koene 2017).
- In GER-FASHION, a manager describes the collaboration with one of the company’s main clients on implementing a major change in the IT system that will allow the retailer to expand the product range in the fulfilment centres considerably (Jaehrling, 2017a):

“And we are expecting clear instructions here by the end of February, what are [name of retailer]s’ thoughts on this. So they are currently sorting out: How do we want to act logistics-wise, towards which customers? How large will the product range be? How much of this will be in our own inventory; what percentage or which articles will be shipped directly from the supplier to the customer? And this will have implications: Are we well equipped? Where do we have to expand, where do we have to completely restructure [processes]?” (head of logistics planning department)

Overall, the innovation processes are highly centralised and stretch across organisational boundaries. Although in principle this does not preclude employee participation, it is probably a factor behind the fact that **employee representatives across cases have invariably relatively little influence on the core decision for (or against) and the overall design of large-scale innovations**. The variation we can detect in our cases – and between our cases and their British, American and Australian counterparts – relates more to the **extent to which employees are involved in negotiating and bargaining over the consequences** in terms of redundancies, workplace ergonomics and other job quality issues. We will return to this latter aspect below but must first substantiate the first claim (low level of influence on pace and overall design of innovations).

In line with the literature, it might be assumed that employee representatives and management have different interests with regard to technological innovations. According to the orthodox view, strong employee representatives are assumed to slow down innovation (e.g. in order to prevent job losses), while management is usually assumed to favour investment in physical capital, unless strong employee representatives threaten to appropriate too much of the productivity gains (‘hold-up’ problem). Other writers, in contrast, have argued that strong employee representatives and cooperative labour

relations can contribute to even higher R&D investment and facilitate the adoption of innovations by making sure that employees' interests will be taken into account, thereby generating employees' cooperation and decreasing implementation costs (see Addison et al., 2017 for an overview of the arguments).

However, these bold assumptions do not capture the complexity of interest configurations and participation processes at the firm level, as an analysis of our cases reveals. In one case, the works council even deplores the limited innovation budget made available by the company, because it is worried that low productivity levels might ultimately lead to the off-shoring of the DC to neighbouring East European countries. It regards the underinvestment as a breach of the company's duty to invest in the plant in exchange for wage moderation, as agreed in a company pact for employment concluded a few years ago: *"At the time we were told this is to invest in the future. Where is the future?"* (chairman of works council at DC1, GER-FASHION). This situation thus resembles a kind of inverted 'hold-up' problem: While the employees have invested their share through wage moderation, the company is, in the view of the works councillor, appropriating too much of the productivity gain.

There are other employee representatives in our sample with a more critical stance towards the large-scale automation implemented in their companies – for instance because they anticipate negative impacts on health and safety (FR-MEDIA) or because the new facility is built far away from existing facilities that will be closed down in exchange (GER-FOOD DC2). But regardless of their preferences and regardless also of their institutional and organisational power, it seems that if management is determined to implement these changes, it can do so even if they are opposed by employee representatives. This is essentially because across countries the participation rights of employee representatives simply do not extend to vetoing or effectively modifying this kind of far-reaching decision but are mostly restricted to the right to be informed and consulted. And even these rights may be ignored if the relationship between management and unions is tense or remote, as in the case of the introduction of semi-automation in the two French companies (Perez and Gautié, 2017; Gautié and Perez, 2017):

"The top managers of the company focused only on figures, without taking into account the human factor [...] they never asked employees what could have been improved with respect to the old process [...] even the team leaders, even the [local] managers were not consulted [...] we were thrown into a warehouse that had been designed by people who did not know our jobs" (logistics agent in new semi-automated warehouse, FR-FOOD).

In FR-MEDIA, the staff delegates of the committee that is to be informed and consulted prior to any important technological changes, didn't receive any information from management in time, according to one union delegate: "they gave it to us 24 hours before the consultation. There were 200 pages to read!

"This critical evaluation is contradicted by top managements' account: According to them, they made important efforts to involve workers: "We took teams, we went to visit the equipment manufacturer upstream [...] Former operators were equipped to make virtual reality to understand all the gestures that are involved in the work, and to adapt the future equipment" (CEO of FR-MEDIA).

In the latter case, a possible explanation for these diverging views is that management involved employees once the decision on the semi-automation process had been taken, while employee representatives expected to be informed and consulted prior to this decision.

The case of GER-FOOD (DC2) is illustrative of the limited impact of otherwise strong employee representatives with relatively high institutional (co-determination rights) and organisational

(mobilisation of employees) power resources: Here, the works council, are reported by its chairman, successfully opposed other management cost-cutting strategies in the years preceding and during the innovation processes (e.g. the plan to fully outsource truck drivers) by exploiting the ‘brokerage position’ of logistics work, essentially through strikes that effectively produced out-of-stock situations in the supermarkets of the retail chain. However, the works council failed to prevent or substantially modify the decision to build a new, automated DC in a ‘geo-optimal’ location, not least because management had set up a separate company for the purpose (Jaehrling, 2017b).

Overall, therefore, the decision to invest – or not to invest – in automation and to introduce changes in the physical distribution network seems to be little connected to the preferences and power resources of employee representatives and does not seem to vary systematically across the three countries in our study. The reasons given by management representatives for investing – or not investing – in automation primarily emphasise the economic costs and benefits (see also 5.2.1).

The national industrial relations systems and the corresponding typical organisational cultures do, however, seem to affect how and to what extent worker representatives and managers negotiate on the following issues:

- e. redundancies, social plans, severance payments;
- f. implications for pay levels, working time and other employment conditions;
- g. ergonomic design of the workplace.

Broadly speaking, in the Dutch and German cases, many of these issues are subject to extensive and detailed negotiations between management and staff representatives, the results of which are subsequently set out in agreements concluded at company or even establishment level. This seems to be less the case in the two French companies. This is partly because important issues like basic pay and working time issues continue to be regulated by sector-level agreements and national labour law. Thus, for the relevant matters in our context, staff representatives at company level obviously have more responsibilities and also more formalised rights in the German and Dutch companies, and consequently are involved in decision-making and bargaining processes at company level on a more regular basis.

A second difference relates to the bargaining style or, more generally, to the degree of cooperation and trust between management and employee representatives. Whereas the French examples quoted above indicate a high degree of mistrust and poor communication, the example of NL-MEDIA reads like a textbook example of a high-trust relationship embedding the negotiations around innovation related issues. Where job quality issues are concerned, the company has tended to implement changes gradually after discussing the need for innovation and change and the proposed solution, in detail with the employees (through shop floor meetings) and employee representatives. Management put forward the argument that the changes were necessary for job security in order to convince employees to go along with them. The changes in the market were sometimes quite visible: when a client left, employees physically saw the empty shelf space left behind. Similarly, new initiatives to fill shelf space were very visible (and much appreciated) by employees. As a consequence, employees also seemed well aware of the need to keep customers happy and to expand to new markets in order to maintain the utilisation of the warehouse facilities. The works council has been supportive of the changes but has emphasised the need to minimise the negative impacts on employees (Keune and Koene 2017).

This collaborative attitude on the part of both management and employee representatives seems to have facilitated the implementation of innovations in this case. At the same time, the case is less evidently a textbook example with regard to the protection of job quality, as employee representatives made important concessions with regard to pay and working time, as will be described further below. The major benefit for employees in this case is that the company succeeded in maintaining

employment levels despite the disruptive changes in its core market segment (e-commerce and digitisation of books), not least by imposing high flexibility requirements on employees. In a similar way, the company pact in GER-FASHION, which was concluded in the context of a major restructuring of the physical distribution network, traded concessions on wages and working times against investment obligations and a five-year employment guarantee, echoing other ‘employment and competitiveness pacts’ (Rehder and Hassel, 2001). Here, and in other cases (GER-FCMG and GER-FOOD (DC2), NL-MEDIA), company agreements also fix the terms and conditions for redundancies and offer individual solutions for those not able or willing to work in a changed environment.

The more adversarial labour relations in the French cases, and the fact that the large innovation projects are not accompanied by compromises forged between management and employee representatives, do not necessarily lead to different outcomes in terms of job quality. With regard to working-time issues for instance, the institutional framework gives employee representatives in the case of FR-MEDIA the power to veto the annualisation of working hours; since union delegates make use of this option, the working hours of employees in this company are considerably less flexibilised than in the case of NL-MEDIA and GER-FASHION (see 5.3.1). In a similar vein, while there is a higher level of employee involvement in the German cases with regard to occupational health and safety, public policies in the case of France to some extent seem to work as a functional equivalent in gearing HR strategies towards more sustainable workplaces (see 5.2.2). We will discuss the resulting differences in terms of job quality across cases and countries in more detail below, but a preliminary conclusion suggested by our findings so far is that there is only a **weak link between the degree of employee participation and outcomes in terms of job quality**.

Any assessment of the innovation model and of employee involvement would remain incomplete without a closer look at the broader management-labour relations through which the adoption and implementation of innovations at company level were coordinated. In this respect, the economic and technological trends described above have left their traces, too, in the sense that they are a ‘stress test’ and increase tensions in management-labour relationships, at least in some of the establishments under study. The centralisation of management functions and the internal vertical disintegration (retailer-owned subsidiaries) are seen by employee representatives, and to some extent also by managers, as a trend that leaves them relatively powerless when it comes to influencing decision-making on both innovation and job quality-related issues. This was even reported in cases with ‘high-trust’ labour-management relationships, as in GER-FASHION, while it accentuates previous trends in low-trust environments, as in the case with FR-FOOD, where the role of senior managers at establishment level has shifted from managing a business unit (with suppliers and clients) to the more limited role of monitoring the work process in the warehouse, in order to reach the targets (performance indicators) set at company level. Moreover, there is a declining share of lower level management jobs, which leads to less interaction between team leaders and their teams as they are overwhelmed by administrative tasks, not least due to increasing requirements in terms of reporting (Gautié and Perez, 2017).

5.2 Process innovations: automation: fewer manual jobs, less physical strain?

At first sight, the process innovations introduced in retail DCs are undoubtedly ‘skill biased technical changes’ in the basic sense that they raise the relative demand for skilled labour and substitute for unskilled labour. However, this assessment is qualified by two caveats. Firstly, *within* the remaining manual occupations, skill requirements are decreasing as a result of the same technological changes, so the changes do not increase skill levels overall. Secondly, a range of factors are slowing down job destruction in the manual occupations or even fostering job creation – not least an increased demand for warehousing services as a result of the shift from ‘brick and mortar’ retailing to e-commerce. (5.2.1)

Thus while the substitution of routine and often poorly rewarded jobs through automation might by implication raise average job quality for the remaining jobs in the industry over the long term, our findings suggest that the routine jobs will be around for some time to come. Thus investigation of the impact on various job quality dimensions and the way in which companies deal with them (5.2.2; 5.2.3) continues to be highly relevant.

5.2.1 Interactions with employment levels, skill requirements and discretion

It is no surprise that the technological innovations introduced in the companies in our sample have significantly increased productivity levels. However, these increases do not necessarily translate into reduced employment levels: While in FR-FOOD, FR-MEDIA and GER-FOOD (DC1) the semi-automation in fact led to substantial job cuts (up to 50% in the case of FR-FOOD), this was not the case in the other companies. One factor that may help to explain this is that semi-automation in these cases was introduced not least as a response to an increase of the volumes to be handled by the DCs following the expansion of e-commerce (GER-FASHION, NL-MEDIA) or simply a growth in sales volumes of the retailer owning a DC (GER-FCMG). Moreover, the (semi-)automation remains partial and this is unlikely to change in the short to medium term. Depending on the specific features of product range and service requirements, automation is not seen as a justified investment (*“we do not push automation as far as we could, because the flows do not justify it”* (Warehouse director, FR-MEDIA). In particular in the food segment, logistics companies have introduced automation mostly in newly built warehouses, but not across the board. In one case even the new warehouse is a conventional warehouse (GER FOOD DC 1); according to the trade unionist interviewed, this decision was based on senior management’s evaluation that the benefits for the product range (groceries) were limited (Jaehrling 2017b). At NL-MEDIA and GER-FASHION, new clients are initially serviced by separate, less automated warehouses because of the uncertainty as to whether and when there will be a return on investment.

Finally, the dedicated e-fulfilment centres in grocery retail (‘dark stores’) are low-tech facilities, and the same is obviously true for the decentralised network of smaller DCs working for Amazon Prime Now⁷¹. These examples confirm that the strategic choices around automation depend largely on management’s evaluation of the economic costs and benefits. It seems that certain features of the product range, as well as the economic context (low-margin retail environment, marketisation) lead companies to adopt disruptive technologies overall at a slower pace than is technically feasible (see also Wright and Lund, 2006; Brandt et al., 2016).

With regard to **skill requirements**, it is worth mentioning for a start that digitisation also affects commercial and administrative jobs, as IT solutions such as warehouse management systems (WMS) haven taken over more and more of the planning and replenishment activities that were previously assumed by skilled employees (Martinetz et al., 2015: 30). In our sample, this trend is quite visible in the case of FR-FOOD. By contrast, e-commerce and the supply chain transformation is also considered to create opportunities for some groups of skilled employees involved in developing and planning new products and services (e.g. Heistermann et al., 2017: 7). These new requirements were highlighted by our respondents in NL-MEDIA and GER-FASHION in particular; however, since the focus of our research is on routine jobs, we will not explore these changes in depth here.

With regard to routine occupations, the evidence in our case studies clearly points to a de-skilling trend. Firstly, skill levels are decreasing on average because the job of forklift drivers, which requires somewhat more specialist skills and certificates, are the first to disappear or be reduced as a consequence of automation (GER FOOD, GER-FCMG, FR-FOOD). Secondly and more importantly, skill

⁷¹ see <https://www.youtube.com/watch?v=F4DWM-BqWNs>

requirements are also decreasing for the remaining jobs. This is despite the fact that employees had to learn how to handle new technical equipment (handhelds, computer screens). But even if this requires some basic technical skills, it does not necessarily require, for instance, reading and writing skills (as instructions and information can be visualised or given by voice). Moreover, the instructions and information provided by WMS replace the manifest knowledge previously required for these jobs. Finally, the tasks at each workplace become more narrow and repetitive. This assessment is broadly shared by employee representatives, employees and management representatives in all three countries, as the following excerpts from the case studies document. What is more, they show that de-skilling is not an unintended consequence but rather a planned effect of automation.

- At GER-FASHION, the introduction of the automated sorter in the returns centre made it possible to streamline the distribution of different types of returned goods to different workplaces. Before, employees had to assess the state of different types of goods (shoes, textiles, jewellery), depending on what was in the returned parcel (Jaehrling, 2017a).

“That was also the reason at the time [to introduce the automated sorter], to be able to allocate only one type of product to each employee, in order to increase productivity.”
(head of department, GER-FASHION).

- At NL-MEDIA the design of the automated warehouse was shaped by managements’ intention to ensure that the tasks at the output side of the system remained relatively simple and that a new worker could learn to operate a particular post in about 10 minutes. This plan was also intended to facilitate the transition from the conventional to semi-automated procedures for the existing workforce. At the same time, the company introduced job rotation in order to increase functional flexibility for employees, partly to make them more resilient to possible changes in the available work (due to shifts in the customer base; see also 5.3.2) (Keune and Koene, 2017).
- At FR-MEDIA, according to a trade unionist, the tasks were simplified on purpose, according to a trade unionist (Perez and Gautié, 2017):

“An expert came to work on that so that – at least that was the idea – even a person who could not read and write could work here. [...] Before, at the opening, we had what was called ‘product knowledge’, with training to be able to process them. Today, on my tablet, no more training knowledge of the product is necessary, beep or not beep tells me if it's the right barcode or not the right barcode (trade unionist, FR-MEDIA).

- **In the two semi-automated warehouse** operated by FR-FOOD, manual picking has been replaced by an automatic sorting system with two new jobs: "feeder" ('injecteurs') pick the parcels from the pallet and place them on a big automated carousel. At the exits of the carousel, "palletisers" collect the parcels and put them on the pallet that will be sent to the point of sale. These two jobs ("feeder" and "palletiser") are very repetitive and intensive, as the pace of work is imposed by the machine, as on traditional assembly lines (Gautié and Perez, 2017).

Overall, (semi-)automation has led to a further Taylorisation of the workplace; job tasks are less varied and work has become more repetitive. The remaining tasks performed by humans are not 'cognitive tasks' but routine tasks that at present are too costly to automate. Unlike in the case of manual picking, the pace of work in these jobs is now determined by the automated segments of the production process. Some management and employee representatives emphasise that experience still matters; this becomes obvious when external workers (e.g. from temp agencies, or students on holiday jobs) temporarily substitute for permanent employees. However, the predominant judgement of managers and employees alike is that skill requirements, autonomy and discretion have declined to the lowest

level possible. As a consequence, the training period needed to be fully operational as a warehouse worker has been reduced – e.g. from two to three weeks to only three days following the introduction of pick-by-voice in the conventional warehouses operated by FR-FOOD (Gautié and Perez 2017).

These changes are experienced as a loss of meaning, in particular by employees who experienced the previous work environments. Stripping out any extra tasks, subjecting employees to the pace (and instructions) of machines, and assigning ever narrower tasks is nurturing a sense of alienation and of being treated as a mere appendage of a machine, as illustrated by the quotes below.

“So when you take a collective agreement [...], and you look at the warehouse worker job description, you see a lot of tasks that the warehouse worker needs to know, reception, how to receive a driver, order preparation [...] Now, the storekeeper arrives at a post and it is a single task so that is very poor in terms of task variety: I take CDs that are hanging from a bin, I take a bin, I put the CD in the machine and I push the CDs and the CDs will scroll by themselves and I do that 7 hours a day.” (trade unionist, FR-MEDIA).

“Before [the introduction of pick-by-voice], you had to be an expert in your trade (“métier”), now you just have to know how to use the tool [...] in fact, it is not even a trade anymore [...] you are plugged in when you start, unplugged at the end of the day, that's it” (union delegate, FR-FOOD).

In GER-FCMG, the introduction of a semi-automated monorail picking system has been accompanied by a reorganisation of the way pallets are assembled. This is now ‘team work’, in the sense that pickers are no longer responsible for loading a full pallet but only part of it. According to the chairman of the works council, this is experienced as a loss of meaning by employees who had previously worked in the conventional DC, as they now don’t “see the result” any longer and don’t get any individual feedback from their supervisors, as used to be the case if the pallet was packed very well or if they needed to change something (Jaehrling 2017c).

The latter example also resonates with the notion of ‘la belle palette’ used by French warehouse operators (Gaborieau, 2012), which encapsulates the art of assembling a palette in a way optimised for onward transport. Even though the manual occupations were not regarded as professional ‘trades’ everywhere (as by some of the senior French employees, for example), it seems that there used to be elements of craftsmanship in these occupations too. While younger employees might not share this sensation of loss, to treat this merely as a nostalgic attitude prevalent among older employees would be to ignore a real impoverishment in job design that has affected the world of routine occupations.

5.2.2 Impacts on job quality and company responses

Studies of the impact of the economic and technological changes in retail logistics have in particular highlighted how they have tended to increase work intensity and managerial control over the labour process (e.g. Lund and Wright, 2001 and 2003; Newsome, 2010; Newsome et al. 2013; Davezies, 2008, Gaborieau, 2016). This is linked to the more sophisticated systems of performance measurement and control that have been introduced alongside the new technologies in order to meet the key performance indicators (KPI) laid down in the contracts with retailers. The indicator with the most immediate impact on work intensity is the number of items to be processed every hour in the warehouse and the resources it takes to do that. Performance measurement systems transpose this overall rate into performance standards at the team or individual level, thus defining the number of items to be received, stored, picked, packed or put out per capita, either per hour or per shift. These pre-defined targets can be linked to performance pay schemes in order to incentivise workers to meet or exceed the expected rate. Some studies document the vehement opposition of employee representatives and in some cases even reservations among managers, to the introduction of these

pay schemes. This is because they are considered to speed up the work pace to a degree detrimental to health and safety; there are also concerns that they favour speed over quality and thereby increase error rates (Wright and Lund, 1998 and 2006; Lund and Wright, 2001). However, an increase in work intensity has also been observed in DCs where performance measurement systems have been introduced without individualised incentive schemes (Newsome et al., 2013), because management can resort to alternative instruments to secure performance levels (including arbitrary managerial authority). On the other hand there are also cases where employees and employee representatives have come to accept or even appreciate the system of pay bonuses attached to performance standards (Wright and Lund, 2006).

The role of new technologies in this context also seems to be far from deterministic. An increase in work intensity was observed across different types of warehouse, suggesting it is not linked exclusively to a certain degree of automation or to a certain order-picking technology. A view shared by researchers, however, is that WMS and the new order-picking technologies are basic technologies that greatly facilitate computerised work monitoring as they enable management to constantly monitor at the *individual* level and in *real-time* (not just ex-post) whether and to what extent the expected targets are being met. The role of automation is less clear-cut. For instance, while one study reports a case in which work effort is regulated through a technology-induced increase in line speed (Newsome et al., 2013: 8), another study includes a case where the throughput was also largely determined by an automated sorting system but where employees' work pace nevertheless varied significantly (Wright and Lund, 2006).

Thus while the technological innovations certainly facilitate management strategies to extract increased levels of worker effort (Newsome et al., 2013), empirical studies have also documented that the outcome in terms of job quality depend significantly on organisational choices. Management attitudes and perceptions as well as the bargaining power of local employee representatives are emphasised as mediating factors here. An interesting question, therefore, is whether the organisational choices in our cases (in different industrial relations systems) deviate systematically from the choices in American, British and Australian DCs, and if so, why.

5.2.2.1 Performance measurement and performance pay schemes

One distinctive feature emerging from the case studies is the influence of the **institutional framework on performance pay**. Pay systems linked to performance indicators are a very common feature in our cases, although they are not always individualised. In FR-FOOD, individualised schemes have been introduced in most establishments belonging to the company. They can, however, be vetoed by trade unions, as evidenced in a few DCs where trade unions opposed their introduction due to the expected increase in work pace. This is also the case in FR-MEDIA, where individual bonuses are restricted to managers only. By contrast, French law even prescribes profit-sharing schemes (called "*participation*" schemes) in companies with more than 50 employees that are dependent on performance indicators at the *establishment* level. In addition to this statutory scheme, many French companies (including FR-FOOD and FR-MEDIA) have put in place other types of profit-sharing ("*intéressement*") schemes (see below). In Germany, the law also gives works councils strong co-determination rights when it comes to principles of pay determination (e.g. the introduction of performance pay) and the introduction of technologies that can be used to monitor employees. In the companies in our sample, individual performance pay schemes are in place in four out of the five DCs visited (GER-FOOD (DC1 + DC2), GER-FASHION (DC1+DC2)). The fifth company (GER-FCMG) has a profit-sharing scheme with an annual bonus; management here has no intention to introduce an individualised scheme.

Comparison of the French and the German cases suggests that, overall, there are fewer conflicts between management and employee representatives about the performance pay systems in the German cases. This seems to be less a consequence of different levels of institutionalised rights and

more a result of different management approaches to this issue and the generally less adversarial labour-management relations in Germany. This is reinforced by an institutional infrastructure that supports companies seeking to set up collaborative, high-trust systems of performance measurement and pay, as illustrated by the case of GER-FASHION (Jaehrling, 2017a). While time and motion studies are often carried out by external companies (as in the British companies studied by Newsome et al. (2013)), the system at GER-FASHION is based on a certified procedure that has been developed by REFA, an organisation founded in the 1920s by engineers for the manufacturing industries. The REFA method prescribes regular updates whenever important technological or organisational changes to the work process have been introduced. Both trade unions and employers are involved in developing the methods and the implementation at company level is also a task assumed jointly by works council and management. The CEO of GER-FASHION has been trained as a REFA expert and is “*one of the few who understands the system*”, according to the chairman of the works council. The works council has, for instance, supported an initiative by the CEO to adapt the system to the ageing workforce – through a slightly different incentive scheme for employees aged 50+, which entitles them to a bonus when they achieve 90% of the standard performance level. As a result, a large majority (around 90%) of employees do receive a performance bonus in GER-FASHION – the level of which (laid down in a collective agreement) is relatively modest compared to other companies in our sample (the majority around 150 €/month) (Jaehrling, 2017a).

Although works councils are not involved to the same degree in the two food DCs operated by GER-FOOD, the share of those *not* receiving a bonus is very small in these establishments too, according to the works councils (Jaehrling, 2017b). There is no monetary sanction if targets are not met, and participation in the performance pay system is not mandatory either, so employees who do not feel up to meeting or exceeding the standards can opt out of the system.

All this does not necessarily mean that there is no pressure on individual employees, as some employees and managers ignore or disregard these rights. However, works councils do have the means to fight off pressure on employees, as illustrated by the case of GER-FASHION:

The works council at DC1 distributed a leaflet last year informing employees about their individual right to opt out of the incentive pay scheme. The occasional use of this option had a “healing effect”, according to the chairman: “A few supervisors had to learn that it’s a voluntary incentive scheme, and if I want an employee to achieve higher levels than he normally does, then I have to motivate and not oppress him.” (chairman of work council (DC1), GER-FASHION).

In the other DC operated by GER-FASHION, the works council has, in contrast, deliberately abstained from pro-actively reminding employees about their opt-out rights because they share management’s view that without the performance pay system the DC probably would be unable to meet the delivery lead times agreed in the service level agreement (SLA) with its customers.

Thus the German institutional framework – and a complementary social infrastructure (REFA) – provides employee representatives with considerable options for co-managing performance measurement and performance pay systems, which is probably one reason for the generally more sympathetic attitude towards these systems among German works councillors in our sample. However, the cases show that it is also a question of strategic choice and bargaining capacity whether or not works councils make effective use of these options.

The importance of organisational choices, and more specifically of management styles, is also very evident in the two French cases. While the labour code prohibits individual wage penalties, and unions can also block the introduction of individualised incentive schemes, there are other means by which

productivity levels can be enhanced and work organisation remodelled in a way that conforms more closely to customer requirements. For instance, the management in FR-MEDIA has recently implemented “Time Game” meaning that individual performances are compared to the average for the team as a whole. According to the staff delegates, this benchmark is implicitly used to push workers to reach or even exceed the objective, under pain of being transferred to another team or being given more arduous tasks (Perez and Gautié, 2017). Moreover as mentioned above, both companies have profit-sharing schemes with annual bonuses determined by performance indicators at the establishment level. In both cases, this is transposed in a way best described as ‘management-by-indicators’. The schemes are very complex, as they are based on many performance indicators in several domains – the rate of absenteeism, the number of work accidents, the unit cost per parcel, error rates etc. At FR-FOOD, the complexity of the scheme has increased in recent years and even the trade unionist who negotiates the targets finds it very difficult to fully understand (Gautié and Perez, 2017). Paradoxically, while local managers are required to more closely monitor and enforce performance indicators, the more traditional ways of securing secure performance (supervision by team leaders, direct interactions) have been cut back and replaced by software and managers operating at a greater distance from the shop floor (see 5.2.1). Meanwhile in FR-MEDIA, the performance indicators have been more strongly oriented towards customer satisfaction (both individual customers and shops) through the recent introduction of indicators concerning “quality” – including indicators of customer satisfaction based on regular surveys.

“Putting client satisfaction in all indicators, in all managerial and collective initiatives, including profit-sharing, also has the virtue of reminding [employees of] the ‘contribution – compensation’ pairing.” (Warehouse director, FR-MEDIA (DC2)).

Another element in this shift towards ‘management by customer’ is a change in corporate culture, as explained by the logistics director of FR-MEDIA:

“The relationship we had with our colleagues in the shops was like one between friends: ‘we render a service’. And the objective of the initial actions was to change that, to make sure that we moved on to a true customer-supplier relationship. We went from ‘I render a service’ to ‘I sell a service’”. (Logistics director, FR-MEDIA)

One measure in this vein are so called “call conferences”. These are meetings with a group of employees and managers. During this meeting, they call clients who expressed not being satisfied by the service delivered.

Thus in the French cases, the enhanced technological possibilities for monitoring and controlling employees seem to amplify a more general trend towards interpreting ‘lean’ principles in a technocratic and hierarchical way (‘lean à la française’, Daniéllou, 2015, see also Gautié et al. in this volume).

Still, as the examples provided above illustrate, in both the French and German cases, employee representatives enjoy considerable co-determination rights on the issue of performance measurement and pay, regarding both their introduction and their design. This might be an important difference to the way companies in the liberal market economies operate (see e.g. Lund and Wright 2001).

5.2.2.2 Physical strain and ergonomic design of workplace; employee involvement

Managers in the companies under investigation and manufacturers of technological equipment alike emphasise that automation minimises physical strain as it reduces the need to lift and carry heavy loads. This claim is even reflected in some cases in the descriptions of the new machines, such as the semi-automated ‘Ergonomic (sic!) picking system (EPS)’ by WITRON. The leaflet on EPS states

“For each pick, the operator cabin is automatically positioned such that the picker need not lift, carry, or bend to perform his or her pick (...) ETP is able to reach a very high pick performance compared to conventional warehouse systems, independent of the age or gender of the picker. “ (WITRON Leaflet on EPS).

This view was expressed by many managers in the companies in our sample; and the fact that there is less manual handling of heavy loads is not disputed by employees and employee representatives either. However, whether ‘less heavy lifting’ in fact literally outweighs the other strains induced by the technological changes is another, more contested question. In this regard, employees and employee representatives across cases broadly share the view that the changes described above (increased repetitiveness, increased work intensity) as well as some new specific strains imposed by the machines (see below) combine to maintain or even increase the arduousness of warehousing jobs. These new specific strains are mostly non-ergonomic movements adapted to the requirements of the semi-automated machines:

- At GER-Food (DC2), the operator cabins in the EPS-System installed in the new warehouse are called “vomit cages” or “roller coasters” by employees’, according to the chairman of the works council, as they move quite fast up and down and forwards and backwards (Jaehrling, 2017b).
- At FR-FOOD, one operator working as a ‘feeder in the new semi-automated warehouse, who had previously worked as a picker in a conventional warehouse, explains: *“At the feeder work station, you are very static, you don't walk anymore, but you keep rotating [...] while in the old warehouse I handled 1340 parcels per day, at the feeder work station, I handle up to 700 parcels per hour; even if there is less load carrying, it is very tiring”* (logistics operator, FR-FOOD) (Gautié and Perez, 2017).
- At FR-MEDIA, operators in the semi-automated warehouse have to carry out a painful repetitive gesture (tipping the sleeves of CDs hanging from the ceiling), which could have been avoided by investing in another, more expensive option, but this option was deliberately neglected by the company for economic reasons according to the employee representatives (Perez and Gautié, 2017).

Notwithstanding the last example, it seems that there is an increasing awareness on the side of managers, in particular human resources managers, about the need for more ergonomic workplaces and reduced physical demands. There are several factors supporting this.

Firstly, the **high strain jobs are increasingly clashing with an ageing workforce**. As noted above, the average age in several of our company case studies is high and increasing and this demographic change is a factor incentivising firms to innovate in this regard. Secondly, this pressure is exacerbated, in the German cases, by increasingly tight labour markets. In particular in the more provincial sites (where DCs are often located), human resources managers are faced with increasing recruitment difficulties, which make retention, even of older employees, more important.

Another important factor is, once again, the **institutional framework and organisational cultures**. When it comes to more fine-grained decisions around the proper *implementation* of large scale technological and organisational changes (e.g. how to design an ergonomic workplace in the semi-automated warehouse), the legal framework in all three countries gives employee representatives and other professionals (e.g. company doctors and health and safety specialists) relatively comprehensive rights and duties. However, it seems that these rights are more strongly ‘activated’ in some of the German cases. In GER-FOOD (DC2), where management-labour relationships have otherwise been rather tense in the past decade, management usually responds to works councils’ demands for some smaller scale investments in more ergonomic equipment (within a certain budget limit), according to the chairman of the works council (Jaehrling 2017b). Again, employee involvement is taken to higher

levels at GER-FASHION. At DC1, the works council has, according to its chairman, made active use and enforcement of the standard procedures and relevant legal provisions an increasing focus of its activities over recent years, in some cases pursuing a somewhat reluctant management by taking issues to court or to the municipal Office for OHS. At the time of the interviews, the HRM department was organizing a peer-to-peer project, initiated by researchers from a local university, that addressed migrants' needs and health/stress related issues. Moreover, an employee suggestion scheme was modified and formalised last year on the initiative of the works council, as the previous more informal system was not working well. Both the works councillors and the managers we interviewed were very positive in their evaluation of the new suggestion scheme, as it has resulted in a strong increase in suggestions, some of which have proved very valuable, for increasing productivity, improving ergonomics at the workplace and reducing the risks of accidents (Jaehrling, 2017a).

Conversely, where employee involvement procedures have been abolished, employees perceive this as yet another layer in the overall degradation of job quality, as in the case of **FR-FOOD**. Senior workers, such as the union delegates, remember that before the centralisation process in 2004 (integration of all DCs into a separate subsidiary of the retail chain) shop floor workers were consulted through work groups and/or encouraged to make suggestions for small, incremental innovations at an "ideas fair", with workers being offered a small gift if their idea was implemented. According to one truck driver we interviewed, not only do workers not have any incentive to innovate anymore but they are even supposed not to do so. This can induce a lot of stress, in particular when new tools are not functioning well. Sometimes tools are removed after a few months because they are malfunctioning (Gautié and Perez, 2017).

This again exemplifies the hierarchic management styles and the low level of trust in the French cases, which is a non-negligible factor impacting on both innovation and job quality. The case of FR-MEDIA illustrates this 'vicious circle' (Perez and Gautié, 2017). Here, the low-trust relationship has become a legacy impeding moves towards more employee involvement. The management had recently set up workshops on issues related to organisational and technological changes (e.g. job rotation), thereby responding to a request from employee representatives to involve employees more strongly in these changes. However, some employee representatives deliberately do not attend, as they suspect this is primarily a means to streamline workers' views with managements' decisions, as one of the trade unionists explains:

"Working groups, I'm not against them. If management trains the employees, gives them all the information to handle this subject, it could become something productive, so why not? But I have the feeling that management is joining forces with employees but is not telling them everything. So they are influencing his views a little bit so that they do not deviate from the management view" (union delegate, FR-MEDIA).

These contrasting cases are again largely in line with the expected differences arising out of the institutional environment and the different organisational cultures and management styles that have developed in these environments. However, the case of GER-FOOD DC1 illustrates that low-trust relationships can also develop in the 'social partnership' cluster. The chairman of the local works council at DC1, while accepting that local managers are perceived as generally benevolent and supportive, complains that important decisions on OHS and HR issues have been centralised and that the remote management at national headquarters makes virtually no effort to improve health and safety. This translates into a lack of (small-scale) investments in machines and tools that would alleviate painful gestures and postures (such as wrapping machines or roller shutters) (Jaehrling, 2017b).

In France, on the other hand, public policies over the past 10 years have increased the pressure on companies to improve occupational health and safety (“Plan Santé Travail”, in force since 2005), and recent legislation on ‘arduous work’ is now requiring companies to develop adequate measures to reduce the arduousness of jobs. This has triggered some responses in the two companies under investigation. At FR-FOOD, the main strategy has been to introduce what has been labelled ‘facilitating tools’, i.e. the kind of tools mentioned above that help to reduce painful gestures and heavy lifting. More widely, according to one regional HR manager, one of the key objectives of the automation processes that will be introduced in the coming years is to move to a sustainable process in terms of working conditions, in a context of increasing regulatory requirements (Gautié and Perez, 2017). In the case of FR-MEDIA, some training sessions have been introduced to help workers cope with increasing stress at work and sleep problems. However, in this company, one of the employee delegates denounced the hypocrisy of these and other training courses, pointing to the deliberate neglect of a technical option that would have prevented employees from carrying out a painful gesture (Perez and Gautié, 2017).

5.2.3 Impact on labour market segmentation and ‘inclusiveness’: temp agency work, women, immigrants

As has become evident in the previous sections, the new technologies have (partly intentionally) led to lower skill requirements and also decreasing requirements in terms of lifting and carrying heavy loads. This has implications for the use of temp agency work, and also for the employee structure.

Starting with the latter, the share of women as well as immigrants has increased in the two French cases, and this is partly the result of targeted recruitment strategies.

At FR-MEDIA, the director of the new semi-automated warehouse W2 appreciates that it was “designed around an ergonomic concept. Everything has been done to avoid the handling of loads. Such that virtually all positions can be used for all persons, whether male or female, whether or not they have an incapacity” (warehouse director, FR-MEDIA).

And at GER-FASHION, it was not least the labour shortages that led HR managers to develop a project with the employment agencies to recruit from a group of refugees, albeit on a very small scale (fewer than 20 employed in the end). As this did not cover its requirements and local temp agency workers are increasingly difficult to find, the company has recently started to recruit temp agency workers from neighbouring Poland. This was at first an ‘experiment’, with 100 TAWs employed for 3 months. At the time of the interviews, the scheme was to be renewed following a positive evaluation by both managers and works council (Jaehrling, 2017a).

Thus, to some extent, there is a trade-off: the deskilling of jobs facilitates the hiring of excluded workers, thereby improving employment prospects for ‘outsiders’. This however comes at the price of impoverished employment conditions, and with almost no prospect of internal horizontal or vertical mobility. It is also worth pointing out in this context that the increased requirements in terms of working time flexibility (see 5.3.1) mean that it is increasingly difficult in these jobs to reconcile work and family. While two of the German companies (GER-FASHION DC2; GER-FCMG) used to offer their employees the possibility to work on ‘mother shifts’ (sometimes also ‘father shifts’), i.e. on permanent morning shifts, this practice is now discontinued; all newly recruited employees at least are in principle expected to be available over the full operating hours, including weekends and late nights.

The **use of temp agency work** is generally facilitated, too: for instance, thanks to the voice picking device, “it is much easier to integrate the young inexperienced temp agency workers [...] much simpler than when you had all the instructions on paper” (director of one conventional DC). But this is not the only reason for a relatively high and in some cases increasing share of TAW in the companies under

study. With the exception of GER-FOOD (DC2) the share of temp agency work in our cases was considerably above the national average rate, ranging from 10-15% (GER-FOOD DC1) to above 25% (NL-MEDIA). TAW is used to differing extents and for various reasons:

- as one element in an overall attempt to use external flexibility in order to adjust to severe fluctuations in work load and seasonal peaks in demand (NL-MEDIA; FR-MEDIA). In the case of FR-MEDIA, the company switched to this option because it is cheaper than paid overtime for permanent employees, according to one union delegate.
- as a prolonged probation period, i.e. new recruits usually enter the firm via temp agency contracts (GER-FASHION, GER-FOOD (DC1))
- in the initial phase after the start of new semi-automated DCs, due to difficulties in recruiting the desired number of employees and in part also to poor job quality and high turnover (FR-FOOD).

Nevertheless, external ‘casualisation’ plays a more limited role particularly when compared to cases reported in studies on US warehouses, where multi-tiered arrangement including subcontracting and temp agencies prevail and where temp agency workers make up 50% or more of the workforce (Gonos and Martino, 2011; Gutelius, 2015, Jaffee and Bensman, 2016). The introduction of process innovations has, however, tended to increase rather than reduce their share in the companies in our sample too. This might not necessarily be visible at the aggregate level, as there are also contrary effects. Semi-automation has reduced the use of temp agency work in the case of FR-MEDIA, where TAWs acted as ‘buffers’ for the job cuts associated with the semi-automation. Moreover, in the German cases, where temp agency work traditionally makes up a substantial share of employment, recruitment difficulties due to tight labour markets also applies to TAW, so in three companies (GER-FASHION, GER-FOOD (DC1 + DC2)), TAW has declined or is about to decline, but this is not related to process innovations. Moreover, the **use of subcontracting** has also increased in several DCs for truck drivers (NL-MEDIA, GER-FOOD (DC1 + DC2), FR-FOOD) and stands at 50% or higher in our cases (see Table A-1).

5.3 Organisational innovations: Temporal and functional flexibility

While the ergonomics of warehousing jobs is a relatively well investigated topic, “the scheduling and rotation of tasks in warehouses (...) have not attracted much research” (Davarzani and Norrman, 2015:6). This is also true for the above mentioned studies on companies in the liberal market economies, which have highlighted these companies’ strong reliance on external flexibility and the impact on work intensity. Still, the “imposition of demanding shift patterns to satisfy the voracious demand for 24/7 consumption” (Newsome et al., 2013:4) and “erratic work schedules” (Gonos and Martino, 2011: 500) were identified as key features of job quality degradation in these studies too. In the following two subsections, we analyse to what extent and in what way companies in our sample have adjusted their internal work organisation (temporal and functional flexibility) *in conjunction with* the innovations described above. It is necessary to bear in mind that internal flexibilisation is not a new trend and is not simply related to any innovation dynamic. The extension of shop opening hours since the 1990s, for instance, can hardly be framed as innovation per se and is not in itself a consequence of any innovation, but rather follows customer expectations or at least retailers’ interpretation of them. However, the innovation dynamics described above exert additional pressures on companies.

The following trends can be identified as common challenges that reinforce companies’ efforts to increase their internal flexibility:

- *Firstly*, the implementation of JIT principles has squeezed out buffer times. With a more demand-oriented supply chain, fluctuations in demand translate more immediately into fluctuations in workloads in the distribution centres.

- *Secondly*, the large scale investments in ‘high-tech’ warehouses have to be justified economically by being operated round the clock if demand is high before there can be any investment in additional facilities.

“..so obviously with the investment in W1, mechanisation, they came to see us and told us that given the magnitude of the investment that had been made, it was not possible any more to work only from 8 am to 5pm” (staff delegate, FR-MEDIA).

Moreover, given the long time-to-market for these large scale schemes, expanding them at the same speed as sales growth might be difficult. In GER-FCMG, for instance, a sharp increase in the companies’ sales volumes could not be matched quickly enough by setting up an additional facility; according to the chairman of the works council this was the main reason for an extension of operating hours a few years previously

- *Thirdly*, e-commerce has removed any restrictions on shopping hours as web-shops are ‘open’ 24/7. However, unlike over-the-counter purchases, the purchased product is not immediately in the customer’s possession, with the exception of digitised products like e-books. Reducing the waiting time and offering as short delivery times as possible has therefore emerged as a service feature that companies can compete on. As explained above (3.1), customer expectations regarding delivery times are varied and complex and need to be balanced by firms against service cost and quality. However, to the extent that powerful competitors like Amazon make the reduction of delivery times a key element of their market conquest strategy, even regardless of costs, companies come under strong pressure to mimic this strategy, as explained by one manager:

“Amazon continues their deliveries on D+1 [=within 24 hours], including the weekend, while we, because we do not work on Sundays, because of the regulation etc., there is a time lag. And this gap in service, there are two ways of apprehending it: either one ignores it and says ‘that it is like that’, or one tries to find an alternative solution, in this case to negotiate an agreement on Sunday work, for example” (logistics director of FR-MEDIA).

- *Fourthly*, according to many interviewees, both expected and unexpected peaks and slumps in demand have increased as well, in both B2C and B2B warehouses. There is no uniform explanation for this phenomenon, and sometimes interviewees also stated they did not know the precise reasons. For B2B warehouses, the decrease in inventory space in shops is certainly a factor; another likely explanation is the increased product variety, including many seasonal products, and the shorter product life cycles (e.g. the fast-fashion trend). One factor quoted several times by interviewees is the increasing use of coordinated marketing campaigns such as ‘Black Friday’ or ‘Cyber Monday’. Thus the increasingly sophisticated EDI and forecasting software is of only limited use in accurately predicting demand. Local managers at two different companies (GER-FOOD (WH 1); GER-FASHION (DC2)) actually said that their planning activity is like reading a “crystal ball” .

5.3.1 Working time: internal casualisation?

Despite these common pressures, and despite some common trends in company responses, the strategies adopted by our case study companies still vary considerably. For instance, lead times, i.e. the time elapsing between the point of order and the delivery to the end customer or shop, range from 12 hours (GER-FOOD) to 96 hours (GER-FCMG) in the DCs handling fast-moving consumer goods. Lead times are more uniform in the (B2C) non-food segment, where all companies have adopted ‘service innovations’ offering their customers options for next-day (GER-FASHION, FR-MEDIA) or even same-day delivery (NL-MEDIA). However, not all companies aim for shorter lead times; indeed, in two of the German cases, there has been a partly deliberate reversion to longer lead times. In both cases, the main rationale behind the extension of lead times was to spread workloads in the DCs more evenly. In

GER-FCMG, the extension of lead times (to 96 hours from 72 previously) five years ago was a response to increasingly uneven sales volumes in the shops, with peaks on Monday and Friday/Saturday. The longer lead time allows the DCs to prepare orders for peak days during ‘slump’ days (Jaehrling 2017c). GER-FASHION – jointly with its internal clients – decided to abandon its 24-hour delivery option in 2016 and instead streamline all processes on a 48-hours lead time. The previous variety of delivery times caused discontinuous work flows in the DC, thereby reducing efficiency (Jaehrling, 2017a).

It could be expected that the longer lead times would also reduce the need to flexibilise working hours. However, this is not the case in these two companies. In GER-FASHION, streamlining the processes on 48 hours has even further reduced the buffer time and increased the need to synchronise processes in the DC, so as to avoid one department running out of work, according to one group manager. In GER-FCMG, the extension of lead times actually followed a decision to *expand* operating hours (to 24/6) – which was taken mainly in order to utilise the DC’s capacities more fully. In this context, as the logistics manager stressed, the extension of lead times also averted the need to rely more strongly on temporary agency workers, the use of whom is in fact at a relatively low level in this DC (less than 10% on average), compared to other DCs in our sample.

Nevertheless, reducing lead times invariably leads to additional pressures to flexibilise work organisation, as illustrated by the example of FR-MEDIA (Perez and Gautié, 2017). The company has launched a scheme whereby an order placed by 6 p.m. in the online shop will be delivered the next day free of charge to the store. This has repercussions on the internal flexibility requirements. The workload that is ‘foreseeable’ or ‘predictable’ on a daily basis has declined from 70% to 50%:

"This requires agility and responsiveness in the teams, a lot of agility and multi-skilling, with pressure on the team in respect of the client promise, which is accentuated throughout the day" (director of DC2, FR-MEDIA).

These examples suggest that companies do enjoy considerable discretion with regard to lead times. Shorter lead times increase pressures to flexibilise work schedules (and introduce multitasking, see last quote), but even if companies opt for longer lead times, this does not necessarily reduce pressures to flexibilise schedules, as other factors also impact on the level of internal flexibility. This is evidenced not least by the considerable differences in our company sample, as Table 3 shows.

Table 3: Overview of working time flexibility in case study establishments

| | Weekly/Daily operating hours | Shift systems | Annualisation? | Part-time | Bonuses |
|--------------------|---|---|--|------------------------------------|---|
| GER-FOOD | DC1: Mon-Fr / 6:00 - 22:00 (+ Sun for part of those working in Fruits + Veg.) DC2: Mon-Fr / 6:00 - 23:30 ; Fruits+Veg: + Sun / 17-1:30 | DC1: Dry food + fresh food: 2 shifts Frozen food: 1 shift (6-14); Fruits+Veg: 1 Shift (early or late) DC2: 2 shifts | DC1: <i>Very Limited:</i> Bonus for overtime work is paid. For overtime hours, employees can choose between paid hours and putting them on own “leisure” account. DC2: <i>Some:</i> bonus for overtime work is paid (after 40h/week); but hours exceeding 38.5h feed in working time account (up to max. 30 h). | DC1: ~9% DC2: ~8% | DC2: Sunday: 50-100% Night: 25% Overtime: 25% DC2: Sunday: 90% Night: 15% Overtime: n.a. |
| GER-FCMG | Mon-Sat / 0-24h (since 2014; previously: Mo-Fr / 6-22h) | 3 shifts (6-14/14-22/22-6h); Some work 1 shift, some rotate bi-daily or weekly | <i>Some:</i> overtime hours feed into working time account (maximum: 22h). Employees can take time-off; managers are allowed to use 2,5h/week | 10-15% | n.a. |
| GER-FASHION | Mon-Sat (since 2010/11), max. 5:30-1:00 (later start + earlier stop in low seasons) | DC1: 7 different shifts, permanently assigned to 7 groups of employees DC2: Either 2 long or 3 short shifts, depending on season. In some months switch (2-->3 shifts) during the week | <i>Full annualisation.</i> All overtime hours exceeding contracted working hours go into working time account; no overall maximum; no minimum/maximum weekly limit, not even for part-time employees. No bonus for overtime. | 84% of blue collar workers | Night: 1,82€/hour (~16%) Overtime: None |
| FR-FOOD | Mon-Sat (+Sun for fresh products) / 5:00-22:00 | Depends on occupation, products (fresh, grocery), also on the warehouse Drivers: 2 shifts (5:45 - 21:45); Warehouse blue collars: mainly 2 shifts (5:00 - 22:00) | <i>No</i> | ~0% | Night: 25% Overtime: at least 10% (legal minimum) |
| FR-MEDIA | DC1: Mon-Fr (+ Sat. in high season) / 6:00-20:00 (+ night work in high season) DC2: (B2C warehouse) 7:00-21:00 in (+Sat) | 2 shifts Rotation depends on season | <i>No</i> | ~0% | Night work: 25% Overtime work: at least 10% (legal minimum) |
| NL-MEDIA | Since 2012: Increased operating hours 7.00-23.00; since 2016 also need to work Sat + Sun. | Warehouse moving towards 3 shifts. | <i>Some.</i> Overtime is translated into compensation hours; they can be taken up or paid for during the year. When there is not enough work, workers can be obliged to take up compensation hours. | n. a. | Overtime bonus normally 25%, exceptionally 50% (more than 12.5 hours daily) to 100% (weekend and public holidays). Shift work bonus outside 7.00-18.30 of between 32.5% and 40%; 50% on Saturdays and 75% on Sunday and public holidays. Irregular working hours bonus between 20%-60%. |

Four main strategic elements by which companies try to enhance internal temporal flexibility can be identified:

Firstly, an **extension of daily and weekly operating hours**: In almost all establishments in our sample, operating hours have been extended into the late evening and night and/or the weekend over the past 10 years, for all or part of the warehousing operations. The only exception is **FR-FOOD**, where operating hours were already quite long. Daily operating hours still vary substantially, between 14 hours (FR-MEDIA) and 24 hours (GER-FCMG). Due to the long operating hours, employees usually have to rotate between 2 and 3 shifts (including night work). In some cases, employees are assigned to permanent shifts, either in accordance with their own preferences (GER-FCMG) or because this is the model preferred by the company (GER-FASHION (DC1)). Weekend work has become the norm in most cases, with the exception of three establishments (FR-MEDIA (DC1), GER-FOOD (DC1+2)). Sunday work is common for all or some of those working with perishable grocery products (FR-FOOD, GER-FOOD DC1 + DC2), but it has also been introduced at NL-MEDIA and is about to be introduced in FR-MEDIA.

The impact of the institutional framework on this aspect is discernible but diminishing. At the time of the case studies, management in several companies wanted to increase daily and weekly operating hours even further (GER-FOOD (DC2); GER-FASHION (DC2)), but had so far met opposition from works councils, which enjoy considerable co-determination rights in this regard. Despite these rights, however, working hours are very long in GER-FASHION (18/6) and in GER-FCMG (24/6). In the view of the (external) trade unionist, the works council at GER-FCMG stood no chance of blocking management plans for a significant extension of operating hours a few years ago. He estimates that if the conflict had been taken to court the sharp increase in sales volumes would have justified the extension of operating hours in any judge's view. However, the works council succeeded in getting agreement that Saturday work will be limited to the early shift once a new, additional DC starts operations (and takes over a share of sales) (Jaehrling 2017c).

Similarly, the institutional framework in France has for a long time been a safeguard against the extension of operating hours to 24/7 in the cases under study, but French law provides for many derogations. For instance, with regard to the introduction of night work, management at FR-MEDIA made use of the option to seek authorisation from a health and safety inspector if the approval of employee representatives is not secured and incorporated into a collective agreement. To date, however, night work has been used only in high season because of its costs, according to a union delegate. In the same company, unions had also opposed management plans to introduce Sunday work. However, a recent legal reform (the 'El-Khomry' Act) enacted in 2016 has partly lifted restrictions on Sunday work and given companies more options to conclude collective agreements on this issue. As a result, a collective agreement on Sunday work had recently been concluded at group level but had not yet been implemented in the DCs under investigation at the time of the interviews (Perez and Gautié, 2017).

The legal restrictions on Sunday work in both Germany and France still matter in the sense that they have obviously led to a more limited use of Sunday work, whereas Dutch law provides for more options to negotiate derogations at the company level. This option was used by NL-MEDIA when implementing weekend work in conjunction with the innovation processes. However, these differences are likely to disappear, with laws being flexibilised and companies making more use of previously existing exit options (Jaehrling and Méhaut, 2013).

A second strategic element used by several companies is a **variation in scheduled working hours, often based on the annualisation⁷² of working hours**. Full annualisation implies that employees' weekly working hours can vary considerably from one week to the other, and that 'overtime hours', i.e. weekly or daily hours that may exceed the average contracted working hours, are neither paid at the regular rate nor qualify for a bonus. Instead, they are compensated with time off in lieu at some point during the reference period, with employees having variable degrees of discretion to choose when. The companies in our sample differ considerably in this regard; their arrangements range from full annualisation (GER-FASHION) to no annualisation at all (FR-FOOD, FR-MEDIA), with everything in between (see Table 3). Here, legal restrictions obviously make a significant difference, to the extent that they are enforced or used by employee representatives. In FR-MEDIA, there have been recurrent attempts by management over the past 5 years to introduce annualisation, but this requires a collective agreement and the two unions that still represent the majority of workers have been able to oppose this so far with the help of another company agreement concluded in 2000 (introduction of the 35-hour week) into which they deliberately built a safeguard against annualisation (Pérez and Gautié, 2017). At the other end of the spectrum, in GER-FASHION, annualisation was introduced 20 years ago and there is no information on whether this was a contentious issue at the time. However, the increasing use of this tool by management – e.g. a strong reliance on overtime hours in peak seasons – has obviously increased dissatisfaction among the predominantly part-time employees, and the works councils have tried to limit individual flexibility requirements. In DC1, the works council has recently succeeded in introducing 'working hours in accordance with employment contracts'. This means that weekly working hours can be only +/-10% of the contracted hourly volume (but +/- 20% in the peak months). In both DCs the works council are also demanding more planning security for part-time employees. So far, they only get to know on each Friday if and when they will have their free day (due to part-time) in the following week (Jaehrling, 2017a).

A third response of companies to variable workloads is to make **unexpected changes to working hours at short notice**. As stated above, this is caused by the limited ability of companies to accurately predict workloads, not least due to ever shorter delivery times and thus reduced buffer time. The classical instrument for coping with unexpected changes in workloads is (paid) overtime. This is the primary flexibility instrument in one of FR-FOOD's conventional warehouses, where overtime hours are mandatory and are mandated at very short notice. Workers phone in at 4 pm every day in order to find out how many hours they will have to work the next day. The number of overtime hours imposed can amount to 3, according to one picker (Gautié and Perez, 2017). Thus, although there is no annualisation in this DC, companies enjoy relatively high levels of flexibility. However, this flexibility is rewarded with additional earnings, unlike at GER-FASHION. Here, the usual practice for coping with short-term changes is to roster more employees than will actually be needed (based on the weekly forecasts), and then, based on the updated daily forecast, to ask employees if they want to 'voluntarily' stay at home the next day or even go home early on the same day. The same practice is used at GER-FOOD (DC1). Legally, companies have to inform their employees about their working times at least four days in advance. In these cases, therefore, they are depending on the willingness of employees to stay at home or leave work early voluntarily. This is a legal way of bypassing works councils' rights of co-determination on overtime hours, and the works councillors see no legal means of stopping this practice as long as it is voluntary; instead, at GER-FASHION they keep reminding employees about their rights (Jaehrling, 2017a).

⁷² A broad definition of annualisation includes "systems whereby employees' working time (and pay) is calculated and scheduled over a period longer than one week" (Kouzis and Kretsos, 2003). This 'reference period' may be up to one year.

Finally, the **use of part-time work** is another strategic option to enhance internal flexibility. However, this option is used mainly by GER-FASHION (where part-timers make up 84% of the workforce), whereas in the remaining companies part-time work plays only a minor role (at ~10%), when compared to the national averages. In FR-MEDIA, where part-time contracts are to date virtually non-existent, management wanted to introduce part-time contracts (over 15 hours (Monday and Tuesday) or 21 hours (Saturday, Monday and Tuesday)) but was unable to attract any applicants. This is in stark contrast to GER-FASHION, where unlike in the French case a relatively high share of women are employed, many of whom, according to the works councils, prefer to work part-time. Even though this certainly reflects the different socio-demographic composition of the workforce in both companies, as well as the different social norms with regard to (female) part-time in the two countries, it would be wrong to conclude that the German company is organising its work schedules according to employees' preferences.

Instead, GER-FASHION uses part-time work as a corollary of the annualisation of working hours, as it can thereby substantially top up the hourly volume with supplementary hours in peak seasons. Moreover, part-time contracts allow the company to closely match work schedules to peak times. Works councils at both sites acquiesced in this working time policy based on long and flexible part-time jobs, as they acknowledge companies need for flexibility. The works councillor at DC1 also maintains that flexible part-time contracts are preferable to excessive use of temp agency work, which would otherwise be necessary in order to cover peaks in demand. Nevertheless, the volume of contracted hours offered to employees has been a contentious issue for a long time as it does not match the preferences of many (including female) employees. Works councils at both sites have urged management to reduce the number of shorter contracts (100 hours/month and less) and offer employees the option of increasing their working hours. This has resulted in some improvements; at DC2 for instance, the works council reached an agreement with management that in the current recruitment programme all new contracts shall be for 130 or 150 hours. Management's agreement was clearly motivated by increasing recruitment difficulties for shorter part-time jobs (Jaehrling 2017a). A different alternative strategy was adopted in FR-MEDIA in order to compensate for its failure to recruit part-time employees. Here, management is experimenting with a "*groupement d'employeurs*", where several employers create a legal entity which can directly hire employees on a permanent basis and make them available to the companies within the group.

"This employers group hires people on permanent contracts and makes them available to the company on Mondays, Tuesdays and Saturdays, and the remainder of the time (Wednesday, Thursday and Friday), they are assigned to another X platform. For the employees, it's been full time, 35 hours, and for us, only 14 hours". (Director of DC2, FR-MEDIA).

This example also calls into question the general distinction between 'good' internal and 'bad' external flexibility as it seems to strike a better balance between employees' and employers' interests than the strongly flexibilised part-time contracts used at GER-FASHION.

Overall, large scale automation and e-commerce have clearly led to increased flexibility requirements for all or most employees in all three countries. More work at unsocial hours (nights/weekends) is a common trend across cases and countries and greater variations in daily and weekly working hours, partly at very short notice, can also be observed in several companies. However, the instruments used by companies (classical paid overtime, annualisation, part-time work, 'employee sharing') differ considerably, as company responses are shaped by the various legal options open to them, the structure of the labour supply and the attitudes of employee representatives. As a result, flexibility requirements for individual employees vary considerably between the cases, particularly with regard to the monetary compensation offered. In principle, this underlines the point made earlier, i.e. that

technological changes do not determine flexibility requirements. At the same time, legal restrictions and co-determination rights have proven to be relatively porous – and in some cases have become more porous following legal reforms, as in France – in the face of the disruptive changes as well as managements' determination to align working schedules as closely as possible with the rhythm of the market. It is important to remember that in some instances, managers as well as employee representatives prefer internal to external 'casualisation'. As we have seen above, however, the increased levels of internal flexibility have not *reduced* the use of temp agency work or subcontracting; if anything, they might have *averted a further increase* in the use of external flexibility.

5.3.2 Job rotation as a win-win-win solution?

In addition to working time flexibilisation, job rotation schemes have been expanded in several companies (GER-FASHION, NL-MEDIA, FR-MEDIA, FR-FOOD). Job rotation is mandatory for all employees, but has not been systematically implemented at FR-FOOD and GER-FASHION due to employee's opposition. In principle, job rotation is often regarded in the literature as a 'win-win' solution for warehouse workers (e.g. Leeuw and Wiers, 2015) in the sense that it

- increases companies' ability to cope internally with holiday or sickness absences and level out peaks and slumps in workloads at different work stations in the company, thereby also reducing the need for overtime hours or temp agency work;
- can help to reduce the physical strain by limiting the negative consequences of task repetitiveness,
- might require additional skills from employees and thus increase their 'employability'.

In the companies under investigation, the efforts to introduce job rotation have been motivated primarily by the first reason (NL-MEDIA; FR-FOOD (conventional warehouses), GER-FASHION), while the second reason is the main rationale behind these attempts at FR-MEDIA and the semi-automated warehouses of FR-FOOD, but was also invoked as an additional argument by interviewees in the other cases. The third reason was also emphasised by management in the two French companies. They have not only introduced job-rotation (thus actually '*multitasking*') but also taken additional training measures aimed at enhancing workers' employability and even, in the case of FR-FOOD, with a view to enhancing mobility and career advancement through the introduction of an externally validated skill certificate. At NL-MEDIA, job rotation was introduced not least in order to make the workforce more resilient in dealing with the changing task requirements associated with a shift in the customer base. Nevertheless, management reported that some regular workers had problems in adapting to rotating work stations and that temp workers were often better able to deal with doing different tasks.

While the first effect (flexibility) is an almost automatic consequence of job rotation, the effect of job rotation on the other two dimensions (less physical strain, upskilling) is less clear-cut and partly a contested issue in the companies. In the case of NL-MEDIA for instance, as the authors of the case study report conclude "*job rotation may have made work more interesting as it reduces monotony. At the same time, the tasks at the different work stations are quite similar and do not require many new skills, autonomy is not increasing and work pressure has increased as individual down times have decreased.*" (Keune and Koene, 2017). In FR-FOOD's semi-automated warehouses, job-rotation is not systematically implemented as some workers are very reluctant to hold the (very strenuous) feeder job. Moreover, in the conventional warehouses, job rotation is at odds with the traditional horizontal trajectories from more to less physically demanding jobs. Senior workers with reduced physical fitness are, therefore, reluctant to return to the demanding picker tasks (Gautié and Perez, 2017). In FR-MEDIA, management and union delegates argue about the financial compensation for job rotation; trade unionists have demanded monetary compensation as job rotation requires multiple skills – a view not shared by management. At the same time, one trade union delegate expresses his doubts as

to whether job rotation actually does enrich jobs: *“Does the accumulation of five poor jobs make an enriched job? I'm not sure, especially when you see the quality of each one”* (local trade union delegate).

Overall, the findings suggest that, in the context of the hyper-Taylorisation of tasks in DCs and the overall pressure to remove ‘slack’ times, job rotation is increasingly useful for securing flexibility. It may thereby also help to secure workers’ employability in times of changing task requirements (see NL-MEDIA) and to avoid even greater reliance on temp agency work. However, it seems to be less suited to mitigating the considerable physical strains, since the removal of slack times also reduces forced breaks and employees still rotate between highly repetitive and strenuous tasks.

5.4 Co-incident or co-evolution: changes in remuneration

As the innovations have been introduced, so wages in the case study companies have fallen considerably for at least some workers and stagnated for others. This is because the innovations were often implemented in conjunction with other cost-saving measures in order to cope with strong competitive pressures. The worst affected group is the truck drivers, who are most exposed to outsourcing dynamics. In NL-MEDIA, the remuneration of truck drivers was brought into line with the transport sector collective agreement, effectively leading to lower remuneration (Keune and Koene, 2017). Some truck drivers at GER-FOOD, those who were outsourced to 3PL providers, suffered a similar drop in pay. However, decreasing wage levels are not confined to outsourced staff but have also affected the remaining manual occupations inside the DCs.

- At GER-FOOD (DC1), a lower paying collective agreement in line with the CA for the transport sector is now applied to all new employees of a newly built warehouse. According to the trade unionist who is responsible for negotiating the new company collective agreement for this site, the trade union had no legal means or the necessary organisational strength to oppose this.
- At GER-FOOD (DC2), a new regional sectoral agreement entered into force recently, after long negotiations between trade unions and the employers’ organisation about a modernisation of the pay grades in order to reflect changes in job profiles. Although the trade union had successfully pressed for more systematic consideration of physical requirements (not just formal skill requirements), it could not reach agreement on precise job descriptions. Consequently, it is up to the companies to classify jobs based on the general scheme and this has proved to be a very contentious issue in many DCs. At DC2, management argued that lower skill requirements justified classifying manual jobs in the new automated warehouse in lower categories; newly employed workers there are paid lower wages, and the wages of incumbent employees will be gradually brought into line with the lower remuneration level as well (Jaehrling, 2017b).
- At GER-FASHION a wage cut amounting to around 14% of monthly pay was collectively agreed 10 years ago when the logistics division was converted into a legally independent company in order to bring wages levels more into line with ‘market wages’ in the 3PL segment, in which the company wanted to gain a foothold. Moreover, when the division became legally independent from the parent holding company, employees also lost their entitlement to additional company benefits and a few years later, additional cuts were introduced (e.g. abolition of bonus for Saturday work) (Jaehrling, 2017a).
- At FR-FOOD, the merging of all the retail company’s DCs into one legal entity more than 10 years ago coincided with the implementation of a cost-cutting strategy for all establishments through the abolition of a series of local collective agreements and the introduction of lower standards (e.g. lower entry wages for new entrants; seniority premium frozen for incumbents). Basic wages increased only very slowly thereafter (1% per year) and have now reached a level barely exceeding the national minimum wage. As general base wage increases are very low, wage bargaining focuses mainly on the profit sharing scheme (up to 8.5% of the annual wage). Over the past few years,

however, the bonus has dropped considerably in some establishments as it has become more and more difficult to fully achieve the targets set by top management – to the extent that employees went on strike in one DC (Gautié and Perez, 2017).

- At FR-MEDIA, management has frozen basic wages since the introduction of the 35-hour week in 2001; as at FR-FOOD, basic wages for warehouse operatives are barely above the minimum wage, and the profit sharing bonus (up to 115% of monthly salary) has also de facto stagnated, as targets have become more difficult to reach, according to trade union delegates (Perez and Gautié, 2017).

Lower skill requirements are sometimes invoked by management in order to legitimise lower remuneration levels (see GER-FOOD DC1). However, the other cases suggest that the stagnating and decreasing wage levels in the manual occupations are primarily the result of the increased marketisation of the logistics function and the overall goal of cutting logistics costs – through innovations, but also through direct cuts in wages. Still, lower skill requirements and lower requirements in terms of lifting heavy loads make it easier for companies to enforce wage cuts and to sustain low wage levels, as they can extend their recruitment strategies to ‘vulnerable’ groups (see 5.2.3) and thereby benefit from the wage differentials resulting from labour market segmentation. This in turn might also exert indirect pressure on incumbent employees (‘insiders’) to make wage concessions. Thus we can conclude that the lower wage levels in our companies are not a pure *coincidence* (of unrelated trends), but are to some extent *conditioned* by the same factors that have spurred innovations (‘lean’ focus on lower costs) and to some extent also *co-evolve* with innovations, in the sense that lower skill requirements tend to depress wage levels, at least in slack labour markets.

To give a fuller picture, while there are common trends, the resulting wages levels in our cases again still vary considerably, both in absolute terms and relative to national median /average wages (see Table 4).

Table 4: Remuneration in case study warehouses

| | Monthly basic wage (picker, full time) | Performance pay (/month) | Annual bonuses, profit sharing |
|--------------------|--|---|--|
| GER-FOOD | DC1: € 2115 – 2437 DC2: old CA: € 2036 – 2180; new CA: € 2115 - 2231 (but de facto less) | DC1: up to € 550 DC2: up to € 600 majority ~€ 150 /month | DC1: 552 holiday bonus + 50% of monthly wage Christmas bonus DC2: € 1200 holiday + Christmas; € 600 – 1.200 profit sharing |
| GER-FASHION | DC1: € 1863 (in 2014) DC2: € 1775 (in 2016) | DC1: majority 100-150 €/month. | DC2: € 690 Christmas bonus, € 690 holiday bonus |
| GER-FCMG | n.a. (somewhere between GER-FOOD and GER-FASHION) | - | Profit sharing (no exact information available) |
| FR-MEDIA | € 1.400 – 1.900 | | Annual fixed premium (a monthly wage) + Holiday bonus (1/2 monthly wage)+ € 1000 profit-sharing |
| FR-FOOD | entry wage just above the SMIC (€ 1480); seniority premium has been abolished for new entrants since the mid-2000s, and frozen for incumbents | Depends on the DC; where implemented, the surplus may be quite high, up to € 1000 or more | Annual premium ("13th month") + profit sharing, up to 8.75% annual wage, depending on profits and other indicators |
| NL-MEDIA | Entry wage lowest scale = legal monthly minimum wage € 1525 (2016). End wage highest scale covered by collective agreement: around € 3400. | | Profit sharing of between 1.5% and 4.5% dependent on company performance. No profit sharing if result is below 95% of expected result. |

This might in some cases reflect differences in employees' socio-demographic profiles (in conjunction with the gender pay gap, see the differences between German establishments), but also relates to a lot of other factors that lead to different remuneration levels in low-skill occupations across countries (see Gautié/Schmitt 2010). It should be noted that the relatively high wage levels in the German cases are not at all representative of retail logistics companies, as a comparison with national earnings statistics shows (Jaehrling 2017a).

6 Conclusions

The automation and digitisation of warehousing processes has so far resulted in less job destruction in routine manual occupations than could be expected in view of the available technological options. Our snapshot analysis of current company strategies reveals only limited ambitions to fully automate warehousing processes in the short to medium run, primarily because this is not regarded as the most economically viable option for all market segments and for all distribution network strategies. This further confirms David Autor's assessment that machines can perform *some* but not *all* the tasks of warehouse operatives: "There is at present no cost-effective robotic facsimile for these human pickers. The job's steep requirements for flexibility, object recognition, physical dexterity, and fine motor coordination are too formidable." (Autor 2015: 24). Moreover, e-commerce has increased demand for warehousing services (thereby partly replacing jobs in 'brick-and-mortar' shops). While both trends do not preclude more substantial job cuts over the long term, they suggest that job quality in routine manual occupations will remain a relevant issue affecting many employees for some time to come.

In this regard, one important finding is that the adoption of less disruptive modernisation paths (semi-automation or conventional warehouses instead of full automation) are not necessarily associated with the preservation of good working conditions in the remaining jobs. Our analysis reveals a considerable degradation of job quality – and we are not looking at companies with headquarters in liberal market economies and with a bad reputation in terms of job quality, such as Amazon or Walmart, but rather at companies based in state-led and coordinated market economies that mostly enjoy (or did in the past) a reputation as 'best cases' in their industry. Work organisation has become even more Taylorised than before, leading to narrow job profiles with repetitive tasks and very little individual discretion. In addition, working time flexibility requirements have increased, and wages have been cut or are stagnating – not just for those outsourced to 3PL providers but also for the majority of those who are directly employed by distribution centres owned and operated by retailers (or their own subsidiaries).

Why is this, and how is this related to innovation dynamics? The adoption of an analytical perspective that takes into account the broader economic environment in which innovation processes are embedded reveals the driving forces that channel company responses quite uniformly in the 'low road' direction described above – despite an overall contingent relationship between innovations and job quality. This is because, firstly, innovations are often complemented by other strategies linked to the economic trends (retail logistics transformation, marketisation) that exert their own strong downward pressures on job quality. Thus job quality and innovations are partly *conditioned* by the same factors – they spur innovation and at the same time they spur a degradation of job quality. Automation, for instance, is but one option for enhancing productivity levels and driving down unit costs in the overall quest to align logistics processes with lean principles. There are other options, such as off-shoring warehouses to 'geo-optimal' locations, outsourcing or aligning the pay of workers to the lower levels of external '3PL'-service provider, and a flexibilisation of working schedules in order to adjust employees' working hours as closely as possible to the fluctuations in workloads so as to avoid any 'slack' time.

To some extent, innovations and job quality also *co-evolve* in the sense that innovations negatively affect job quality on their own. The technological solutions developed by manufacturers are tailored in such a way that skill requirements and autonomy are reduced to the lowest possible level; thus they have a quite deterministic impact. But this is to some extent a deliberate choice. As our case studies illustrate these technological solutions are developed in accordance with customers' specifications and the logistics companies have in some cases deliberately chosen to further reduce skill requirements or to spurn options that would have reduced physical strain (FR-MEDIA). Similarly, the extension of operating hours and the flexibilisation of individual working schedules are common features across cases, which at first glance might be seen as companies' adjustment to a universal 'any-time-any-place' mindset characteristic of online shoppers. However, as closer analysis of our case study companies reveals, the logistics companies have chosen this path for a number of reasons, partly connected to automation and e-commerce, but partly also following the simple rationale of cutting labour costs in a transformed supply chain in which retailers are able to pass on cost pressures to their logistics service providers. To conclude, digitisation in fact does not have a deterministic impact on job quality, as other authors have stressed. In the 'real world', however, the fact that innovations are embedded in broader economic trends leads to quite uniform strategic responses that contribute to the lowering of job quality. Overall, therefore, it is questionable whether the innovation-induced increases in 'utility' for final customers (quick and flexible deliveries at low costs) are worth the significant deterioration of job quality for warehouse workers. One might argue that, on the upside, the de-skilling trend makes these jobs more accessible to groups affected by labour market exclusion (immigrants). However, their 'inclusion' comes at the price of poor job quality and 'dead-end' jobs for them, as well as for the majority of workers, and therefore hardly qualifies as a solution to high levels of labour market segmentation.

Do companies' approaches to human resource management, employee involvement, and labour relationships at company level matter at all in this context? Do institutions impacting on these relationships matter? There is no simple answer to this question. In several cases, managers and employee representatives at company or establishment level have certainly made considerable efforts to adopt the technological and organisational changes in a socially sustainable way. They have arguably helped to secure jobs in these companies, cushioned redundancies, improved workplace ergonomics and helped to avert an even greater degradation of job quality. Some of these measures were encouraged by institutional constraints or incentives (such as the French law on 'arduous work', or the co-determination rights employee representatives in Germany and the Netherlands enjoy). Companies also differ considerably with regard to certain aspects of job quality, such as wages and working time – which can be interpreted as a legacy of different legal options (e.g. restrictions on Sunday work), differences in labour supply and social norms (e.g. availability of female part-time workers in Germany), as well as differences in terms of high/low-trust management-employee relationships (which in turn impacts on employee involvement/employee suggestion schemes, for example).

Still, one conclusion suggested by our findings is that there is merely a weak link between the degree of employee representative involvement and outcomes in terms of job quality – at least with regard to core dimensions such as pay and working time flexibility. The fact that employee representatives in the Dutch and German companies have been more involved in the negotiations accompanying innovation processes than their counterparts in the French companies, and that management and employee representatives in some companies maintain very collaborative relationships, has not meant that concessions on pay and working time were any less substantial in these firms. This illustrates a simple and well-established finding from industrial relations studies that nevertheless tends to be neglected in debates stressing the benefits of employee participation in innovation processes: In settings where decision-making on 'hard core' issues such as pay and working time is shifted to the company level, firms are able to adjust to competitive (and innovation) pressures by reducing job

quality with the support of local employee representative whose principal concern is to safeguard the jobs of their constituency, thereby helping to intensify competition between companies. This is absolutely not to say that employee representatives at company level are not able to make a difference, as compared to the contra-factual situation (absence of employee representatives). As Schwarz-Kocher (2014) concludes from an overview of a large set of qualitative case studies in Germany, even company level pacts do not invariably result in ‘competitive corporatism’ but can be turned into a powerful resource that help employee representatives to develop alternative solutions and effectively modify management strategies to the benefit of job quality. However, this depends on certain conditions (e.g. the availability of sufficient resources for employee representatives, including external experts; strong organisational power of employee representatives) which are not in place everywhere, and especially not in certain service sector industries such as retailing (Schwarz-Kocher 2014: 20) – and not in the companies in our sample, it seems. Therefore it would be a misleading simplification to call for more employee involvement as a way to set in motion ‘virtuous circles’ between innovations and job quality.

On the other hand, the traditionally more centralised decision-making on these issues in the French cases seems also less and less well suited to channelling firms’ responses towards ‘high road’ strategies and blocking degradations in pay and working time – because companies more fully exploit existing options to derogate from the law (either with or against the consent of local employee representatives) and partly because the derogation options have recently been extended (law on Sunday work).

In contrast, the evidence is less ambiguous with regard to how employee involvement impacts on *occupational health and safety*. Where works councils and employees are effectively involved, as in GER-FASHION in particular – and not just formally consulted in order to cope with minimum legal requirements, as in FR-MEDIA – the resulting processes are assessed, by both management and staff delegates as having a beneficial impact. This is overall in line with general findings on a positive relationship between employee involvement, productivity and innovativeness (Eurofound, 2017). In practice, however, we can conclude from our sample that this is the exception rather than the rule in the retail logistics industry. Although the lean concept emphasises the need for employee involvement and job autonomy, our cases, in line with other studies (e.g. Wright and Lund, 2006, Hasle et al., 2012), show that this is by no means a necessary corollary of lean strategies – indeed the contrary is rather the case.

Are these predominantly low-road company strategies sustainable, or is it likely that there will be some feedback effects that have a negative effect on companies’ competitiveness? It could be argued that the option for companies to rely on an increasingly cheap and flexible workforce reduces their need to invest in automation. This could still be a viable competitive strategy, based on a ‘low innovation – low job quality’ equilibrium. However, some of our case studies also point to the potential limits of this strategy and suggest that sooner or later companies might have exhausted the resources they are currently drawing on. The cooperative potential that has helped to forge company pacts may be exhausted due to doubts as to whether the ‘return’ on *employees’* investment (wage moderation, working time flexibility) is adequate. Moreover, the sustained high levels of physical strain are increasingly coming up against an ageing workforce. While pension policies across countries have tended to reduce early retirement options over recent decades and thereby ‘encouraged’ companies to retain their older employees, HR departments have been relatively ineffectual in the face of innovation policies and general company strategies that tend to treat humans as appendages to machines and demand that they be ready to perform repetitive movements at a speed imposed by the machine and to extend their availability to the 24/7 machine running times. This strategy might be functional for some time to come, and it is difficult to construct a ‘business case’ for better job quality (leading to more innovations etc.) in the case of the routine manual occupations in warehouses.

Improving job quality in these occupations is an important objective in its own right that requires considerably more commitment from both companies and politics.

7 References

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8 List of Case Study Reports and Industry Profiles

| Case studies | |
|--------------------------|---|
| GER-FASHION | Jaehrling, K. (2017a). <i>Distribution and Return Centers in German Fashion Retail</i> . Case study report for WP6 of the QulnnE project. Unpublished manuscript. |
| GER-FOOD | Jaehrling, K. (2017b). <i>Distribution Center in German Food Retail</i> . Case study report for WP6 of QulnnE, unpublished manuscript |
| GER-FCMG | Jaehrling, K. (2017c). <i>Inhouse Distribution Center of a German FCMG (Fast Moving Consumer Goods) Retailer</i> . Case study report for WP6 of the QulnnE project. Unpublished manuscript. |
| FR-MEDIA | Perez, C. and Gautié, J. (2017). <i>FR-MEDIA</i> . Case study report for WP6 of the QulnnE project. Unpublished manuscript. |
| FR-FOOD | Gautié, J. and Perez, C. (2017). <i>FR-FOOD</i> . Case study report for WP6 of the QulnnE project. Unpublished manuscript. |
| NL-MEDIA | Keune, M., Koene, B. (2017). <i>NL-MEDIA</i> . Case study report for WP6 of the QulnnE project. Unpublished manuscript. |
| NL-FOOD | Keune, M., Koene, B. (forthcoming). <i>NL-FOOD</i> . Case study report for WP6 of the QulnnE project |
| Industry Profiles | |
| France | Gaborieau, D. and Gautié, J. (2016). <i>Industry Profile: Retail Logistics – France</i> . Report for WP6 of the QulnnE project. Unpublished manuscript |
| Germany | Jaehrling, K. (2016). <i>Industry Profile: Retail Logistics – Germany</i> . Report for WP6 of the QulnnE project. Unpublished manuscript |
| Netherlands | Koene, B., Keune, M. and Tros, F. (2016). <i>Industry Profile: Retail Logistics – Netherlands</i> . Report for WP6 of the QulnnE project. Unpublished manuscript. |

9 Annex – Summaries of Case Studies

FR-MEDIA (Perez and Gautié, 2017)

Brief characteristics of the companies' structure and business strategy

FR-MEDIA is the subsidiary of a large French retail chain selling cultural and electronic products. Created in the late 1950s, this retail chain has more than 100 stores in France (own or franchise) and around 50 in Europe. The logistic company operates three national DCs: one for the delivery of shops all over the country accounting for 850 employees on a full time basis; the second one is dedicated to e-commerce and employs 130 workers. The last one was announced to be closed soon at the time of the survey (employees being moved to DC2).

Important innovations in recent past

In 2011 the company adopted a five-year strategic plan aimed at modernizing logistics processes, including a modernisation of the industrial equipment for the DC dedicated to shops (DC1), and a comprehensive automation of the DC dedicated to e-commerce (DC2). The technological innovations were accompanied by a change in corporate culture and several organisational changes with the aim of bringing processes more into line with customer expectations (labelled 'management by the customer'). Delivery lead times were reduced.

Key findings on interrelationships between innovation and job quality, employment and inclusiveness

As the activity does not increase globally (the growing of purchases on internet roughly compensate for the decreasing volume of sales in shops), the (semi-)automation of DC2 as the mechanisation of DC1 have had a clear negative impact on the volume of employment. Temp agency workers acted as "buffers" so that the permanent staff has remained rather stable so far.

In terms of work activity and working conditions, the fact that the port of heavy load has greatly diminished has an indisputable benefit of this modernisation. However, the "modernisation" of the two warehouses led to taylorisation and work intensification. Indeed, job tasks are less varied (because of standardisation and suppression of "micro-tasks"); more repetitive, work is made more intensive with a pace of work imposed by the equipment, and informal "quotas" to reach (average productivity per capita). Consequently, multi-skilling (and/or job rotation) appears more necessary, at least to avoid Repetitive Strain Injuries. Nevertheless, it is doubtful that multi-skilling could enrich work from employees' point of view.

It is important to note that the impact of technological innovations on workers' health is largely the result of the choices made by management, and this case is a good illustration of these choices. Indeed, industrial equipment providers offer different options, some of them automating more repetitive and troublesome tasks than others do. These options have been overlooked due to their higher cost.

Since the modernisation of warehouses, there has been a clear trend towards an increase in work schedules (day and week) and a less predictable workload. The management mentions two reasons: the cost of the investments made justifies using the equipment for a longer period, and the desire of the consumer to be able to place orders on the Internet and to be delivered on Day + 1. Workers are worried about it because of the impacts on social life and on work-family conciliation.

FR-FOOD (Gautié and Perez, 2017)**Brief characteristics of the companies' structure and business strategy**

FR-FOOD is the subsidiary of one of the top 10 large French food retailers. It has been created at the beginning of the 2000s when the big retailer decided to centralise its network of distribution centers (DCs) that were so far separate companies. Each DC became an establishment of FR-FOOD, with much reduced autonomy. The objective was to cut costs and to increase the margins of the points of sales. The food retailer is indeed owned by its "members" - i.e. the owners of the super- and hypermarkets - and therefore its objective is to maximise their profits. The business strategy is based on low prices for the consumers - a market segment where competition is fierce. FR-FOOD operates around 30 distribution centres servicing supermarkets across France. It has two kinds of warehouses (i.e. DCs): the "conventional" ones, whether for fresh or grocery products, some doing both, and the 'mechanised (i.e. semi-automated) ones for fresh products.

Important innovations in recent past

The main change in service/product has been the increase in the number of "items" (i.e. the number of products). This was a big challenge for old warehouses, which are saturated because they did not have enough room any more. This was a strong incentive to shorten the delay between reception and expedition of the products, but also to build new (and bigger) warehouses. Another important innovation was the introduction of a new "warehouses management system" (WMS) in the beginning of the 2000s, to organize the whole supply chain, with two main implications: first, the monitoring of the whole supply chain is now highly centralised, while it was previously decentralised at establishment level; the activity of the warehouse is mainly determined at central level; second, it provides the company with a very powerful information system, from which one can elaborate a whole range of "performance indicators". In connection with this software, in the conventional DCs, pick-by-voice (also called "voice-picking") has been introduced over the last 10 years. It was seen as the major innovation for the pickers. In 2010, a major long-term restructuring plan was launched with the aim of optimising the size, functions and location of the DCs (including closing down old ones and building new ones in 'geo-optimal' locations), as well as automating the processes, starting with fresh products. 2 semi-automated distribution centres started operation in the past 5 years, one of which is fully outsourced to a 3PL provider.

Key findings on interrelationships between innovation and job quality, employment and inclusiveness

A "top-down / technical / one best way-no alternative" conception of innovation predominates in FR-FOOD. Workers are very passive, they are not supposed to innovate themselves. The main innovations have induced indeed a reduction in the autonomy of workers, at all levels (from pickers to top manager), not by themselves - even if some, such as voice-picking, have quite deterministic consequences - but because of how they were implemented. In particular, the use of the WMS software has induced an extreme form of "management by indicators. As their autonomy is low, labour turnover is high among top managers (directors of DCs). At shop floor level, voice-picking and the way mechanisation was implemented (so far) were clearly de-skilling technical innovations. JQ seems to have decreased on average, at least in terms of autonomy and task discretion; work hardness has decreased in terms of handling heavy loads with new "facilitating tools" in the conventional, or with the automatic carousel in the new warehouses. But the voice-picking and the implementation of (semi-)automated processes – very similar to assembly-lines with residual manual tasks highly fragmented – have induced some forms of hyper-taylorisation, with very repetitive tasks and work intensification. According to the union delegates, the reduction in autonomy and the absence of consultation sterilizes continuous improvement - i.e. implying a negative feedback from (poor) JQ to innovation. Standardisation and de-skilling makes the use of temp workers easier. At the same time it allows the hiring of unskilled workers (a positive impact on social inclusion).

GER-FASHION (Jaehrling, 2017a)**Brief characteristics of the companies' structure and business strategy**

GER-FASHION is a subsidiary of a large logistics holding which in turn is a subsidiary of a large German e-commerce retailer. The subsidiary was turned in to a separate legal entity 10 years ago with the aim of becoming an independent 3PL provider offering its services to other, external retailers. The company is operating several large national distribution and returns centres. The core business strategy of the logistics subsidiary consists in expanding its customer base, providing reliable and price competitive logistics services (rather than prioritizing short lead times) and developing value-added services to its customers.

Important innovations in recent past

The expansion of its customer base was accompanied by an expansion of services offered to customers, such as developing online-shops, finances, customer call centres, partly in cooperation with other external partners. In its DCs, major investments were made in order to automate the processes: The most important technological innovation in the returns centre (DC1) was the introduction of a sorter some 15 years ago. At the national distribution centre (DC2), sorting and picking have been semi-automated and partly even fully-automated in several steps stretching over almost 20 years. Around 10 years ago, the company responded to increasing competitive pressures from other e-commerce retailers with a major restructuring of the physical distribution network. This essentially involved the closure of a distribution center and the concentration of all returns in one national returns center. This was accompanied by an employment and competitiveness pact concluded between employee representative and management that traded concessions on wages and working times against investment obligations and an employment guarantee for 5 years. Another recent organisational innovation at DC2 was the streamlining of all processes on a 48hours lead time at DC2.

Key findings on interrelationships between innovation and job quality, employment and inclusiveness

Overall, the company has successfully managed the transformation to an independent logistics provider, but there is still a lot of insecurity about future turnover, both with regard to internal and external clients. Job quality benefits from a dense web of institutions and generally collaborative labour relations which force and enable the company to implement innovations and the restructuring of the physical distribution network in a more socially sustainable way (than would be the case without this framework). However, the company pact has negatively affected job quality, and although job quality is still considered to be better than average in the industry, employees according to the works council increasingly feel that they have 'invested' a lot in the transformation and modernisation process of the company but don't benefit from it sufficiently. The working time organisation in particular has been a contested issue over the past years; both the high share of part-time jobs and the high and increasing flexibility requirements that are not least related to the companies' overall focus on 'lean' principles as well as the fierce competition from other e-commerce retailers. The company exemplifies the challenges and difficulties to opt for a 'high road' strategy as an individual company, in a strongly changed market environment characterised by many new, low-cost competitors.

GER-FOOD (Jaehrling, 2017b)**Brief characteristics of the companies' structure and business strategy**

Due to problems of getting access to logistics companies in the segment of food retail, the report draws on interviews with representatives from two different distribution centers, operated by legally independent logistics subsidiaries of two different retail chains. Both retail chains belong to the top 10 large German food retailers and operate between 15 and 30 regional DCs all over Germany servicing a dense net of supermarkets and hypermarkets. The two logistics subsidiaries have only one single customer, the retail chain, and do not compete for other customers. Instead, their business strategy consists in rationalizing logistics processes in order to keep transport and handling as low as possible, while at the same time responding to the more demanding ordering behavior of shops (requiring quicker and more frequent deliveries).

Important innovations in recent past

Major innovations and changes over the past decade include the restructuring of the distribution networks (closing down old and building new DCs in 'geo-optimal' locations); in one case also the inauguration of a semi-automated warehouse. In both logistics subsidiaries, the reduction of lead times has also been on the agenda, with regard to fresh foods (DC1), but also with regard to 'slower moving' dry food goods (DC2). Both retail companies have experimented with online shops for a selected range of products and the setting up of B2C distribution channels; so far this segment is very small and is not affecting the processes in the two DCs visited in the study. In both DCs, lead times (delivery to shops) have nevertheless been reduced.

Key findings on interrelationships between innovation and job quality, employment and inclusiveness

In the account of the employee representatives in both DCs, job quality used to be quite good compared to competitors in the sector, but has declined and is currently further declining. This is less related to any deterministic impact of technological innovations; both DCs are conventional DCs where pick-by-voice has been introduced a long time ago and is operated with a performance pay scheme that seems to be overall appreciated by works councils and employees. In DC1, works council criticizes an overall negligent attitude of the remote management at headquarters with regard to any HR issues; as evidenced by their reluctance (for economic reasons) to invest in incremental innovations improving workplace ergonomics. Moreover, wages are under pressure in both cases, both companies have outsourced a large share of truck drivers, and in DC 2 a new collective agreement somewhat approached wages to the lower level of the transport sector. Finally, both DCs are under pressure to further flexibilise working hours following the reduction of lead times. In DC1 the higher flexibility requirements were exclusively shifted to a group of newly recruited part-time employees, with the consent of the works council. Additionally, all employees are affected by strong peaks in orders and, as a consequence, in workloads. The logistics subsidiary has signaled to the retailer that this is a problem, but the retailer has so far not changed its order practice. This example overall underlines the asymmetrical power relations in the retail supply chain, where logistics service providers, even where they remain in-house, more or less have to cope with the terms and conditions imposed by retailers.

GER-FCMG (Jaehrling, 2017c)**Brief characteristics of the companies' structure and business strategy**

GER-FCMG is the logistics department of a big German retail chain selling fast moving consumer goods. The retail chain has successfully expanded its networks of shops to the whole of Germany as well as other European countries and has experienced strong increases in sales volumes over the past decade. The company had to adjust its physical distribution network accordingly in order to cope with this increase. This was partly reached through automation (see below), but also the inauguration of new facilities. Not all facilities are owned and operated by the company; it has a longstanding partnership with a 3PL company that operates its regional cross-docking facilities. In the account of the logistics manager interviewed, the fact that the national DCs are owned by the company itself, and not by an external company, leads to a more holistic, coordinated approach in organising the flow of goods in and between DCs and shops. So changes in DCs are not implemented without anticipating and trying to avoid any negative effects on intralogistics processes in the shops and vice versa

Important innovations in recent past

In the past decade the company has transformed its national DCs from conventional into semi-automated DCs. After several experiments with an online shop (operated with the support of Amazon), the company has set up a separate DC for its' B2C sales which is run by an external 3PL provider. The prolongation of lead times some years ago can be seen as exemplifying its holistic approach to the organisation of the logistics processes: it was a response to increasingly uneven sales volumes in the shops, with peaks on Monday and Friday/Saturday, which translated into increasingly strong fluctuations in the DC. The longer lead time allows the DCs to prepare orders for peak days during 'slump' days and also avoid a further increase in temp agency work.

Key findings on interrelationships between innovation and job quality, employment and inclusiveness

The semi-automation of the national DCs has destroyed the – somewhat more skilled and better paid – job of forklift operators. For the remaining jobs, skill requirements and physical demands have not been substantially modified; but senior employees according to the WC had difficulties to accept that they no longer 'see the result' of their work, as loading a palette has become a (sequential) team work and is no longer in the responsibility of a single worker; thus their work has become more similar to working in an assembly line. The most important change in job quality over the past decade was not directly related to an innovation: the extension of operating hours (night + Saturday) was mainly driven by strong unexpected increases in sales volumes that could not be matched quickly enough by newly built facilities. The works council has managed to negotiate a reduction of operating hours on Saturday (only until 2pm) once the new DC will start operations. But operating hours will still be longer than before the extension. Working time flexibility requirements (overtime hours) are moderate, compared to other German companies in the sector, and the company also makes less extensive use of temp agency work than other companies in the sector. This moderate internal and external flexibility is made possible not least by the company's conscious strategy to minimize peaks in demand by imposing adjustments in ordering behaviour on the shops (longer lead times = requires shops to order relatively long time in advance of demand). This exemplifies the potential benefits of a vertical integration of DCs and shops in one company, to the extent that it incites companies to optimise logistics flows for both shops *and* DCs.

NL-MEDIA (Keune and Koene, 2017)**Brief characteristics of the companies' structure and business strategy**

NL-MEDIA was (is) an independent logistics provider with several national DCs. The company operated warehousing, transportation, and a well-developed IT infrastructure providing warehousing and logistics services for the media, fashion and health care industries. Over a 100 years old, the company had seen significant changes in the past 20 years. Originally founded to provide warehousing and logistics services to Dutch book publishers and booksellers, the company was at the for-front of the developments in e-commerce that presented it with a rapidly changing market place for logistics services. Building on its strengths, the organisation has strengthened its position in “last mile distribution” to shops and private individuals. NL-MEDIA was functionally organised. In 2015, it employed over 1000 fte (of which more than 70% in open-ended contracts).

Important innovations in recent past

The company was drawn into the (B2C) e-commerce market early on (around 2000) as the key partner of a large online retailer, and accordingly had to adjust its processes to the different expectations with respect to fulfilment processes (picking and packing for single customers), speed of delivery and information (e.g. order tracking). This included significant investments in the automation of sorting and B2C packaging. Other major innovations over the past decade have been the adaptation of its business model to e-books and printing-on-demand (POD), requiring cooperation with external partners, and finally the expansion of its customer base by moving into additional product segments (other media products, healthcare and fashion). The company has also developed its market and sales information services to its clients, thereby strengthening its role as a neutral hub in the market for both physical and digital media distribution.

Key findings on interrelationships between innovation and job quality, employment and inclusiveness

In the sector, the organisation is seen as an actor that takes an inclusive approach involving the role of the employees in its strategies and innovations. The findings show that (1) timely adjustment gave the organisation time to introduce major adjustments in its activities and operations gradually, avoiding large scale forced changes. The management approach of proactive and gradual change whilst clearly communicating urgency and consequences, using the collective agreement as an important and useful instrument for negotiations on changing working conditions and compensation, resulted in stable and relatively harmonious employment relations and a loyal workforce. It prepared the ground for further strategic innovation where the organisation could consider leveraging its core competencies through diversification into fashion and healthcare. (2) Not all of the changed market expectations had to be absorbed by the organisation itself. Increased cooperation with external partners reduced the pressure on the existing organisation. (3) Different jobs were affected in very different ways by the innovations. In the most vulnerable and low-skill jobs, we saw limited changes in the content of the work, but significant changes in working conditions (flexibilisation, job rotation, extension of operating hours, and increased control.) At the same time, at the level of managerial and professional functions the job content changed substantially and in these positions more fundamental reorganisations took place and novel expertise was only available by hiring it from the outside.

NL-FOOD (Keune and Koene)**Brief characteristics of the companies' structure and business strategy**

Dutch food retailing is characterised by high supermarket density, much competition, slightly growing sales volumes, and changing market conditions through experimentation with online delivery by all major players. Convenience is important and most chains have broadened opening hours towards evenings and Sundays. Key issues for the industry are employment and working conditions in the warehouses and also the growing automation of warehouse activities with its impact on job quality and the employment structure in the field. In supermarket logistics, the past years have seen extensive debates on job quality in the sector, exemplified by ongoing tensions in social dialogue and the large union FNV not signing the most recent collective agreement. The sector is characterised by unease about labour conditions regarding job quality, security and pay. The quickly growing flexibility needs have been resolved by growing deployment of temporary staff.

The NL-FOOD case is a composite case based on an analysis of the developments in NL supermarket retail logistics and interviews with various key actors in the field to document the development of food logistics in the Netherlands.

Important innovations in recent past

We document two themes related to innovation and job quality. First, we explore the possibilities for improving Job Quality for DC workers in an environment where the introduction of centralised warehouse management systems (WMSs) contributes to supply chain optimisation and an increasing use of technology for planning and control on the work floor. Second, for the near future, full automation of warehouses is expected to replace many of the existing jobs and significantly change the employment structure in warehousing. Considering the planning around a fully automated warehouse scheduled to open in two years, we document the expected impact.

Key findings on interrelationships between innovation and job quality, employment and inclusiveness

First, we document an organisational innovation that reintroduced the role of employees as important actors in improving warehouse operations after the introduction of a centralised warehouse management system in NL-FOOD. After introducing a centralised WMS in all DCs in 2004, increasing uniformity in operations, around 2015 the organisation realised that the extreme focus on technology had negatively affected organisational climate "leaving employees with their scanner as their best friend." In an attempt to reintroduce engagement and employee contribution to learning, new objectives were formulated for people management in the DCs and the organisation supported organisational innovations where employees regained control over part of their work, showing the relevance of employee engagement and possibilities of improving on the operations of the WMS. As full automation is expected to take time, the possibilities to improve working conditions in the semi-automated DCs are certainly expected to remain relevant in the years to come.

Secondly, we document the expected consequences of full automation. A significant improvement of warehouse productivity is expected (50% more) with a sizeable reduction of employees (-70%) and a substantial change in the employment structure (less temporary employees, more and also higher-skilled maintenance workers, lower-skilled jobs in operations).

We draw two main complementary conclusions from this case. First, we see how even in the context of important radical technological innovations, such as a WMS and voice picking, there is still room for managerial choice and possibilities for continuous improvement by increasing engagement and involving employees. Second, we do see that developments towards full-automation will again significantly change warehousing work, both in volume and in content. The challenge here is how to manage the transition as painlessly as possible, and also to recognize and support the possibilities for pride and engagement in the new context for the remaining employees.

CHAPTER 8 – Innovation, Job Quality and Employment Outcomes in Care: Evidence from Hungary, the Netherlands and the UK

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1 Introduction

This chapter is concerned with exploration and analysis of the inter-relationships between innovation, job quality and employment in the care sector. It draws on empirical case study research of care organisations/companies from Hungary, the Netherlands and the UK.

The care sector is different from, but related to, the health sector. A key distinction in the care sector is between residential care (where an individual is cared for in a residential care home/nursing home where care staff are employed on site) and homecare/domiciliary care (where individuals receive care in their own homes by carers and other workers coming to visit them). The focus here is on the latter type of care and on a particular element of the care sector: that concerning caring for elderly people in their own homes undertaken by paid carers. Unpaid care provided by friends and family members to elderly people in their own homes is important in volume and socio-economic terms but is excluded here from direct consideration, albeit it is of indirect importance given that increasing reliance on informal care changes the role of some paid carers to include actively involving informal carers in care provision for clients.

This chapter is divided into four sections. This first introductory section provides an overview of how the care sector is structured and funded in Hungary, the Netherlands and the UK, before identifying common generic factors influencing the development of the care sector across countries. The second section introduces the empirical case studies of care organisations, presents case study evidence on key features of employment and job quality and their implications for social inclusions, before showcasing organisational and technological innovations from the case studies. The third section analyses inter-relationships between innovation, job quality and employment by synthesizing evidence across the case studies. Overarching conclusions are presented in the fourth section.

To understand the inter-relationships between innovation, job quality and employment outcomes in the care sector it is necessary to appreciate the context in which it operates. This section sets out the national contexts for the care sector in Hungary, the Netherlands and the UK in turn, and then identifies common generic factors that influence the development of, and challenges and opportunities facing, the care sector across the case study countries to greater or lesser extents.

1.1 National contexts for care for the elderly

There are some variations between the three case study countries in how the care system is structured, regulated and financed, and how it relates to the health system. It is important to understand these different parameters as they shape opportunities and set constraints for innovation.

In **Hungary** social services for older people are regulated by Act III of 1993 on Social Administration and Social Services (*SzT*). This Act defines the various forms and structure of care as well as the conditions of entitlement including a guarantee for access (Tróbert and Széman, 2016).

As is the case in England (see below), the social service system in Hungary operates independently of the health sector. Following a change in the political system, one of the basic functions of the 1993 Act was to define the responsibility of the Hungarian state, including ensuring the conditions for social care (beyond the responsibility of individuals, their families and local communities) is the task of the central organs of the Hungarian state and the local government and that the state and local governments are responsible for providing personal care for the socially needy (Udvari, 2013). An important distinction is made between *basic social services* (such as village and scattered farm caretaker service, meals, home help with alarm

system and day care) and *specialised services* (such as institutions providing temporary placement including care homes for the aged, nursing and care homes).

Home help service and institutions providing long-term care play important roles in elder care in Hungary (Tróbert and Széman, 2016). The basic pillar of elder care in Hungary is home help. In 2000, 40,292 people received home help whereas in 2014 this figure had increased to 132,985 (KSH, 2016). Despite a more than three-fold increase, the service has not kept pace with the growing number of people receiving care, where the number of care receivers per care worker increased from 4.7 in 2000 to 9.5 by 2013 (KSH, 2016). Home help with an alarm system is a supplement to home help, where the aim is to allow older people to remain living in their own home, but the state provides assistance in times of crisis (Tróbert and Széman, 2016).

Residential institutions are the second pillar of the Hungarian system of elder care. In 2006, 84,133 persons lived in residential institutions; the number having risen to 90,311 by 2014 (KSH, 2016). These residential institutions are not the primary focus here.

Financial social care in Hungary remains the task of the state (local government). However, churches and the private sector are also present among the providers and institutions. Out of the 55,426 people receiving residential care in 2014, just over two-fifths lived in homes maintained by local governments and other state bodies, close to 18 percent lived in institutions owned by churches, 10 percent lived in institutions owned by not-for-profit associations, just over 6 percent lived in foundation-operated institutions and 4 percent lived in association-operated institutions. The remainder was spread between homes operated by public foundations and institutions operated by joint ventures (KSH, 2016).

In theory, individual services are interlinked however there are gaps in provision whereby it is difficult to achieve a smooth transition between the different forms of service (Tróbert and Széman, 2016). On the basis of Regulation No. 36/2007 [*SZMM on the detailed rules for examining and certifying the need for care and social neediness on the basis of health status*], in 2008 the assessment of care need was introduced as a condition for access to services. A five-point assessment scale was introduced where the individual's score is used to determine eligibility to care need (expressed in terms of the number of hours of care the individual is entitled to be based on their self-care capability). If the need for care does not exceed four hours per day, an application can be made for home care. If the need of care exceeds four hours per day, the individual can be placed in a residential institution. So in this way, the two elements are interconnected. In practice, however, the number of care receivers per care giver (9.5) brings into question the feasibility of care workloads, whereby care workers in Hungary are over-burdened and subsequently not able to provide the level of care required by the elderly (Tróbert and Széman, 2016). While there is an emphasis on gradually shifting from residential institutional care to home help, the separation of the social services system from health system has caused many difficulties in Hungary. General practitioners and hospital specialists are often not informed about available social services with poor communication between the various services (Tróbert and Széman, 2016). Moreover, strains on the system has seen the use of care services decline by around 10 percent among new applicants, resulting in those with limited needs being excluded from receiving care (Czibere and Gál, 2010).

The funding allocated to support home care with alarm systems has been gradually reduced at the same time as provision having been centralised in 2013, giving rise to numerous problems. Two further changes

in regulations⁷³ restrict the activities that can be performed by home care workers and changed the administrative tasks and activity-based remuneration of the carer. The second regulation now divides activities into two groups: social help and personal care. On the one hand, the new regulation has seen a number of different services included in the list of approved activities (such as accompanying carers and maintaining contacts). Conversely, other activities have been removed from the list of approved activities (such as hanging out washing) (Tróbert and Széman, 2016). Activity-based care, combined with low pay, has had a negative impact on the relationship between care receivers and care givers, making the carer's work more difficult and more stressful (Tróbert and Széman, 2016). Particularly in smaller villages, in remote regional locations and among the disadvantaged with low incomes, local governments have found it difficult to ensure basic services to enable the elderly to remain in their own homes for as long as possible (Tróbert and Széman, 2016).

In the case of the second pillar of long-term care in residential institutions, stricter conditions for eligibility since 2008 have meant those admitted to residential institutions have generally very poor health and/or complex medical needs. Nursing and medical needs are increasing at the same time as staffing conditions are deteriorating. Because the care system is unable to meet demand, additional burdens are placed on family members, who are not being provided with adequate support (Tróbert and Széman, 2016).

The institutional context in which the homecare sector in **the Netherlands** operates is complex. Homecare (*thuiszorg*) is comprised of four elements: medical care, personal care, assistance and domestic help for people who need help in the home (Keune and Koene 2017). Shaped by historical trends and social conditions, the philosophy underpinning the Dutch healthcare system is based on a number of universal principles including access to care for all, medical insurance for all and high-quality health care services.

The Dutch homecare sector has been subject to many changes and reforms in recent years. At the current time it has three legislative and financial foundations. Medical and personal care are regulated by the *Health Care Insurance Act (Zorgverzekeringswet; ZVW)*, in what might be described as 'regulated competition', and is financed through compulsory health insurance, which was privatised in 2006 (Keune and Koene, 2017). Most of the private health insurance companies in the Netherlands say they are not-for-profit cooperatives (albeit many have built up quite substantial reserves) that allocate any profits to the reserves or return them in the form of lower premiums. Recently political considerations have led to a slowdown in further marketisation and continuation of blocking of profit distributions to shareholders, with the possible intention of never allowing it (Keune and Koene, 2017). In some cases, individual contributions are required (Keune and Koene, 2017).

The Long-Term Care Act (*Wet maatschappelijke ondersteuning, WMO*) regulates assistance and domestic help, which became the responsibility of the municipalities in 2015 (Keune and Koene, 2017). This decentralisation was accompanied by a reduction of around one-third in the funding available for assistance and domestic help. It is the responsibility of the municipalities to support the self-reliance of those who cannot do this on their own and may include domestic help (cleaning, cooking, etc.), adaptations in the home (e.g. stair elevators), transport, social activities, wheelchairs and so forth. Under certain conditions, this can be done via a personal budget. The type of assistance is personalised and increasingly the idea is that this kind of home support will only be provided when there are no possibilities for informal care arrangements or where the support needed is beyond the capacity and capability of such

⁷³ Regulation No. 1/2000 that took effect on 14 January 2015 and Regulation No. 26/2007 that took effect on 3 December 2015.

arrangements (Keune and Koene, 2017). When home care is needed, a visiting nurse will assess which type of care is required and connect with the relevant medical and social domains (Keune and Koene, 2017).

The sector has been subject to a long series of reforms, budget adjustments and other recent changes. Reforms have been motivated by austerity motives (including curbing the increasing share of healthcare expenditure as a proportion of total government spending), the goal of the ‘participatory society’ (including the idea that those that those individuals needing care continue to live at home for as long as possible, with necessary bespoke support) and longer-term objectives such as fostering competition in the sector - between both health insurance companies and providers (Keune and Koene, 2017). These changes have often been at the centre of public debate, particularly because care is for traditionally more vulnerable groups in society and there are concerns that members of these groups may not receive proper care in the future (Keune and Koene, 2017).

In general, healthcare expenditure in the Netherlands has been under pressure in recent years. While public expenditure on healthcare has remained stable since 2012 at 14.5 percent of GDP, it has been increasing quite strongly in absolute terms and as a percentage of total government expenditure. Because of the increase in costs and as part of general austerity policies, the Dutch government has made stabilisation and reduction of health expenditure an important objective (Keune and Koene, 2017). With demographic ageing, and since the elderly make up a large share of homecare clients, it is often argued to be main explanatory factor for the rise in healthcare expenditure (Keune and Koene, 2017).

Reducing relatively expensive institutional care in hospitals and retirement homes is a key public policy objective. Hence there is a push to increase first line medical care and the self-reliance of people living in their own homes for as long as possible (Keune and Koene, 2017). Many municipalities have faced criticism for trying to reduce the support provided due to financial constraints and recently, a number of elderly and sick people who lost previous support (particularly domestic help) have taken their cases to court. Decisions from the courts have resulted in the obligations for municipalities to expand (reinstate) their levels of domestic support. Municipalities have exerted downward pressure onto providers, resulting in lower wages and job loss because the providers cannot or do not want to reduce their rates (Keune and Koene, 2017).

In the Netherlands, there have been fluctuations in the number of homecare jobs and concerns about the quality of these jobs. There are a total of 24 private health insurers in the Netherlands who are responsible for delivery as regulated under the *Health Insurance Act* (Keune and Koene, 2017). There are roughly around 400 municipalities in the Netherlands who are responsible for enforcing the *Long-Term Care Act* and the *Youth Act* (Keune and Koene, 2017).

In the period from 2008 to 2016 the total number of companies in the Dutch home care sector increased more than seven-fold from 1,680 to 12,555 (CBS, 2016). This large increase in the number of providers largely stems from a dramatic increase in the number of self-employed persons (without other employees) who have become active in homecare. In 2008 there were only 1,180 self-employed (without other employees). By 2016 this number had risen to 11,745. In addition, the number of companies with between two and 50 employees also increased; albeit not increasing as fast as sole operators. By contrast, the number of companies with 100 or more employees declined from 105 to 80; with downsizing and bankruptcies (CBS, 2016). The sometimes tumultuous developments in the sector are exemplified by the bankruptcy of TSN in 2015. TSN was a large national domestic help organisation employing 10,000 domestic help workers. Following bankruptcy, in 2016 about half of its activities were taken over by Buurtzorg and the other half by local solutions where municipalities made a agreements with smaller,

sometimes new, organisations to secure the continuity of help provision to its former clients. Despite all the changes there are still a number of very large companies in the sector, such as Stichting Buurtzorg⁷⁴ with some 9,300 homecare employees (Keune and Koene, 2017). Home support (and previous TSN activities) were placed in a separate unit (buurtdiensten⁷⁵). Some large employers are part of multinational companies, such as Inluzio: a company active in all areas of homecare, and part of the multinational Facilicom Services Group (FSG) which is also active in the UK, France and Belgium. In addition to homecare, FSG is also active in construction, safety and cleaning. All in all, the sector is becoming increasingly fragmented in terms of the number and size of providers (Keune and Koene, 2017).

In terms of employment, the Dutch homecare sector had some 144,000 employees in 2015 and over 90 per cent of the workforce are women (AZW, 2014; van Essen et al., 2015; Keune and Koene, 2017). Total employment has decreased by some 18,000 between 2011 and 2015, despite having increased by around the same amount during the five-year period from 2006 to 2011 (AZW, 2014; van Essen et al 2015; Keune and Koene and Koene, 2017). A number of large providers are facing difficulties, while some new entrants are experiencing rapid growth. Given the recent fluctuations in employment and because it is not yet known how recent reforms will play out, it is difficult to accurately forecast future employment levels. This is made more difficult because it is not always clear which sector a job or worker belongs to, because some providers also operate across other sectors such as cleaning (Keune and Koene, 2017). However, in the short-term a serious shortage of qualified workers in the field of home care is foreseen given demographic developments.

In terms of education level, in 2014 around three-quarters of employees in the Dutch care sector belonged to the VVS professional group (nursing, caring and social-agogic). In addition, there are a variety of social workers as well as a large group of other employees (Keune and Koene, 2017).

In the **UK** (specifically *England*) the social care system (of which homecare is a part) is separate from the health system: the National Health Service (NHS). The NHS is free for all at point of use, its budget is ring-fenced, it is paid out of general taxation and it is devolved to each of the four nations of the UK (Green, 2016). Social care in England is provided through local authorities acting as commissioners, its budget is not ring-fenced and it is both means-tested and needs-tested.⁷⁶ Only a minority of individuals are eligible for publicly funded care (with this proportion varying geographically in accordance with socio-economic characteristics and the health of the resident population) (Green, 2016).

The foremost challenge facing providers of care in England is a continuing downward pressure on local government and social care budgets. Despite some local differences between commissioning authorities, budgets are generally tight in all commissioning areas, albeit the extent of tightness varies (Green, 2016). Results from a survey of councils in England and Wales that was conducted by the Local Government Information Unit found that more than 40 per cent of all local councils anticipated making cuts in frontline services which will be evident to the public, rising to 71 per cent among social care commissioners. More than half considered adult social care to be the most pressing issue (Butler, 2017). Despite an ageing population, real expenditure on social care in England fell by 7 per cent between 2009-10 and 2013-14. One of the ways this was achieved was by tightening eligibility thresholds for publicly-funded social care,

⁷⁴ A literal translation is 'neighbourhood care'.

⁷⁵ A literal translation is 'neighbourhood home support'.

⁷⁶ As at July 2015 people with assets of more than £23,250 have to pay the full cost of their social care.

and passing the financial squeeze on to care providers by negotiating lower prices for the care they finance.⁷⁷ This results in homecare providers trying to deliver high quality care for less and less money. The strain of the combination of continuing underfunding of adult social care, the significant pressure of an ageing population and the National Living Wage (i.e. the statutory minimum wage floor) is evident in the pressure on the homecare provider market. A study by consumer watchdog Health England published in August 2017 pointed to four areas in which people’s experiences of service could be improved: care planning, skills and qualifications, consistency and continuity, and communication and feedback. The tight budgetary environment has led to 95 UK local authorities having had homecare contracts cancelled by private companies as they can no longer afford to deliver them. In March 2017 it was estimated that around one-quarter of the UK’s 2,500 homecare providers were at risk of insolvency and almost 70 had closed down in a three-month period.

In England, across the industry there has been a shift away from direct provision from in-house local authority care teams towards greater private and voluntary sector provision of social care services (Green, 2016). The majority of care is provided by private providers, even if it is publicly funded.

Regulatory structures are important in social care. Homecare providers in England are regulated under the Health and Social Care Act 2008 by the Care Quality Commission (CQC) (Green, 2016). New regulations came into force in April 2015 including new standards covering the conduct and level of training of care providers and the protection of service users. The Care Certificate was introduced to replace the National Minimum Training Standards and the Common Induction Standards in England, came into force in April 2015 (UKHCA, 2016: 21). In October 2014, the CQC introduced a new framework for assessing compliance with classifications of outstanding, good, requires improvement or inadequate (UKHCA, 2016: 22). Linked to the issue of regulation, the nature of care work in England has become more medicalised. Homecare duties have expanded to include work that was previously done by medical professionals and associate professionals (Green, 2016).

Cumulatively, these trends have resulted in a system that is crisscrossed with fault lines in how services are funded, commissioned, provided and regulated – between the nationally-funded NHS and local authority-funded social care, public and private and public funding, and private and public delivery (Humphries, 2013: 8).

The number of adult social care jobs in England in 2014 was estimated at 1.55 million (around 1.19 million full-time equivalent jobs), where around three-quarters of those jobs were held by independent employers, 8 per cent were employed by local authorities, 9 per cent worked as direct payment recipients and 6 per cent were employed by the NHS (Green, 2016). In terms of the gender structure of the workforce in England, it is predominantly female (82 per cent in 2014) (NMDS-SC database⁷⁸). Approximately 17 per cent of the workforce in England is from a Black and minority ethnic (BAME) group background, rising to 59 per cent in London.⁷⁹ In terms of nationality, 82 per cent of the workforce is British with non-European

⁷⁷ LangBuisson (2015) calculate that local authorities reduced their fee rates by a national average of over 9% between 2010/11 and 2015/16.

⁷⁸ The NMDS-SC is an online database (see <https://www.nmds-sc-online.org.uk/content/About.aspx>) which holds data on the adult social care workforce. It is the leading source of workforce intelligence and holds information on around 25,000 establishments and 700,000 workers across England.

⁷⁹ In part, reflecting differences in the ethnic profile of the population in England.

Economic Area (EEA) nationalities making up 12 percent and the remaining 6 percent having an EEA nationality. In 2014, the mean age of the workforce was 43 years (Green, 2016).

Around three-quarters of the adult social care jobs were involved with direct care, including care workers, senior care workers, support workers and jobs for direct payment recipients. In addition, a range of other jobs involved providing care and support directly such as community support and outreach workers and other care-providing jobs. Managerial and supervisory roles accounted for 110,000 jobs, including senior managers, middle managers, line managers, registered managers and other managerial roles not directly involved in providing care. Regulated professions accounted for 90,000 jobs including social workers, occupational therapists, registered nurses, allied health professionals and teachers (Green, 2016).

The number of adult social care jobs was estimated to have increased by around 3 per cent (40,000 jobs) between 2013 and 2014 and by 17 per cent since 2009. The proportion of direct care-providing jobs increased from 74 per cent in 2011 to 76 percent in 2014 (Green 2016). Since 2009, there has been a continual shift away from employment with local authorities towards independent sector jobs. Personalisation of adult social care is also apparent with a large increase in the number of jobs for direct payment recipients since 2009 (where the increase is estimated at around 36 per cent or 35,000 jobs). The majority of the increase in adult social care jobs since 2009 came from an increase in jobs for CQC regulated non-residential establishments (up by 40% or 140,000 jobs) and in care homes with nursing (up by 20% or 50,000 jobs) (Green, 2016).

In terms of skills and qualifications, implementation of a regulatory framework on social care in England in the early 2000s had a positive effect on the level of training and qualifications in the sector. In 2012, 84 per cent of UK care sector employers reporting providing training for their staff, compared with 59 percent across the whole of the UK economy (Skills for Care & Development, 2013). However Gospel and Lewis (2011) suggest that few UK organisations have combined training with a broader set of human resource management practices of the kind required for a high performance work system.

From these national overviews it is relevant to note that the precise roles and activities included within what is conventionally understood as the homecare sector varies between countries. In the Netherlands there is a four-fold distinction between medical care, personal care, assistance and domestic help for people who need help in the home. This is a broader range of activities than in the UK and Hungary where the health and (social) care systems are separate. In the UK personal care is the main activity within the homecare sector. Older people who can afford to do so might pay for companionship services. Other than help with meal preparation and serving, domestic help tasks (such as cleaning, etc.) do not fall within the auspices of homecare. Likewise, medical care other than tasks such as ensuring clients take medication, are not routinely classed as homecare. In Hungary there is a key distinction between social help (i.e. domestic tasks) and personal care.

1.2 Generic factors influencing the development of the care sector across countries

From the national accounts above it is clear that there are several generic interlinked factors influencing the development of the care sector across countries.

First, in all European countries there are *ageing populations*, albeit the rate at which ageing is occurring varies. For example, in the Netherlands the share of persons aged 65 and older has been increasing rapidly, from 7.7 per cent of the total population in 1950 to 11.5 per cent in 1980 to 13.7 per cent in 2000 to 17.8 per cent in 2015. Moreover, population projections point to continuing growth in the numbers of older

people. This growth is important for any consideration for care of the elderly. However, not only are there greater numbers of older people, so leading to a greater need for care *ceteris paribus*, but the elderly tend to have more complex needs as they grow older (i.e. the nature of demand for health and care is changing), such that appropriate care provision might be more complicated also, so presenting challenges for the sector.

As the needs of older people have become greater, which has been reflected in a greater ‘medicalisation of care’, there have been pressures both enhanced integration of care and health and greater collaboration between service deliverers. This *blurring of boundaries* poses both challenges and opportunities for care providers. On the one hand integration means there is scope to create more coherent progression pathways for carers to work in health-related roles, while on the other there is greater space for distinguishing between domestic help, personal care and healthcare related roles (i.e. greater segmentation of tasks). More complex needs of care beneficiaries (i.e. ‘clients’) mean that for the maintenance of good quality care for elderly people collaboration between different parts of the care and health systems, and between providers, is crucial; working well together matters. Changes in other parts of the wider system – notably in health services, welfare and benefits, housing and well-being policy domains - have important implications for care.

More older people, and their more complex needs, place greater demands on funding for care. The *challenges of financing care* have implications for the balance between different kinds of care provision. There is pressure for individuals to move out of hospital sooner and to live independently in their own homes for longer. This means that individuals in their own homes are in need of additional care, as the care requirements they present with are more complex than was formerly the case. Financial pressures at the macro economy level mean that there have been cuts in public expenditure, so creating financial pressures for the care system. Reductions in funding have meant increased stringency in criteria for care support – such that the profile of those eligible for publicly-funded care is skewed more towards the neediest than was formerly the case. Ongoing challenges of insufficient funding put the care system under pressure, and these can be exacerbated by uncertainties about funding level changes.

Cost factors are one driver of a policy emphasis on *older people living independently in their own homes for longer* (with social care [and health] support), rather than being in hospital or moving into residential care. This means the care system has to deal with individuals who might formerly have been in hospitals. Well-being factors also drive in the same direction towards independent living and underlie a trend towards greater emphasis on client-focused care as opposed to more standardised care delivery. The wish to improve self-reliance, driven by a combination of cost-factors and client well-being, is an important factor driving both technological and (mainly) organisational innovation.

Older people in need of care tend to be vulnerable. This means that *the care sector is regulated, with minimum quality standards set*. As revealed below, regulation can be a driver of innovation as care organisations innovate to meet/ improve standards of care – for example as certain minimum skills requirements can drive investment in training and development of staff. Conversely, overbearing regulation, or frequent changes in regulations, can stifle innovation by restricting room for manoeuvre.

In general *implementation of technology* to support carers/ older people is less advanced in the care sector than in health (although there are variations between countries and organisations). Technology can play a role in monitoring the condition of care clients and in bring healthcare applications within the scope of care. It may also facilitate administration, planning and processing of care visits.

2 Case studies, key features of the care sector and main findings

This section outlines key findings from case studies undertaken across the three countries (for further details see the Annexes). Section 2.1 introduces the case studies, section 2.2 outlines key features of employment and job quality, and associated implications for social inclusion, and section 2.3 showcases specific examples of organisational and technological innovations, outlining in each case associations with job quality and employment outcomes and implications for social inclusion. The case studies involved interviews with managers and workers, and were supplemented by interviews with other directly relevant stakeholders. Reflecting on the evidence presented in this section, inter-relationships between innovation, job quality and employment are discussed in the round in the following section.

2.1 Introduction to the case studies

Empirical case studies of care organisations/companies involved in-depth interviews with managers and workers, and were supplemented by interviews with other directly relevant stakeholders and experts. The interviews explored business strategies, market segments of operation, details of employment, approaches to job quality, challenges faced and important innovations planned/implemented in the recent past. A particular focus was on investigation of inter-relationships between innovation and job quality, employment and social inclusion.

Table 1 outlines the nature of the case study organisations and the number of interviews undertaken in each case.

Table 1: Overview of case studies

| Pseudonym | type of company / establishment | number of employees (< = 50; 51-500; 501-2500; > 2500) | number of interviews | case study storyline |
|---------------------------------|---|--|--|--|
| HU-SOCIAL INSTITUTION | United Social Institution providing integrated social services in a relatively small local municipality – the focus of the case study is on the Home care unit | < 50 | 3 interviews (of which 1 focus group with 5 employees) | Poor job quality as a hindrance for innovation |
| HU-CHURCH PROVIDER | Historic church providing social care services in a city in a peripheral part of Hungary | 51-500 | 3 interviews (of which 1 focus group with 8 employees) | The role of supportive management in enriching intrinsic job quality |
| HU-GOVERNMENTAL PROVIDER | Provide care services for elderly people in a city in a peripheral part of Hungary | 51-500 | 2 interviews (of which 1 focus group with 8 employees) | The vicious cycle of constant underfinancing, a bureaucratic organisational culture and labour shortage |
| NL-HOME CARE | Regional healthcare organisation with separate divisions providing welfare, care, living and comfort services across 20 local municipalities. The focus of the case study is on the Care Division | 501-2500 | 11 | Working towards self-organisation and smart co-operation around district nurses to improve local effectiveness combining holistic client support with specialised actor inputs |
| NL-HOME SUPPORT | Home support unit of large regional home care organisation providing home support services (mostly cleaning) | 51-500 | 12 | Attempting to integrate home support activities in a home care organisation undermined by ambiguity about ambitions for home support services |
| UK-FAMILY PUBLIC | Private family-owned care company, delivering a publicly-funded block contract in four towns in a semi-rural area of England | 51-500 | 6 | Good intentions undermined by external constraints |
| UK-FRANCHISE PRIVATE | International company operating local franchise model (with multiple franchises in England) delivering privately-funded care supported from a National Office – interviews at National Office and at two franchises ('1' and '2') in 'Middle England' | 51-500 (per franchise) | 12 (across National Office and two franchises) | Leadership and management for a high-quality proposition: central guidance with local delivery |
| UK-METRO PUBLIC | A private care company trading under its own name but part of a wider group, delivering publicly-funded care for several different commissioners in an ethnically diverse metropolitan area | 51-500 (in branch) | 7 | Commissioner: contractor collaboration for ethical care in a diverse metropolitan environment |

Source: Own compilation based on case study reports (see the list of reports in section 6 of this chapter).

2.2 Case study evidence on key features of employment and job quality

This section outlines key features of employment and job quality, and associated implications for social inclusion, in order to set the context for the discussion of innovations in 2.3, which in turn impact on employment, job quality and social inclusion.

2.2.1 Employment characteristics

The workforce in care is overwhelmingly *female*. In terms of *age*, while offering employment to all age groups, the sector is relatively unattractive to younger workers, with many jobs filled by middle-aged and older workers. Despite some local and national variations, the care sector has relatively high proportions of workers who are *non-citizens* and/or who are from *minority groups* (this is especially the case in the UK, although in the Netherlands in areas close to the border companies are also looking outside the country for labour).

The care workforce is relatively *low-skilled* as measured by formal qualifications required on entry and in performance of standard carer roles in the UK and Hungary and for home support roles in Hungary and the Netherlands. Often a greater emphasis is placed on a ‘caring disposition’ than qualifications or experience in recruitment, albeit the general trend is for an increase in skills requirements from a low base. Indeed, in the Netherlands the levels of entry qualifications required is higher for carer roles than in the UK or Hungary, and there is an increasing differentiation between carer roles that require an increasing level of formal vocational training and home support jobs. Whereas in the UK after a short induction course and work shadowing carers can go out and deal with clients and undertake further training (e.g. for a Care Certificate) on-the-job, in the Netherlands the norm for carers would be to have undertaken a three-year vocational training course, while nurses will have undertaken vocational training at levels 4 or 5.⁸⁰

The sector is characterised by *ongoing recruitment and retention challenges* – such that some care organisations are recruiting on a continual basis. This was the case for all three case study organisations in the UK, while in the Netherlands labour shortages were reported to be particularly pronounced in NL-HOME CARE from summer 2016 for carers and especially for nurses in the face of pressures to upgrade positions to deal with more complex care requirements and proactively manage and activate the informal care network (Balhuizen and Koene 2017).

2.2.2 Job quality

Turning to consideration of the *QuInnE indicators of job quality*, in terms of *wages* pay levels are low relative to the national average. This reflects both the skills profile of carers and the financial pressures on the sector. Variability in pay tends to vary according to whether workers are on guaranteed hours contracts (as is the norm in Hungary and the Netherlands) or on zero hours contracts (which are common in the UK) (Gardiner and Hussein, 2015).

With regard to *employment quality* the case study evidence indicates that in general care workers have continuing employment, even if they are not engaged on a permanent basis. This reflects the fact that

⁸⁰ In the Netherlands formal qualifications required for carers and nurses are as follows: Carer level 2: 3 years level 2 vocational training carer –allowed to do cleaning, give coffee, give out food, etc.; Carer level 3: 3 years level 3 vocational training carer – allowed to wash, dress, people, do basic medical activities, etc.; Nurse level 4 vocational training - regular nursing activities; Nurse level 5 higher vocational training – required by district nurses.

there are not marked variations in the volumes of care required once contracts have been awarded; rather the demand for care is such that most care workers are secure in their jobs and (in most areas) could find similar work elsewhere. In the Netherlands, while there has been a good deal of turmoil in the market and bankruptcies recently, there is a growing shortage of care workers and so possibilities for continuing employment. Traditionally internal progression opportunities have been limited given relatively flat organisational structures. Nevertheless, there are examples of carers in the UK being promoted to supervisory and management positions. However, greater integration of care and health offers opens up more opportunities for progression (with some level 3 carers being able to advance with further training to level 4 and level 5 nursing positions in the Netherlands in NL-HOME CARE), and where care organisations include domestic (e.g. cleaning) functions as well as care functions (as in Hungary) there are examples of internal progression. At the same time, the NL-HOME CARE example shows that this progression is limited to workers that can make a step from home support/domestic help to care roles that require further formal training. For workers on guaranteed hours weekly hours are generally predictable. For those on zero hours contracts in the UK working hours can be less predictable, but then workers can choose whether or not to work at certain times. Since carers are out in the community presence at a central workplace is not applicable; however, in another sense presence is extremely important as clients expect/are dependent on visits at certain allotted times. There is evidence for some involuntary long hours working where there is insufficient time scheduled to undertake all tasks that carers would wish to do and carers complete such tasks (or related administrative activities) in their own time. There is more limited evidence of involuntary part-time work which is most likely to occur for new recruits when they are becoming established.

Turning to *education and training*, aside from basic literacy and numeracy, formal education standards are low for domestic/home support roles in Hungary and the Netherlands and for carer roles in the Hungary and the UK. However, regulatory frameworks set minimum standards and case study evidence indicates that care organisations can be keen to provide non-mandatory training in order to better equip workers to fulfil their roles and to raise standards of care. Skills acquired are transferable within the care sector and have some relevance in related sectors. At least one case study care organisation emphasised the importance of inducting new staff with previous care experience in ‘their way’ of doing things. Refreshment of certain skills on a regular basis is compulsory. Some case study organisations provided ongoing learning opportunities for additional specialisms. This reflects that fact that given the more complex care clients need at home, care providers are looking to raise the skills levels of carers.

A key feature of *working conditions* is that care workers and individuals undertaking domestic activities in clients’ homes tend for the most part to work alone. At face value this affords them a certain amount of autonomy, but traditionally the particular tasks to be undertaken have been specified. Financial constraints can mean that the determination of ‘allowable tasks’ has become more stringent, whereas in the Netherlands case study focusing on home help (NL-HOME SUPPORT) the direction of travel is in the opposite direction with greater discretion expected of workers to determine priorities. The latter is in accordance with a shift towards greater client-focused care. Semi-autonomous teamwork is evident in the Netherlands case studies where there are self-organised teams (NL-HOME CARE) (see section 2.3 for further details), but not in the Hungarian and UK case studies. Job variety in care tends to come more from dealing with different clients than in terms of the range of tasks performed, but the shift to person-centred care brings with it greater job variety. Work intensity is high given the schedules to which carers work and the fact that the needs of clients are increasing on average. The fact that caring and domestic help are physical roles and that clients may display challenging behaviours in emotionally-charged situations raises

the risk of care workers suffering physical and psychosocial problems. As ‘lone workers’ in general care workers have limited opportunity for interaction with others performing similar roles. The additional responsibilities of the workers increase their need for organisational support in dealing with growing complexity and discretion. Case study evidence indicates that care organisations are working to increase supervisory, and especially peer group, social support (as exemplified by the organisational champions described in section 2.3.1). However, especially in the lower-skilled roles in the Netherlands, cost pressures have led to growing responsibility and pressure without concurrent development of adequate organisational support.

Turning to *work life balance*, work scheduling in the care sectors is dictated by the fact that some clients need care at certain times of day (e.g. often in the morning for help with getting up/having breakfast, at lunch-time and in the evening) every day (including weekends), so leading to split shifts (morning and evening) and regular weekend work. Domestic help is generally undertaken in what might be considered conventional ‘normal working hours’. To some extent, within the constraints of when care has to be delivered, workers (especially those on zero hours contracts) can say when they are available to/would prefer to work, and can be rostered accordingly. While this suggests some degree of working time flexibility, once a worker is rostered and a schedule of care visits is set, workers have very limited control over their hours. If an individual cannot fulfil a visit it has to be allocated to someone else. Case study evidence indicates that it is often the case that carers find they cannot fit in all of the tasks that are required and/or that they would like to do to a standard of which they could be proud, within the allocated time. Especially in the case of home support, workers often have long-standing relationships with their clients, and feel a responsibility to them, more than to their (sometimes more transient) relationship with care organisations. This means that work (especially but not exclusively administrative tasks), can spill over into non work time.

The case study evidence suggests that *consultative participation and collective representation* in the care sector is relatively poorly developed, with no/low direct participation in organisational decisions. Formal worker representation and trade unions are relatively weak in the care sector, although there are variations between countries. In the UK the privatisation of care helps explain low levels of unionisation (even in a UK context), although trade unions have helped to influence debate about employment standards (as the example of the Ethical Care Charter outlined in section 2.3 illustrates). In Hungary the norm is for a lack of trade union involvement, although in the case of public sector providers it is compulsory for a public servants council to exist. The influence of trade unions and works councils is greater in the Netherlands where a sector-wide collective agreement is regulating a wide variety of pay and working conditions and works councils are active and play a key role in specifying a number of issues that are part of the collective agreement and adapt them to the reality of specific organisations (such as training and development, and certain elements of remuneration and reimbursements). At the same time, the big market changes that the care sector has been facing (cost pressures, requirements for more inclusive/patient-centred care, changing funding streams, etc.) and the growing number of very small organisations has limited the impact of individual employee participation in traditional organisations (Keune and Koene 2017).

Taken together, the characteristics outlined above point to *poor extrinsic job quality* in care. Yet the case studies (and the wider literature) point to *high intrinsic job quality*, with workers in care tending to value their role in helping their clients and making a difference to their lives. Hence the care sector presents an interesting juxtaposition low extrinsic and high intrinsic job quality.

2.2.3 Implications for social inclusion

So what does this mean for social inclusion? The ‘4S’ framework devised for QuInnE (Warhurst et al. 2016) to categorise different facets of jobs that are important for social inclusion distinguishes:

- **Stepping stone jobs:** offering entry into paid work
- **Sticky jobs:** offering sustainable employment
- **Springboard jobs:** offering routes to better jobs either within internal or external labour markets
- **Stretchy jobs:** offering work and employment that extends working lives

The relatively low barriers to entry⁸¹ and high expansion and replacement demand for carers means that care provides stepping stone jobs in abundance. Individuals who find that other employment opportunities are closed to them because of a lack of qualifications or where local labour markets are slack, can often find job opportunities in care.⁸² However, organisational innovations aimed at self-organisation (in the Netherlands) and the increasing responsibilities for care workers (more generally across the three case study countries) make care work more demanding. If qualification requirements for care workers are raised as a result, especially in the absence of provision of any additional organisational support, barriers to entry are likely to increase.

Ongoing labour shortages in care in many areas, together with increasing demand as the population ages means that care can provide sustainable employment. Care jobs tend to be sticky jobs.

The extent to which care jobs are springboard jobs offering routes to better jobs is less clear. As mentioned in passing above and the case study evidence in section 2.3 shows, there are good examples of instances of where and how workers in care can progress (albeit progression might not reap significant [or indeed any] financial reward). Trends towards the integration of health and care and also towards greater medicalisation of care, in theory offer opportunities for progression. However, such progression routes are not always clear. Furthermore, there is likely to remain a significant demand for conventional care roles in the short- and medium-term.

Care jobs can be stretchy jobs– albeit some tasks can be physically demanding. The fact that care work often can be undertaken on a flexible/ part-time basis means that in work organisation and scheduling terms care jobs can be fashioned in such a way that can be stretchy. Life experience can be an asset in care and some of the case study organisations specifically championed older workers, while recognising the benefits of a multi-generational workforce.

Hence the features of the care sector – sometimes reinforced by the proactivity on the part of care organisations – suggest that it is (and has potential to be even more) a socially inclusive sector.

2.3 Showcasing innovative practices from the case studies

The findings from the case studies are organised by showcasing case study examples of two main types of innovation – organisational (section 2.3.1) and technological (section 2.3.2). Implications for job quality, employment and skills are drawn out in each case; (these are explored further ‘in the round’ in section 3).

⁸¹ One interviewee in the UK remarked that there was a prevailing feeling amongst some segments of the public that caring is something you do “*if there is nothing else you can do*”.

⁸² Albeit they might not possess personal attributes that mean that they are suited to working in care.

In general, the case studies highlighted more examples of organisational innovation than of technological innovation – although it is important to note that (at least in some cases) technological innovation may require associated organisational innovation to be effective – and to enhance job quality. Hence organisational innovations are considered first.

Overall, it is apparent from the showcased examples of organisational and technological innovation outlined above that *key drivers of innovation* in the care sector include:

- *regulation and regulatory changes* - care is a relatively highly regulated sector given that society/political norms acknowledge that care is being provided to vulnerable people;
- *market changes* - in terms of how care is commissioned and by whom;
- *cost savings* - reflecting the financial pressures on the sector in the context of austerity at the same time as an ageing population brings greater demands;
- the *needs of care recipients* (referred to as ‘clients’);
- *organisational ethos*; and
- the development, introduction and demands (on the organisation and on the workforce) of *new technologies* – which can facilitate planning, provide potential solutions for increasing productivity in care, but also can increase the complexity of care work (especially as hospitals and nursing homes deal increasingly with the most severe cases only).

2.3.1 Organisational innovations

Five types of organisational innovations are showcased in this section: a general shift in focus from ‘time and task’ to ‘outcome related’ care; enhanced support for carers (and their clients) –through (1) training and development, (2) stress management, and (3) peer support through organisational champions; collaborative working; innovation in organisational models and the development of self-organised teams; and an initiative to ‘raise the floor’ in an attempt to enhance job quality of carers and the quality of care for clients.

2.3.1.1 From ‘time and task’ to outcome-related care

Traditionally in the UK and Hungary care that is publicly funded has been organised on a ‘*time and task*’ basis– i.e. care requirements are prescribed at the outset (by a social worker/nurse) and a care provider is contracted to deliver the care specified for a given price. In this model the carer has to complete specific tasks in the time available (or as many of them as is possible); any additional input has to be undertaken in their own time, so infringing on the work-life balance of care staff. *Outcome-based care* looks at care more holistically from a client perspective – and this tends to be more demanding of carers’, supervisors’ and managers’ skills. Hence in the care sector there needs to be an onus on continuing skills development to deliver personalised quality care. However, shifting from ‘task-based’ to ‘outcome-based’ care is not necessarily straightforward, as the following example shows.

Led by a local commissioning authority in England, in what was termed an ‘innovation’, UK-METRO PUBLIC had an ‘outcome-focused contract’ from one of its several local authority commissioners (Green and Wright, 2017). Under this contract for each client the care supervisor was given a pot of money to do an assessment and make a plan based on spending that money in such a way as to promote the client’s independence as much as possible. Rather than care plans being fixed for a year, the aim was for outcome-focused contract to be reviewed – and adjusted as necessary – every 12 weeks. Additionally, there were expectations that UK-METRO PUBLIC should incorporate various community services to help support the individual client:

“So they would say we expect you to reach out to Age Concern, for example, and get a befriender in here for a Thursday afternoon [for Mrs Jones]. ... We expect you to reach out to X workshop down the road so Mr Jones can go down and do a bit of carpentry on a Friday.” (Area Manager, UK-METRO PUBLIC).

While this outcome-focused contract was considered good in principle, it had proved difficult to operationalise in practice. First, skills additional to those typically required by (or possessed by) supervisors are necessary to manage such packages; hence extra training is required for a more demanding role – but such training was not immediately forthcoming. Moreover working in this way would require upskilling of carers too to execute more varied roles. Secondly, support services/ charities were very stretched and so found it difficult to offer any resources of the type desired for additional client support. Thirdly, existing invoicing arrangements demanded by the commissioning authority were too standardised to cope with the flexibility of outcome-focused contracts:

“Government money has to be accounted for and how those systems work is very standardised. You have to produce an invoice and that invoice has to say it will spend at this time on this date. That invoice at the very most you’re looking at a month so within that month you can’t bank the money and use it another time because within that month you have to know that money’s been used. If the money hasn’t been used they’ll take it off.” (Area Manager, UK-METRO PUBLIC).

At the time of the fieldwork, UK-METRO PUBLIC was working with the local authority in question to try and address some of these issues. However, this case exemplifies how external constraints associated with public financing arrangements and additional skills requirements for workers can impede innovation that might enhance the quality of care for clients.

A similar dynamic is found in the Netherlands in NL-HOME CARE (Balhuizen and Koene 2017). To assess individual clients needs NL-HOME CARE introduced the role of the district nurse (in cooperation with other regional care providers) with special additional responsibilities in holistically assessing client needs and with the explicit responsibility to advise clients about all support and care possibilities available in the neighbourhood. The district nurse’s activities recognised the interdependency between local care providers and the value of taking a holistic, outcome-oriented perspective. However, long-term funding for these activities is difficult as regular funding is provided on a ‘time and task’ basis. To date the district nurse activities have been funded as part of the ‘visible link’ innovation programme in home care⁸³ and explicitly distinguished as ‘S1’ activities, separated from executive care ‘S2’ activities. With the ending of this programme, two large insurance companies have offered to keep financing the activities of the district nurse cooperative, but the future of the programme is uncertain as the market doctrine does not recognise the value of co-operation (as outlined further below):

“It’s annoying that we are still in between two paradigms. [...] co-operation [...] would better fit this participation co-operation, the whole view. At the same time, of course, we have brought the paradigm of competition in care. And that’s a dominant position, insurers compete with each other. And those insurers ... aim to contract the best providers and buy it under the best conditions. And this creates competition. [...] What we actually say to all insurers: now pay one party to arrange things in a specific district, because that is clear for the

⁸³ The ‘visible link’ programmes are from the Netherlands Organisation for Health Research and Development.

GPs and for everyone, and then the customer can still choose [between] home care providers. [... B]ut let one person do this piece of infrastructure. If every insurer says no, I pay everybody a little bit and then everyone can do it a little. Yes, then it will not work.” (member of the executive board, NL-HOME CARE).

2.3.1.2 Enhanced support for carers (and their clients)

(1) Investments in skills development:

More generally, case study organisations emphasised the need for investment in skills development for employees to deliver better outcomes for clients. As noted above, typically positions in the area of domestic help do not demand formal qualifications and so are open to all. Hence recruits to the sector in such roles need not have any relevant experience or prior training, albeit the situation is different for carer roles with a healthcare/medical element and varies between countries, with qualification demands being highest in the Netherlands.

The demand for carers and relatively poor extrinsic features of job quality mean that even when there were very limited opportunities in other sectors, openings in care remained: the care sector is socially inclusive. In Hungary, for example, a significant number of employees were reported to come from sectors suffering job losses where low-skilled employment had dominated; the care sector provided a route back to sustainable employment for the unemployed (i.e. care provided ‘stepping stone’ and ‘sticky’ jobs). In Hungary HU-CHURCH PROVIDER employed so-called ‘public employees’ (i.e. unemployed persons willing to work) in auxiliary tasks in care; legally public employees are not permitted to work in nursing and caring tasks and so job roles have to be designed as to separate ‘caring’ and ‘auxiliary’ tasks). With some training alongside their work duties, it was reported that around half of public employees graduated into work as ‘carers’. (Patyán et al. 2017a). This strategy can be conceptualised as offering ‘wins’ all round: the unemployed (especially older women) are integrated into work and can progress into a caring role, heavier auxiliary tasks can be removed from the workload of carers and the employer can identify and train suitable recruits as carers.

An interviewee in her fifties who had previously worked in accounting and book keeping had become unemployed when her previous employer closed down and when professional short courses failed to help her find a job turned to the care sector, using her social connections as a member of an ecclesiastical committee to gain entry to the sector as a public employee before graduating to become a carer:

“Finally I realised that I have no other choice to find a job at my age, except to work as a social caregiver. The age doesn’t matter that much in this area. There are many ladies here who are near to the pension age.” (Carer, HU-CHURCH PROVIDER).

Albeit this represented some downskilling in relation to this individuals her previous employment, the care sector in Hungary offers employment opportunities for older workers.

In the light of the inclusive nature of the care sector, care organisations necessarily have to ensure that workers are trained to meet minimal quality standards and further training is likely to enable higher standards of care to be delivered. At face value this suggests that unless domestic-related tasks are separated out from care tasks – as in the case of HU-CHURCH PROVIDER – the care sector is likely to become less inclusive for the least skilled. Moreover, training needs to be adapted to the needs of the workers.

In the UK UK-METRO PUBLIC has a diverse workforce drawn from various different ethnic and language groups (Green and Wright, 2017). Some carers have gravitated towards the sector because of no/low formal qualifications (often associated with a dislike of traditional classroom-based teaching methods). As part of the shift from time and task to more outcome-related care, UK-METRO PUBLIC had introduced first, a new type of practical training focusing on consequences; and secondly, narrative record keeping. In part this was stimulated by a necessity to improve medication management in order to conform with externally imposed quality standards (i.e. regulation was a primary stimulus for innovation), but this was matched by the organisation's desire to improve the quality of care.

Rather than a conventional emphasis on 'how something should be done', a new approach was adopted in what was termed '*what happens if you don't do it training*' focusing on the consequences of poor medication management rather than on 'how to do it'. The improvements in medication management as a consequence of this more practical learning style were described by the Area Manager as having been "*immense*".

Additionally, a 'care worker medication lead' had been introduced from amongst the care workers (without promoting them – in a fashion similar to the organisational champions appointed by UK-FAMILY PUBLIC in the UK [outlined below]):

"We're giving them a status saying we see you as somebody who's done fantastic work in this field, whose constantly done well with medication and therefore it's like creating a champion almost. We give them additional training so that if any of their colleagues get stuck they can start by talking to the medication lead who may be able to give them a solution from the care worker's point of view." (Area Manager, UK-METRO PUBLIC).

To provide further reinforcement, there had also been a particular focus on medication in supervision meetings.

Alongside this there was an emphasis on "*narrative*" record keeping as a way of enhancing quality standards and improving the baseline of information available for collaborative working in the light of policy drives towards integration of care and health and greater collaboration between care providers (as discussed below). The Quality Officer reported that there used to be a tendency for carers to record: "*all care given*". However, this is not helpful for knowing how the client is or for any other healthcare professionals dealing with the client. So carers with the new narrative record keeping carers are encouraged to write things like: "*The service user answered the door swiftly*" – which shows that there are not mobility problems, etc. Carers are also encouraged to write down what service users have eaten/ are eating; (this may be important if a person is taken to hospital/ requires a medical procedure, etc.)

This development serves to enhance job quality for carers but requires reasonable standards of literacy amongst care workers, for whom English is a second language for many in this case.

Innovations in learning and skills development need not be prompted by external stimuli (such as regulatory standards). In some instances the ethos of the organisation and the manager is the crucial factor in going beyond baseline regulatory and contractual requirements and so provide an enhanced quality of care. Different organisational structures and financial models also help explain differences in the room to manoeuvre in providing such improvements.

In the UK at UK-FRANCHISE PRIVATE particular emphasis was placed on learning and development. A central 'national office' provided a mentoring programme for new franchise owners (who generally came

from successful careers in commerce rather than care), plus ongoing support. Indeed, before being accepted as a potential franchisee the Franchise Team at national office work with psychologists to undertake psychometric testing around how well potential franchisees' attributes accord with passion and empathy, cultural fit, people orientation, attitude to risk, whether and agile learner, etc. (Wright and Green, 2017b).

Likewise, in training for carers reference was made to values, validation, professional needs, and social needs (acknowledging the isolating nature of care work [as discussed further below]). In professional terms carers were encouraged to complete the 'Care Certificate' (which was developed by the industry and has set new minimum standards that should be part of the induction training of new care workers), but case study interviewees emphasised the five 'needs' (i.e. qualities) of a care giver: empathy, dependability, patience, strength and flexibility.

Illustrating the local discretion that is possible in a franchise model and the greater financial resource available in a business model based on privately- rather than publicly-funded care provision), Local Franchise 1 at UK-FRANCHISE PRIVATE insisted that all new recruits (whether or not they had previous experience in care) undertook a week's classroom-based training (which was the start of the nationally-recognised Care Certificate) and also required workers to undertake City and Guilds Training in Alzheimer's and dementia care (reflecting the particular emphasis this particular franchise owner placed on care for this 'specialism'). When carers had been with the franchise for six months they were offered the opportunity to take further qualifications in Health and Social Care (funded by the company), on the proviso that if on a modular course one of the options is on dementia, that module should be completed. The senior management team had all been offered the chance to do degrees – with no requirement that it had to be in a health-related subject, on the grounds that *"the whole process of doing a degree and the academic rigour of doing a degree and the general learning from it"* would be beneficial (Franchise Owner, Local Franchise 1, UK-FRANCHISE PRIVATE).

In an innovative development for UK-FRANCHISE PRIVATE Local Franchise 2 had appointed a Learning and Development Manager and a Learning and Development Officer to develop the franchise's people management function. Developments to date at the time of the fieldwork included making induction training more interactive and people oriented; development of 'refresher' courses on topics such as dementia, challenging behaviours, personal care and medication; one-to-one coaching; etc. Attention had also been devoted to succession planning (i.e. 'spotting' individuals who might be suited to particular management roles and developing individualised development packages for them, including projects which might be of wider benefit to the franchise).

It is worth noting that franchise owners had invested a substantial proportion of their own money in the franchise, and had a certain degree of both resource and autonomy to introduce innovations as they wished. The rationale for such learning and development innovations was to improve the standard of care for clients and provide enhanced job quality for staff.

(2) Combatting (potential) detrimental features of lone working and managing stress

As noted in section 2.1, a key feature of working in care is that (at least in most instances) the carer tends to work alone with the client. According to the extent of discretion the carer has in organising the schedule of the working day (and this can vary by organisation and country) this means that the worker may have some degree of autonomy, but traditionally there has been a lack of teamwork to provide support for lone

working (the self-organised teams in the Netherlands at NL-HOME CARE outlined below is a partial exception to this).

In all instances the case study organisations recognised that a carer’s role can be physically and emotionally demanding, as described by two of the carers from Hungary:

“It is physical work. To put a 70-80 kg client into the bathtub and to take him out, it is not easy. To do the cleaning for five clients a day...at the end of the day I go home and I am dead tired.” (HU-CHURCH PROVIDER, Carer).

“We are mentally shattered. To deal with the large number of elderly, demented people ... disease...feeling of death... loss ... everyday topics. My firm belief is that after 25 years of work we should retire ... because ... because we burn out and that’s all.” (HU-CHURCH PROVIDER, Carer).

Difficulties in ‘switching off’ from personal involvement with individual clients’ circumstances and needs can mean that stresses and strains can spill over to carers’ working and non-working lives, with detrimental impacts on work-life balance. It was recognised widely across case study organisations that training had a role to play in preparing carers for the demands of the job – especially as the content of the role increased from home support to caring to nursing. But on its own (ongoing) training might be insufficient; rather additional social and psychological support might be needed in some instances.

The case study organisations adopted different strategies to address these needs. Opportunities for care workers to come together with each other were universally acknowledged as important, but could be difficult to engineer:

“Community activities should be strengthened when they [the carers] can be together after work. Unfortunately the workload is so heavy and the deadlines are so tight that it is very difficult to do it. Everybody is rushing, running.” (HU-CHURCH PROVIDER, Head of organisation).

In the UK at UK-FRANCHISE PRIVATE considerable emphasis was placed on “touch point” opportunities at the central care office providing opportunities for care workers to come together in a sociable atmosphere, while also sharing experiences between themselves and with the office-based team. UK-FRANCHISE PRIVATE Local Franchise 1 had started ‘Area Meetings’ with fewer people (rather than larger groups) coming together and had received good feedback from that. Moving away from the central office and clients’ homes, a group of staff at UK-FAMILY PUBLIC led a late summer excursion to the seaside with carers, some clients, their families and other staff in order to provide an opportunity for everyone to come together. This was seen by the owner and staff as a token of appreciation for their hard work from which all could benefit (Wright and Green, 2017b).

Another of the case study companies emphasised the importance of thanking staff for their work. In the UK at UK-METRO PUBLIC a fortnightly newsletter had been instituted (Green and Wright, 2017). While the foremost purpose was to provide work-related reminders to carers, the newsletter also provided a mechanism to thank carers for their work:

“It’s [the newsletter] just a one sided sheet where we write little things down about, you know tips and reminders: you know how to give people ... more calories in their food to bolster their nutrition. ... It always starts with you know ‘Thank you so much for the quality care you’re

giving our customers, thank you for working hard'. So lots of thank yous in there, lots of support and I think that's been really valuable. People will often say to me since you've been here the communication is better and so it may not sound particularly innovative, but the improvement it's made and the way our care workers feel is a real plus." (UK-METRO PUBLIC, Area Manager).

While the strategies showcased above might seem rather small scale and informal they nevertheless represent innovations to enhance intrinsic job quality in an environment where financial and temporal resources are stretched. However, the case study research yielded an example of a more formal approach to address worker well-being.

In Hungary HU-CHURCH PROVIDER had a strong Christian ethos and placed a key emphasis on highly motivated staff (Patyán et al. 2017a). Over time management recognised the extent of psychosocial risks faced by carers given the emotional and physical demands that their heavy workload placed on them and then tested carers' burn out using the Malasch Burnout Inventory (MBI) test (i.e. a leading measure of burnout):

"It was at the beginning of 2016 when I noticed some workers had changed. They started to be a bit introvert, even though I asked what the trouble was they said nothing. I thought I would perform a burning out test. Then I was shocked by the results. 30% of employees had medium or high level burnout symptoms. Certain people went on [the] sick list more and more often." (HU-CHURCH PROVIDER, Head of organisation).

Then a specialist was engaged to lead sessions with a group of carers on a weekly basis, but the expense involved in running such sessions on an ongoing basis was prohibitive:

"The specialist gave them a lot of good advice and in some cases the need for individual case management came up as well. It was very useful but it was not cheap at all. I can't promise that we would make it frequent even if they would need it." (HU-CHURCH PROVIDER, Head of organisation).

Thereafter, an 'open door policy' was instituted, such that carers could come to the head of the organisation at any time with problems (whether work-related or otherwise [e.g. financial]). This support was obviously appreciated by the carers, and was a positive factor in their job quality:

"The atmosphere is very important, because if I do not enjoy myself, the elderly people notice it and it hits back [...]" (HU-CHURCH PROVIDER, Carer).

"If there are any conflicts with the elderly people you can turn to the management and they will help you. They defend you, they appreciate you. The management is for the employees." (HU-CHURCH PROVIDER, Carer).

By adopting this strategy the employer played an important role in enriching intrinsic job quality.

As the example above suggests, financial constraints mean that affordability is a key consideration in any attempt to enhance job quality and worker well-being.

(3) Peer support through organisational champions

Another model of support for carers and their clients – importantly involving very limited additional financial costs to the organisation – involved incorporating an important element of training alongside organisational innovation.

UK-FAMILY PUBLIC in the UK is a fast-growing family-owned private care company providing publicly-funded care. The owner wanted to improve communication within the company as it continued to grow, recognising that she could no longer provide the same support herself to her staff as when the company was smaller. So, in essence, the impetus behind creating new 'organisational champion' roles revolved around supporting and empowering staff, enhancing their skills and helping them to work better as a team, while improving the quality of care provide to clients (Wright and Green, 2017a).

Although the idea of the owner, it is salient to note that it was informed by the company's involvement in the Skills for Care⁸⁴ initiative on 'skills around the person' – so illustrating the importance of engagement with external bodies in the case of a family firm in stimulating innovation. This particular Skills for Care initiative starts from an assumption that care workers all have their own skills, knowledge, experience and attributes which they bring with them to their work and also that person-centred approaches are vital in ensuring that care and support meets clients' individual needs and preferences.

At the time of the fieldwork 'Community Champion'⁸⁵ and 'Dignity Champion'⁸⁶ roles had been introduced, and there were plans to introduce further roles in the future. Rather than introducing a new layer of management (which would have been one solution for a fast-growing company in which the business owner was increasingly stretched), the 'organisation champion' roles were filled by well-respected carers who maintained their day-to-day care roles; (hence the strategy adopted did not result in any change in staffing levels, but did enhance communication within the company). Although the 'champions' were not paid more, the business owner saw the creation of the role as demonstrating her commitment to career development and the value she placed in her staff. In terms of social inclusion, the innovation aims to increase the attractiveness of care work as a career. It is hoped that this initiative will help make jobs more attractive as employees are encouraged and supported to develop specialisms, which in turn might lead to increased recruitment (including from non-traditional groups) and/or reduced turnover. The 'champions' themselves saw the added value they offered by the very fact that they were on the same 'level' as the carers:

„The girls do struggle sometimes. There are things that they want to talk about. They don't want to particularly go to the co-ordinator, they don't want to go to the manager. There needed to be a level person. They obviously found some comfort in me. I see a lot of the service users...I do think that people have found quite a comfort. Someone they can just go to when it's not a massive problem but it is something that they feel needs to be looked into.”
(Community Champion, UK-FAMILY PUBLIC).

⁸⁴ Skills for Care is the strategic body for workforce development in adult social care in England.

⁸⁵ The 'Community Champion' is someone who carers can talk to about values and also raise issues and concerns with about their role, rather than "going to the boss" (i.e. the business owner).

⁸⁶ The 'Dignity Champion' role is linked to the ethos of person-centred care and is concerned with upholding the dignity of the client in relation to language used (e.g. not "Mr Smith suffers with dementia" but "Mr Smith lives with dementia") and the environment in which personal care is delivered (e.g. "closing curtains and shutting doors").

The organisational champions undertake industry training to become specialists, for example in dementia care. The champions cascade their knowledge throughout the organisation (and externally in the community). It is envisaged that this cascading of knowledge will result in a general upskilling of all employees. The emphasis on skills development was highlighted in more general terms by the business owner:

„We have to give people the skills, the knowledge, the understanding, the support that they need to deliver and do a good job. We can't blame people if they don't do a good job. It starts and stops with us. We've got to support people.” (UK-FAMILY PUBLIC, Business owner).

„I think it is kind of giving people the tools they need to move forward...Because care is a career and it is not easy and it is stressful...This is a hard job. We are never going to be able to pay you the money you deserve to be paid but what we can do is look after you, nurture you. Support them all in a way they generally do deserve to be supported in. That is what it's all about.” (Business owner, UK-FAMILY PUBLIC).

This emphasis on support was echoed by the Community Champion:

“It is trying to make them see that the job that they do is amazing. They are all amazing. Every member of staff that works for us is amazing...I think in any job you need to be shown that what you do, there is someone there to say thank you when you've done it.” (Community Champion, UK-FAMILY PUBLIC).

Hence, the emphasis is on providing support to carers in a manner which makes sense within the financial constraints faced by the organisation.

2.3.1.3 Collaborative working

Collaborative working between carers, health professionals and other service providers underlies holistic care provision and also has the potential to streamline the efficiency with which (limited) resources available are used. To a great extent collaborative working is inherent in the self-organised teams in the Netherlands outlined below in the sub-section on 'innovation in organisational models. Innovations in collaborative working can also be driven by statutory needs to provide care in a climate of financial constraints.

Close working with one local commissioning authority may be regarded as an innovation for UK-METRO PUBLIC in the UK, which is one of two main providers in the authority's commissioning area, which together provide over 50 per cent of publicly funded care provision in the local area. This close working was prompted, at least in part, by the local commissioning authority's desire to raise quality standards in the light of the balance of the weighting in the competition for contracts in the previous commissioning round being overwhelmingly towards cost rather quality (reflecting the huge financial pressures on the care sector) (Green and Wright, 2017). For the next commissioning round (for which the competition was already underway at the time of the fieldwork) the desire was to place more onus on quality – although price remains paramount:

“It was a really poor procurement [last time] because we were under so much cost pressure. In this procurement [i.e. the current procurement round that the commissioning authority was preparing for] for example we're going to be assessing bids on a weighting of 70 per cent price, and 30 per cent quality. I think when we started out the last time, there was a 60/40 split

between price and quality but then there was again an unprecedented financial pressure, so we ended up assessing providers at 90 per cent on price and 10 per cent on quality.” (Monitoring and Commissioning Officer, Local Commissioning Authority A, UK-METRO PUBLIC).

Also the local commissioning authority was seeking to work more closely with care providers and to encourage care providers (who ostensibly are competing for care contracts) to work more collaboratively with each other to drive up the standard of care delivery. Hence in the next commissioning round a decision had been taken to award smaller lots in more geographical sub-divisions of local commissioning area A, with bidders being restricted in the number of geographical sub-divisions (i.e. lots) that they can bid for. Such a strategy is designed to enable more diversity of provision (with more smaller providers being awarded contracts) and to encourage greater provision of linguistic (important in an ethnically diverse area) and other specialisms:

“We reserve the right to actually work with the providers through the procurement process to get them to shift around. [...] When we [are looking to] award the contracts, one of the things we’re testing the providers on, is how well you lead on, how do you propose to work with other providers. There may be circumstances when a visit can’t be covered by X agency and Y agency next door can pick up that visit, so it’s about partnership working and collaboration with other providers.” (Monitoring and Commissioning Officer, Local Commissioning Authority, UK-METRO PUBLIC).

These developments are indicative of a market characterised by increasing collaboration – between commissioner and provider and between care providers within a particular local commissioning area, as an attempt to raise quality standards in a stringent financial environment. For carers themselves, the hope was that the development of more collaborative ways of working would open up more opportunities for progression within care, and also into social work and nursing. However, the extent to which this materialises has yet to be seen.

2.3.1.4 Innovation in organisational models

Different organisational models in care are associated with less or more control for different functions. In tightly regulated and bureaucratic systems (as illustrated in Hungary by HU-SOCIAL INSTITUTION and HU-GOVERNMENTAL PROVIDER in particular, and also by publicly funded care provision in the UK in the cases of UK-FAMILY PUBLIC and UK-METRO PUBLIC delivering care on tightly defined contracts) involving delivery of publicly funded care, the scope for developing new/ innovative organisational models is limited. Rather the emphasis here is on small-scale and rather incremental innovation. By contrast the franchise structure of UK-FRANCHISE PRIVATE may itself be seen as innovative in the context of care, although it is notable that it operates in a less financially-constrained market. In this case the franchise model allows for local discretion with central support from a national office; (the company itself is international, but most support to franchises is on a national basis, albeit some local franchises try to learn from international experience). UK-FRANCHISE PRIVATE is a corporate business but each franchise is independently owned and operated. The franchisees get the benefit of a corporate feel and some degree of standardisation, but have the freedom to run the businesses the way they want to, providing they meet the franchisor’s expectations. The commercial rationale for a franchise model is that it is possible to grow relatively quickly, with cash investment from franchisees and reduced management at national level (Wright and Green, 2017b).

The company made a financial decision that it could not operate under local authority block contracts⁸⁷. Geared to the premium end of the care market, its business model is one of offering flexible packages to clients with private funding, with rates charged set by franchise owners and so varying by franchise. In general, particular emphasis is placed on matching the carer and client on character and interests, in order to deliver companionship-based care, as opposed to a primary focus on provision of personal care (albeit often some personal care is involved). The fact that there is no major reliance on public funding means that charge rates are higher than for public funded care, and this affords the company has greater discretion in its activities.

This local autonomy and flexibility is illustrated by practical initiatives – such as a Memory Café and a Lunch Club organised by one franchise – which are then showcased through the franchise network as examples of good practice. In terms of local variation in the case study franchises, UK-FRANCHISE PRIVATE Local Franchise 1 placed particular emphasis on dementia care for care workers. Local Franchise 2 had developed a relationship with a social housing provider which had built some ‘extra care’ accommodation with on-site services and delivered care within that complex. Since all clients were in one place there was no requirement for carers to drive between appointments (as was usually the case in the local franchise area), and so it had been possible to widen the usual recruitment pool in that particular local franchise area to non-drivers. The clients’ care was publicly funded, which was different from UK-FRANCHISE PRIVATE’s general model, but Local Franchise 2 had been keen to take advantage of a new opportunity. Another example of local discretion of a franchise model operating at the premium end of the market was recruitment of a Learning and Development Manager by Local Franchise 2 as an investment in a ‘people management’ function, drawing on workers’ prior experience in other sectors.

In general UK-FRANCHISE PRIVATE had slightly more stringent recruitment criteria than other care companies and sought to hire carers deemed suitable for providing quality care at the premium end of the care market. Objectively many features of extrinsic job quality were similar to, or only marginally better than those experienced in other UK care companies. Given a general ethos that to deliver quality care it is important that workers do not work over long hours the capacity for carers to work very long hours to increase their earnings was curtailed.

Another example of organisational innovation is provided in the Netherlands by NL-HOME SUPPORT, where a home support function that was previously separate had been re-integrated into a broader care organisation (Oosting and Koene 2017). An associated innovation as part of the re-integration was the extension of the job of the home support worker beyond cleaning to include some ‘social support’ and a ‘signalling’ function – which in turn provided an opportunity for enhanced links with other parts of the broader organisation (as set out below). The signalling function involved the home support workers communicating issues they faced in their work environment at clients’ homes, including the condition of the client, to a co-ordinating nurse at the organisation’s headquarters. This signalling function enhances the connection with the rest of the care chain within the organisation and enables emerging issues to be spotted early, such that connections with other units of the organisation can be made quickly. The changing role of the home support worker results in a competitive advantage for NL-HOME SUPPORT:

⁸⁷ A ‘block contract’ is a fixed payment made to a provider to deliver a specific broadly-defined service. Block contracts give a degree of certainty in respect of continuity and consistency for contractors and providers. Generally competitive costings are an important determining factor in awarding of contracts.

“And that is the attractive aspect for an organisation like [NL-HOME SUPPORT], to look at how you can close the gaps between care, welfare and household support, how can you make some kind of arrangement of that? And then you become an attractive partner for health care insurers, the municipality that is the idea of a complete offering, which is something a cleaning company could never do.” (Home support director, NL-HOME SUPPORT).

Role expansion to include social support and a signalling function makes the job more rewarding for the home support worker. Initially home support workers received training to develop the interpersonal, communicative and alarming skills necessary for undertaking the signalling function. This was reported by home support workers as being *“very useful”* and there was enthusiasm for further training sessions and for the associated contact with their colleagues who they otherwise would not meet. However, the additional sessions were subsequently postponed because of lack of funding available. The ensuing situation is indicative of the pressures organisations in the area of home support are experiencing.

Especially in the area of low-skilled home support work has intensified, but the ability to provide organisational support to workers to deal with this is limited. In home support resources for organisational support are extremely limited due to cost pressures: budgets are squeezed, while with a shift to output-based requirements the job demands have become more ambiguous and more encompassing at the same time for those whose duties extend to duties beyond unskilled home support.⁸⁸ Home support workers indicate the challenges this poses to them in the execution of their work:

“You have to watch out that you do not get too involved in a person, because then he will completely rely on you. Mentally that is hard from time to time, how to deal with that. And I find little guidance in these situations. [...] I then try to push him towards his children, because he has seven children so you would expect that they would think of him. But no, he completely relies on me. [And do you contact the coordinating nurse for that?] Yes, but if you call, you do not come through. Only in the morning but I work at that time, so then I send an e-mail. But sometimes it takes a couple of weeks before you get an answer. I find that unfortunate sometimes, that you do not really have a direct line to ask what I should do with this situation.” (Home support worker, NL-HOME SUPPORT).

The organisation recognises the bind that the workers are in. Workers need to involve and activate the client’s informal care network more, but many workers find this difficult and end up doing the additional work in their own time:

“It has become more difficult, what you previously did for a client in three to four hours, you now have to do in two hours. [...] On paper, it seems as if the tasks have disappeared but in practice they have not. They want everything to be soberer, but if you are busy at the client, you do not want to deliver half work, you’d rather do it well. [...] It is a group of low educated people, with not very high salaries that in the end also often clean in their own time, because they want their work to be done well and fully.” (Planner home support, NL-HOME SUPPORT).

⁸⁸ In NL-HOME SUPPORT in the Netherlands there are two grades of workers: (1) HV1: unskilled home support; and (2) HV2: where the home support worker has to help the client organise basic elements of creating a ‘clean and liveable home’.

For management and supervisors it is difficult to support these workers in their changing work environment due to the limited resources available for the activities themselves:

“Well, cleaning a house in two hours, I don’t know, and I am not a stick-in-the-mud, but it would take me longer. And then you get stuck because the municipality says you have to shift the resources between the clients; one needs more and the other less. But that part of providing less hours at certain clients is of course very minimal, as people stay longer at home and therefore also struggle more. [...] When I started, I thought the municipality would be open for negotiation to see how we can help the client, but that is something I have come back from. I found that very sad, but I have to say I had to make a shift in mind-set, otherwise I had better leave. [...] Having as little costs as possible, is at the top of the list, or actually it is the framework in which I work. And we can do more with that, we are not done, but sometimes it is difficult. I can of course do more with [the Welfare division], I started making contacts there and to briefly walk in there every week.” (Coordinating nurse, NL-HOME SUPPORT).

With respect to the signalling training, home support workers clearly appreciated the training, but also noted that, with the additional pressure of the requirements to do less themselves and leave more to others (such as family members and neighbours) the training added to an already full work load. While the training provided them with the possibility to develop interpersonal and communication skills, as well as knowing when to raise the alarm, necessary for undertaking the signalling function, they acknowledged that:

“[The training] is definitely useful. Indeed, you learn a lot from it, it’s just that, sometimes it is hard to apply it all in the short time you have, because the people do actually ask for a piece of your attention.” (Home support worker, NL-HOME SUPPORT).

So this example showcases an organisational innovation that has the potential to improve job quality for workers and to improve anticipation of changing care needs for clients, but which is being thwarted by lack of funding.

A final example of organisational innovation is provided by *geographically-based self-organised teams* in the Netherlands. With decentralisation of responsibilities for homecare from the national government to municipalities in the Netherlands, NL-HOME CARE has sought to rethink the organisation of homecare in general. The combination of increased cost pressures, a desire to enhance the client-focus of homecare, and a call for a re-appreciation of the professional role of home care professionals, have driven initiatives to introduce *geographically based self-organising teams*, embedded in the local community. One particular innovation is the development of self-organised teams. Of special interest from a job quality and employment outcome perspective is that such teams in NL-HOME CARE potentially offer greater possibilities for progression, with the district nurse playing a central role (Balhuizen and Koene 2017).

This innovation is top-down in nature, stimulated by the ‘visible link’ programmes of the Netherlands Organisation for Health Research and Development, so demonstrating the role of national institutional and support structures in innovation. Where relevant, unions and the works council were involved, but otherwise the innovation was management-driven, although employee participation in effective implementation of the new organisational structures was considered especially important.

Two key developments have been driving the general interest in self-organisation solutions in Dutch home care organisations. First the shifting policy emphasis: from efficient institutionalised care to widely shared,

more holistic client-oriented care solutions. Large home care organisations had built up very large bureaucratic professional care organisations where work was done by professional nurses, nursing assistants and cleaners, who in the end provided quite costly and also rather impersonal care solutions. Discontent with the performance of these organisations increased the call for more widely shared community care solutions where home care professionals were expected (and allowed) to not only provide more client-oriented personalised care, but also aim to organise voluntary care around the patient relying on family and neighbors. The second development was the very successful introduction of geographically-based self-organising teams by Buurtzorg: a quickly growing and highly successful new Dutch home care organisation, following an innovative organising model with a ‘nurse-led model of holistic care’ (Buurtzorg, 2017) which has attracted significant attention throughout the Netherlands and beyond.

NL-HOME CARE introduced the district nurse model in a cooperative effort with a regional health care association and five home care organisations. Traditionally, district nurses fulfilled a central role in their neighbourhoods providing and helping people organise the support that they needed from cradle to grave. In the current model, the district nurse has again been positioned as key person in a neighbourhood care provision. (S)he fulfils a key role in the care network surrounding a client and acts as liaison between the care organisations, the clients and other relevant actors in the neighbourhood. NL-HOME CARE district nurses fulfil a dual role: first, they have an independent networking role, acting as visiting nurse and establishing the care requirements/ plans with individual clients bringing together the available expertise and possibilities for support around a specific client; secondly they are key actors – with coaching and co-ordinating roles – in NL-HOME CARE’s self-organising nursing teams operating at neighbourhood level. These self-organising teams have around 10-15 team members, with the district nurse as ‘team captain’, acting as representative and contact person for the team, but leaving most of the discretion to team members in the execution of their work – as explained by the Manager of NL-HOME CARE using a footballing analogy:

“And on that playing field is a team captain. Who ensures that everyone in that field is connected to each other. But that captain also gets input from the sidelines, from the coach, from the trainers, from I know what, they get overviews, information, ‘we notice this and that in the team, try to go a bit more this way or that way. Try to play more offensive or try playing more defensively.’ And he then goes, with his own group to do it himself. But at a certain moment, as more safety arises in that playing field and people are better aligned, they need to do less.” (Homecare Manager, NL-HOME CARE).

For this relatively flat organisational team structure to operate effectively all team members require at least a specified skill level. In this instance, the minimum education level of team members was raised to Level 3 in Healthcare. Yet each team member has a specialism – for example, dementia care, palliative care, etc., to whom other team members can turn for assistance. Much of this support takes place virtually.

2.3.1.5 Raising the floor in extrinsic job quality

One means of improving extrinsic job quality is to improve minimum conditions of employment (i.e. to raise the floor in extrinsic job quality). Minimum wages are a classic example of such an attempt to ‘raise the floor’ at an economy-wide level.

In the Netherlands the *sector-wide collective agreement* for Nursing homes, care institutions and home care, maternity care and youth health care, negotiated at the national level by unions and care organisations, reflects such a measure (Keune and Koene, 2017). Besides *setting minimum conditions for employment*, the protocol with the 2016-2018 agreement highlights several points that the social partners

will pay special attention to in future: the need for reduction of the administrative burden and enforcement of the collective agreement in the sector; the continued monitoring of the bottlenecks that may arise as a result of the restrictions on the use of zero-hours contracts; the need to monitor working conditions and reduce increasing long-term sick leave; and the need for development and career perspectives to support sustained employability for employees in the sector. Social partners will also pay attention to increased employee involvement in decision-making around working times and working time scheduling. Furthermore, the protocol establishes the desire to fundamentally revise the collective agreement in due course to better adapt it to the development of industrial relations in the sector, the development of care in various sub-sectors, creating a balance between the employer and the individual employee in determining employment conditions, individual preferences of employees, and the role of works councils and unions. Finally, the 2016 protocol explicitly mentions the need for active attention to be paid to inclusion of employees with work-related disabilities, as their jobs have been relatively hard-hit when labour was cut during the period from 2014 to 2016 (SOVVT, 2016).

At sector level employment *charters* may be used as a mechanism to raise standards of employment. An example of this approach is provided from the UK by one local area in which UK-METRO PUBLIC operates having seen the introduction of new externally determined standards for the main contractors delivering homecare services. The *Ethical Care Charter* setting out these standards was developed by a trade union representing public service workers in 2012.

The objective of the Ethical Care Charter is to establish a baseline for the safety, quality and dignity of care by ensuring employment conditions that do not shortchange clients, and ensuring the recruitment and retention of a more stable workforce through more sustainable pay, conditions and training levels. In so doing the Ethical Care Charter seeks to reverse the trend for councils (i.e. local commissioning bodies) to achieve savings in a ‘race to the bottom’: driving down pay and conditions, by setting minimum standards against which services are levelled up. Of particular relevance for extrinsic job quality are: first, payment for travel time and costs; secondly, that zero hours contracts should not be used routinely in place of permanent (guaranteed hours) contracts; and thirdly, payment of the voluntary Living Wage (as a minimum threshold). Details of the Ethical Care Charter agreed by local authority A are set out below.

| | |
|-----|--|
| 1. | Time allocated will match the needs of clients (and will not be limited to 15 minutes) ⁸⁹ |
| 2. | There will be no minute-by-minute task-based commissioning |
| 3. | Workers will be paid for their travel time (between calls) |
| 4. | Both local authorities and service providers need to be transparent in their price setting |
| 5. | Zero hour contracts will not be used in place of permanent contracts |
| 6. | Local authorities will monitor service providers, including working conditions of staff |
| 7. | Clients will be allocated the same homecare worker wherever possible |
| 8. | Visits will be scheduled so that workers are not forced to leave to get to another client |
| 9. | Homecare workers that are eligible must be paid statutory sick pay |
| 10. | Homecare workers will be covered by the occupational sick pay scheme |

⁸⁹ 15 minute care visits were used as a minimum by some providers.

| | |
|-----|--|
| 11. | Providers will have a clear procedure for following up concerns about clients |
| 12. | Homecare workers will be trained (and this will not cost them money) |
| 13. | Homecare workers will be given time to meet coworkers to share best practice |
| 14. | Homecare workers will be paid at least the (voluntary) Living Wage ⁹⁰ |

The payment of travel time and costs was seen as relatively uncontroversial at UK-METRO PUBLIC (Green and Wright, 2017). The company had implemented this by building in an additional payment on top of the (voluntary) Living Wage that was equivalent to x minutes in every hour as travel time. However, take up of guaranteed hours had been low: any assumption that (most) staff would want guaranteed hours contracts had not been borne out. At the time of the fieldwork approximately 10 per cent of carers at UK-METRO PUBLIC had taken up the offer of guaranteed hours contracts. The Area Manager explained that she had realised a sizeable proportion of workers would not want guaranteed hours – on the grounds of prioritising their own flexibility (i.e. by letting the scheduler know either in advance, or immediately when the schedule for the forthcoming period was issued, that they would not be available to take up care appointments at certain times), but also admitted that guaranteed hours could have been difficult to operationalise for the company, given the nature of care work and when (throughout the course of the day) hours are needed. The Care Manager explained the pros and cons of guaranteed hours contracts vis-à-vis zero hours contracts as follows:

“The reason they choose not to do it and stay on their zero hours is because they lose their flexibility. So on a zero hours contract, they set their hours that they can work and they can change.⁹¹ ... The guaranteed hours contract is good because if you’ve got a lot of visits with a particular person and they’re the majority of your hours for a week and that person goes into hospital or passes away, you’re gonna lose those hours and there’s not always something that we can give you in place of that until we get a new client so on the guaranteed hours contract, if that person passes away or goes into hospital, you’re still going to get guaranteed to be paid the 30 hours a week that’s on your contract so it’s good in that way. But the problem is, is that a lot of the care workers have childcare issues so they need to change their hours around school times or child minders and those types of things so it doesn’t suit everyone. I mean if you are a stable person that can do that, then it is good because like I say if you lose hours for whatever reason then you’re gonna get guaranteed payment.” (Care Manager, UK-METRO PUBLIC).

The Care Co-Ordinator at UK-METRO PUBLIC who had previously worked as a carer on a zero hours contract but was on a guaranteed hours contract in her current role explained:

“I also liked the flexibility of it because of my kids. I could work at a certain time and leave at a certain time. [She also explained how she could attend school functions by altering her hours

⁹⁰ If homecare workers are outsourced it should be on the basis that the provider is required, and is funded, to maintain these pay levels throughout the contract.

⁹¹ So a carer might say to their employer that in general they are available on Monday, Wednesday and Thursday mornings, but then one week they might say that they are unavailable on a certain Monday morning, and so can they work on a Tuesday instead.

as necessary. She was on salary, rather than a zero hours contract, as Care Co-ordinator, and so would not have this same flexibility without taking holiday] The money side is good because I'm guaranteed that I will get paid whether I work or I don't work. As a carer you get more flexibility because you can choose your hours. I liked that." (Care Co-ordinator, UK-METRO PUBLIC).

The fact that there is a continuing demand for care work and a shortfall in supply of carers meant that most on zero hours contracts generally could work the hours they wanted. The relatively low take-up of guaranteed hours contract had led the commissioner to change the relevant key performance indicator on percentage of workers on guaranteed hours contracts:

"We've changed our key performance indicator to say how many of your workers have been offered the guaranteed hours contracts." (Commissioning and Contract Monitoring Officer, Local Authority, UK-METRO PUBLIC).

As a result of the imposition of the voluntary living wage the wage level increased – so attracting more recruits, including more males (who tend to form only a small proportion of the total workforce in care). Hence, raising the floor appears to be widening the pool of potential recruits, so making care more socially inclusive.

"We think it [the increase in male care workers] is because of the increase in salary. I think people understand that they can actually earn a living from it [i.e. care work] now. So, for example, if a male comes in, he can support his family now in [local authority A]. But I think in general terms the attitude towards males providing care has changed a lot as well." (Area Manager, UK-METRO PUBLIC).

In the case of UK-METRO PUBLIC, at the time of the fieldwork males comprised 5-10 per cent of the workforce. However, it was felt that for males more so than for females, care was seen as a pathway into other health professions:

"Domiciliary care is often a pathway into other health professions for males and I think it's where they start. So they'll start with us and then they might move into nursing or move into residential management so it's a stepping stone in their career rather than something they'll stick with for life. [...] [For women] that's where they [i.e. in a care worker role] and that's where they stay." (Area Manager, UK-METRO PUBLIC).

The pay rate is a further key factor in explaining variations in the number of applicants between different branches of UK-METRO PUBLIC. As noted above pay rates vary by borough, so in local authority A (where an ethical care charter is in place), the Area Manager described a situation of "no recruitment issues". However, the Area Manager went on to qualify this statement that the higher hourly wage making care "attractive to people [with no formal qualifications] as a method of earning money" posed its own difficulties in terms of recruitment:

"You don't have to have experience, you don't have to have a background in care. The difficulty is that people now are aware of the fact this is a career that they can move into that pays £10.98 an hour and they don't have to have any qualifications or background in it whatsoever. So every man and his dog walks through that door." (Area Manager, UK-METRO PUBLIC).

“Recruitment’s not a problem. We have a lot applicants because we have a high pay rate so there’s a lot of applicants coming through. Retention is a problem. ... People come because of the money and when they actually see what they need to do some don’t stay because they don’t want to do it. So some will do a day’s work and then that’s it. They say it’s not for them.”
(Care Manager, UK-METRO PUBLIC).

However, with more recruits coming forward in local authority A than elsewhere in this particular local commissioning area UK-METRO PUBLIC could be more demanding in terms of expectations about standards of performance because of the ease of finding new recruits, whereas elsewhere it was necessary to keep in mind the difficulties in replacing staff who left:

“When you’re commanding a rate of £10.98 and you’re getting a lot of recruitment through you have more control over the people that you’re working for because you have the choice. ... If their performance isn’t up to scratch, you can say your performance isn’t up to scratch, we’re paying you this amount of money, this is what we expect. When you’re paying £8 an hour, your expectations are naturally a little bit lower.” (Area Manager, UK-METRO PUBLIC).

2.3.2 Technological innovations

To a great extent financial pressures limited technological innovation in the case study companies. In Hungary and the UK affordability of technology when delivering for public sector (i.e. local authority/municipality) contracts was a key barrier to adoption:

“Local authorities are very unlikely to support you [with mobile technology] so it is difficult to afford. It is difficult for companies to invest in technology because margins are very tight.”
(Director of Policy and Communications, UK-METRO PUBLIC).

The case studies also revealed strongly held views about whether, and what place, technology should have in care. Some case study companies were at pains to emphasise that they were fundamentally ‘care companies’ and not ‘technology-based companies’ and this limited the role of technology in their operations:

“Technology for us is more in terms of our ability to control our workforce in terms of auditing where they are, what they are doing, and their safety. ... What happens is that when a caregiver arrives at a call, the call is scheduled into an electronic system, they use the client’s telephone, not a mobile, which doesn’t cost the client anything, they ring and put a code in, and we know they’ve arrived safely at the client’s house. If they’re not there within a certain amount of minutes, an alarm goes off on our mobile telephone, and we can also see it on the TV. This gives us the ability to call the client, or call the caregiver, and say, ‘Where are you?’”
(Managing Director Local Franchise 1, UK-FRANCHISE PRIVATE).

This illustrates a role for technology in administration; whereas its role in care delivery needed to be clearly defined. The sentiment of several interviewees was summed up as follows:

“There is going to be a growing opportunity for technology to become part of care but it cannot – and should never – replace the human contact.” (Co-owner, Local Franchise 2, UK-FRANCHISE PRIVATE).

2.3.2.1 *Digital tools for planning, monitoring and reporting care provision*

For the most part technological innovations highlighted in the case studies involved use of digital technologies. A recurring theme in the case study interviews was recognition of the role of information and communication technologies (ICT) in facilitating planning, reporting and delivery of care, but often limited levels of implementation, with lack of finance being a key constraining factor, as outlined at the start of this section. The role of digitalisation for administrative functions was widely recognised, especially given the care is “*fundamentally a logistics business*” (Director of Policy and Communications, UK-METRO PUBLIC). Another issue raised was lack of familiarity of clients, and of some carers, with ICT. In general, use of ICT was more advanced in administrative reporting of care, than in care delivery itself – with regulation and financial and other reporting were key drivers in care administration.

In Hungary in the case of HU-CHURCH PROVIDER a bespoke unified documentation system had been introduced by the management in the previous year in order to reduce the administrative burden of all concerned in planning and delivering care; (this had been financed through organisational savings yielded by the operation of the new system). The software behind the system was multi-purpose, and involved linking clients’ documentation, carers’ activities, financial reporting (to the state) and calculation of care fees for clients. It continues to be modified to enhance its usability. The system was used to prepare a weekly schedule for carers, with the clients also having to sign regarding care received (although it was reported that in reality the carers often complete and check the documentation at home in the evenings). Hence the innovation had not necessarily improved job quality for carers although there were advantages for the provider (Patyán et al. 2017a).

Similarly, in the UK the Care Manager at UK-METRO PUBLIC described how the introduction of a software package (at the instigation of the Group head office) to monitor compliance had brought advantages to the company (Green and Wright, 2017). When she had joined the company records were paper-based. In particular, the new system had been useful for flagging up when a client’s care plan was about to expire or when a carer’s passport expired (the latter being a crucial issue given substantial numbers of non-UK citizens employed). The system had also been used to flag up when quality visits were needed. This had helped streamline planning and had had a positive impact on the job quality of the Care Manager and Care Co-ordinator, but had not had any implications for the day-to-day work of the carers.

At the time of the fieldwork UK-FAMILY PUBLIC had looked into shifting from a paper-based to a digitalised system for rostering and care plans (Wright and Green, 2017a). With the paper-based system weekly rosters were printed out and staff came into the office to pick them up. When arriving at a client’s home, staff used the client’s telephone to let the company know that they have arrived (i.e. check in). At the end of each home visit, the carer wrote notes by hand into the client’s care plans. Every month, the notes from each care plan were brought into head office for collation and review. Under a digitalised system, care plans will be recorded live, via an app which will be installed on every carer’s smart phone. Carers will check in and check out of clients houses so at any given point in time the company will know where every carer is. If a carer fails to check-in to a call, then the system will alert the office to say that the carer has not arrived.⁹² Moreover, the entire recording and monitoring of individual care plans will be digitalised.

Two main reasons were cited for considering adoption of such technological innovation. First, the local commissioning authority had an expectation that all contracted care providers have electronic monitoring

⁹² The carers are used to specific time allocations for each call and of the need to keep to times allocated to complete rostered calls within a particular shift, so no concerns were raised in interviews regarding ‘surveillance’.

systems in place, (so illustrating the importance of commissioners and regulators in driving innovation). Secondly, after the initial migration of data over to the new system, the company will have real time access to details on the care that has been delivered to all of its clients and the staff involved in delivering this care. At any time, after necessary permissions have been granted, family members will be able to view details of the care that has been provided to their relative. So this innovation has the potential to improve communication channels between the care company, clients and their families.

When the owner first considered moving to the new digitalised system, implementation proved too difficult, so it was delayed. Shifting across to the new system would have been very time consuming because it was not possible to migrate details from the existing care plans over into the new system automatically. Rather, details from each care plan would have had to have been re-entered into the new system. During this time, the company was busy with implementing the local commissioning authority's new block contracts and so they did not have the necessary time required to embark on implementation of this technological innovation. This is indicative of care companies being consumed by dealing with the 'here and now' of care delivery, so limiting time available to devote to strategic investments. Originally, the owner also had a number of concerns about data security, which have since been allayed. So a decision was made to delay introduction of the new technology until a later date.

Since initially delaying implementation, the company had changed some of the ways they work. In particular, introduction of the new technology aligns with a shift away from task-focused to outcome-focused care plans, and this will ease migration of care plans over to the new system. In addition, functionality of the app itself has been improved. At the time of the fieldwork UK-FAMILY PUBLIC was about to trial the new system in the largest town it operates in.

Shifting to digitalised care plans is expected to make rostering and monitoring more efficient. Whether this will directly lead to a change to employment levels or structures was not clear. However, the introduction of digitalisation has implications for the work routines of carers, given the shift from handwritten notes to using their smart phone to record details of what they did during their visits. In addition, rather than staff coming into the office to collect their rota, all details will be displayed via an app on their smart phone. Family members of the clients, where they have been given permission, can also log into the app to check on the care that has been delivered and whether there is any other information that they need to know. On the one hand, entering details via the app may limit discretion and autonomy; as one carer noted:

"I am a pen and person paper. I would prefer to sit. I think the thing with sitting and writing is that it is personal. It shows you've sat down and thought about what it is that you are writing. Whereas this app, the tasks are going to be there and you just tick what you've done." (Carer, UK-FAMILY PUBLIC).

On the other hand, it may mean that the carers will have more time to actually care for their clients; resulting in a more rewarding or fulfilling job:

"I think we had two people that were not keen on using their own phones; they were an older two members of staff. ... It's getting over to them it is going to be easier than writing a text and it's going to save them time. Just a little bit more support - for the people that aren't totally happy to use it straight away, come in here, run through the app, providing extra support. Get everyone happy to use it. It was designed by somebody that owns a care agency. So it was designed by somebody that knows about the issues." (Owner, UK-FAMILY PUBLIC).

Clicking on tasks rather than having to hand write notes may mean care work is more inclusive of migrant workers. A UK interviewee from UK-FRANCHISE PRIVATE (Wright and Green, 2017b) expressed concerns about technology in this regard:

“One of the things that I’m cautious about with technology - and in fact I’ve got someone who’s working on a technological package at the moment - but...some of the stuff I see particularly in care homes, in residential settings, is horrendous. I have a contact who has developed and is continuing to develop a thing for care homes. [...] He’s found a niche in care homes, because people’s command of English is so poor, because they’re from a workforce that’s not expected to speak or to have any command of English, and yet they are looking after people with dementia. They have now a system whereby the carer goes in to see the client in her or his room, does their tasks, and then on the keypad on the way out there is a series of pictures: smiley face, flat face, whatever. You press smiley face. Then it has a picture of food, so you press food, and then wash, bath, shower, medication. And this thing [which is automated] then prints out the care log in the care manager’s office, which you can show the CQC [Care Quality Commission⁹³]. And on there it says, “This morning I went to see Mrs So-and-So. When I went into her room I found her to be calm, happy, whatever.” [...] I gave her breakfast, because it was that time of day, and I then washed her, and gave her her standard medication. When I left her, she was still calm, happy, and whatever.” (Manager, Local Franchise 1, UK-FRANCHISE PRIVATE).

Local Franchise 1 at UK-FRANCHISE PRIVATE had moved to a new digitalised care planning system. The former “horrendous” scheduling system was at capacity, but with the new system it had been able to grow the business:

“We’ve actually been able to grow the business quite dramatically because of the system. Because previous to that it was almost impossible to plan for any more hours than we were already planning for. Whereas now we’ve been able to increase by another 400 hours than what was previously being planned for.” (Recruitment/ Care Co-ordinator Local Franchise 1, UK-FRANCHISE PRIVATE).

The new system also enabled other features that enabled rostering, such as an ability for a ‘block’ to be put on hours of work for an individual carer who might wish to set a particular ceiling on hours worked per week.

2.3.2.2 Geographic information systems (GIS)

A related innovation is use of GIS in care planning. UK-FRANCHISE PRIVATE used GIS and geodemographics based on consumer data, census data and business analytics to delimit franchise areas, dividing the UK territory into franchise areas with a minimum population of 25 thousand people aged over 65 years.

There is scope also for using GIS to plan care schedules. It makes sense to put care visits together in a sensible geographic way to reduce travel time and to enable carers to better utilise their time. To some extent there was acknowledgement that care workers have always acted autonomously and have adjusted their schedules so that they work better in this regard. However, a problem arises if this is not

⁹³ The social care regulator.

communicated to the care co-ordinator; as there is a need to ensure that clients are not pressurised into accepting unsuitable call times.

An example of use of GIS in planning care rounds is provided by the Care Co-ordinator at UK-METRO PUBLIC. When she took up her post relatively recently she knew the local area very well and found that several carers were travelling some distance to deliver care. She tried to roster carers to deliver care close to where they lived. She initially used her local knowledge to do this and then described how she would extend this by googling the carers' and clients' postcodes when she was at home to see how far apart they lived and how long it would take them to get there. She then devised call plans such that carers could walk between calls in 15 minutes (something that is possible in a densely populated metropolitan area). This had since been 'templated' on the People Planner system.⁹⁴ As a result “*we don't have so many people dropping calls or running late*” – so bringing advantages to the company and to the carers (Green and Wright, 2017).

2.3.2.3 Video-calling

As emphasised above, many of the case study interviewees (across all case studies) emphasised the personal nature of care. In the Netherlands at NL-HOME CARE the introduction of video-calling for clients who needed minimal supervision (e.g. just a check up to see that all is well) or physical support had been introduced as a substitute for physical travel, especially convenient for the rural areas where it also provided its services and travel time between clients was significant, so providing flexibility for workers and freeing up time for other activities (Balhuizen and Koene 2017). In other instances where previously two people had needed to be present to administer medication, video-conferencing eliminated the need for the physical presence of one worker, with a second pair of eyes joining virtually.

“And what we do with this is that a number of people from home ..., contact a number of clients, just talk to each other by means of video-calling every day. And who calls in with a client and that can range from just a chat to ‘have you have already taken your medication?’ and that these people can also show they did. This way you are also in contact with your clients....you've lost much less travel time and people are also much more free in their comings and goings, because they do not necessarily have to wait for that neighbourhood sister because you can just call and then you're done.” (Manager, NL-HOME CARE).

From an organisational perspective video-conferencing brings greater efficiency to the organisation while also providing opportunities for enabling more frequent contact by less qualified staff:

“For example, we do video-calling. I was responsible for the project. 70 hours a week we provide our care through video-calling, rather than through a personal visit. So, so we connect with the iPad, with a customer and let him take his medicine via the screen. This is an example. That's a big time saver, driving up and down ... Yes, furthermore, that video-call can also be done by somebody from our welfare department, why not?” (Team Leader, NL-HOME CARE).

Hence, ceteris paribus the introduction of video-calling opened up opportunities for inclusion of less skilled workers, promoting labour efficiency and freeing up hours of scarce skilled staff.

⁹⁴ See <https://www.theaccessgroup.com/homecare/features/> - this is a cloud-based real-time care monitoring and planning system, also providing HR, finance and other functions.

2.3.2.4 *Medical Box*

A related innovation is the Medido (Medical Box) mentioned as a technical innovation by care workers in NL-HOME CARE. The Medido is a package that is dispensed by the pharmacy and brings the patient's medication together in one place, already pre-checked and sorted by part of the day. When the patient is due to take medication, the box makes a beeping sound, which continues until after the medication is taken from the box. If this does not happen; a signal is sent to either the pharmacy or the district team who then check to see if something is wrong and then make sure that the medication is taken at the right time. Where videoconferencing can substitute the second professional that needs to be present during the performance of certain medical proceedings, in the specific case of checking the medication type and dosage, the Baxter roll fulfils this role of second observer. As the contents are checked at the packaging point it is not necessary to do this at the time of intake.

On the one hand use of the Medical Box makes the work of the nursing staff less time-demanding while still fulfilling their control activities with patients. It offers the workers more flexibility. However, it also leads to work intensification as simple and easy tasks are removed from the work of the nurse-carer.

2.3.2.5 *Electric bicycles*

An exception to digitalisation and related technologies in technological innovation was the introduction of *electric bicycles* in Hungary at HU-SOCIAL INSTITUTION (Tróbert et al., 2017). Here the previous director had introduced the *electric bicycle* (with financial support from abroad) as a means of improving working conditions. The aim was to make work easier, as the carers cover considerable distances in the town in the course of a working day. However, in this top-down innovation the opinions of the carers were not considered. Their use is tiring – the bicycle itself is heavy and it is very difficult to use them on uneven surfaces. Many carers found riding in public road traffic very stressful and they are also exposed to extremes of the weather (rain, snow, ice, etc.). Often it is difficult to carry the equipment needed on the bicycles. Finally, since use of the bicycle is not compulsory, the carer who does use it cares for more clients and the uneven distribution of workloads can cause tensions among the carers. All of these unanticipated problems highlight the importance of employees' involvement in both the design and implementation process of innovations. Furthermore, maintenance of the bicycles proved a significant problem: servicing and the replacement of batteries is costly and there are no funds to cover these expenses. Hence this innovation is unsustainable in current financial circumstances.

2.3.2.6 *Summary*

In summary, the case study examples outlined above indicate that technological innovations seem to have multiple effects. They ease administration and facilitate planning. In cases such as smarter scheduling, video-calling and the Medical Box, they can be seen as decreasing work pressure and enhancing efficiency. Such innovations can mean that job quality is also improved as work becomes more interesting and challenging. At the same time, such developments can be seen as raising the required skills levels in a sector facing ongoing recruitment difficulties despite limited barriers to entry and where wage levels are relatively low. Increased demands from technology may mean that social care becomes less inclusive in terms of the employment opportunities it offers, albeit in Hungary and the Netherlands a division between 'domestic help' and 'personal care' roles is indicative of greater segmentation within traditional 'carer' roles. It is also the case that technological demands may lead to work intensification as some simpler and easier tasks are removed from the work of the carers.

3 Inter-relationships between innovation, job quality and employment

Moving away from the detail of specific innovations, this section is concerned with cross-cutting issues across all of the case studies.

3.1 Impact of innovations on job quality

Commencing with consideration of the *impact of innovations on job quality*, it is clear that funding pressures mean that innovation has little if any influence on *wages*. For the majority of carers wages are determined by the national minimum wage (in Hungary and the UK) and by sectorial collective agreements (in the Netherlands). One exception to this is the Ethical Care Charter in the UK (an innovation in itself adopted by a care commissioner) which raises the wage floor to the voluntary living wage (which is higher than the national minimum wage). Extra responsibilities stemming from innovations tend not to be translated into higher wages; rather there is a greater emphasis on non-wage benefits (such as social events and trips) which provide opportunities for lone workers to come together. Moreover, there appeared to be general acceptance of the fact that ‘there is no money available’ amongst the workers interviewed in the case studies.

Similarly *employment conditions* tend to reflect national minimum standards, with innovation playing only a limited role in identifiable extrinsic improvements. In Hungary public employees who become full-time employees tend to significantly improve their labour market position. In the Netherlands, organisational innovations and especially developments around self-organisation have significantly affected the working conditions of skilled care workers. For the relatively unskilled domestic help workers there has been little to no innovation with equally limited impact on employment conditions.

In those (few) locations in the UK where the Ethical Care Charter is in operation workers have the right to move from zero hours to guaranteed hours contracts (albeit take up is low). Opportunities for internal progression vary between roles; in Hungary and the Netherlands there is some evidence for progression from home support to care roles.

Given the limited scope to increase wages or improve employment conditions markedly, innovation efforts tend to be focused on ameliorating working conditions. In Hungary, HU-CHURCH PROVIDER introduced innovations to measure stress and burn out and took action to improve workers’ self-esteem. Likewise in the UK attempts to better ‘match’ carers and clients in terms of their interests and so increase the chances of a positive relationship (at UK-FRANCHISE PRIVATE) was done partly to improve (intrinsic) working conditions of carers (as well as being motivated by improvements to care provided). In a similar vein use of GIS to enhance scheduling of visits and reduce travel times has served to reduce the burden of travel time. The move away from a ‘time and task’ model of care delivery to a greater focus on ‘outcomes’ has served to enhance the variety of tasks for workers and so increased their autonomy. However, greater autonomy can spawn additional organisational tasks and increased work pressure, especially where support available to workers is inadequate. However, innovations have not uniformly resulted in greater autonomy for workers: in Hungary in the case of HU-GOVERNMENTAL PROVIDER organisational restructuring resulted in greater bureaucracy which in turn reduced worker’s autonomy (Patyán et al., 2017b).

In general *trade unions* have played a limited role in encouraging innovations to improve job quality. However, there have been innovations designed to increase employee voice, albeit on an informal rather than a formal basis. In time such structures have the potential to stimulate small-scale innovations.

Likewise innovations have had a limited role in improving *work-life balance*. The nature of care itself means that it is necessary to respond to crises, which can occur at any time. At the same time the increasing need for care, falling budgets and growing labour market shortages increase work pressure for individual workers in the sector. Internal support mechanisms (notably involving peer-to-peer support) help in providing a route for workers to offload work-related concerns about some of the more challenging aspects of their jobs, rather than taking difficulties home with them. Education and training support (e.g. bereavement training) can also help in this respect. The fact that an innovation assuring a right to move off zero hours to guaranteed hours contracts had low take up demonstrates how some workers place value on ongoing flexibility for work-life balance, as opposed to following a route which in objective terms might seem to offer more predictable working patterns.

Innovation is often accompanied by *education and training*. This is particularly evident in the case of the geographically-based self-organised teams in the Netherlands. Here there were many opportunities to upskill the employees and so develop the team as a whole. In some instances a circular relationship is evident: in the case of *UK-Franchise* one local franchise's innovative attitude to encouraging education and training was specifically designed to empower employees, perhaps resulting in a fostering of innovation (and enhanced job quality). In the case of *NL-HOME CARE* training to support an innovation (i.e. the 'signalling' function of home support workers) helped to motivate the workers and helped them feel that their role was recognised, but subsequent cancelling of training due to budget cuts had the opposite effect. It highlighted the dominant cost pressures in low-skilled care work, which limit attention for education and training (Balhuizen and Koene, 2017).

Support for workers associated with innovations tends to enhance *job satisfaction and self-evaluated job quality*. This was certainly the case in Hungary at *HU-CHURCH PROVIDER*, where innovation was directed at providing greater support for workers. For many carers job quality is intrinsically relatively high and this is a function of motivation and pride in their dealings with clients, rather than being associated directly with innovations per se.

3.2 Impact of innovations on employment levels, skills structure and inclusiveness

Innovations have had limited impact on *employment levels* in social care; rather employment levels are dictated primarily by the (growing) elderly population in need of care and factors at macro level such as funding available. A strong belief from several case study interviewees that technology cannot substitute for the 'human touch' suggests a limited appetite for technological innovation to substitute for workers in delivering care.

Innovations tend to have more impact on *skills structure* – on balance, the overall direction of travel has been for innovation to increase skill demands on staff, especially through greater multi-skilling (although there are some counter examples). This is particularly apparent in the case of the geographically-based self-organised teams in the Netherlands at *NL-HOME CARE*, where social innovation (i.e. self-organised teams) increases skills requirements, and where associated technical innovations also require upskilling. A simpler example is the case of 'narrative reporting' in the UK at *UK-METRO PUBLIC*, which requires a higher level of English language reporting skills than was formerly the case. On the other hand use of menu-driven apps requires rests more on use of pictures than of words, so placing fewer demands on literacy.

Innovations have had little if any direct impact on the *gender* structure of the overwhelmingly female workforce. This is also the case for the *age* structure of the workforce and the proportion of *migrant*

workers/non-nationals employed. To some extent the fact that innovation has stimulated a requirement for more complex skills sets there is a potential danger of excluding the *less skilled* from the workforce, but there is little evidence on this to date.

3.3 Impact of job quality and employment on innovations

Evidence from the Netherlands suggests that skilled, experienced and relatively entrepreneurial individuals are needed to establish and successfully run self-organised teams. Typically workers in care have relatively low qualification levels, and this in itself can act as a brake on innovation.

Trades unions and works councils (where they exist) have had a limited impact, if any, on innovations. In Hungary in the case of HU-GOVERNMENTAL PROVIDER the public servant's council opposed the implementation of innovation but this had no impact (Patyán et al., 2017b). With the exception of trade union initiated Ethical Care Charter, it has been management, rather than workers or their representatives, that has been more important as a driving force for innovation.

In most of the cases studied, with the exception of HU-GOVERNMENTAL PROVIDER where a bureaucratic organisational culture dominated, the management were open to *employee suggestions for improvements*, and had put in place mechanisms (even if relatively embryonic) to stimulate this. To date, however, the role of employees' suggestions on innovation had been limited. The *intrinsic interests of employees (and managers) in improving the quality of care provided* can act as a positive resource for innovation, albeit this was not always apparent in practice – partly because their energy can be (almost entirely) expended in performing their current roles and also because of a lack of experience in taking the initiative in a wider work environment and a shortfall in resources. Indeed, a key motivation for becoming a carer/working in the sector for many of the individuals interviewed in the case studies was to improve the quality of care, so this is likely to predispose them to consider favourably innovations that improve the quality of care - even if this does not seem to result in higher extrinsic job quality (as in the case of the organisational champions in the UK at UK-FAMILY PUBLIC). This is illustrated by the fact that in the Netherlands the primary care team was the main driver of any improvements or changes that were implemented by self-organised teams in the Netherlands at NL-HOME CARE, while in NL-HOME SUPPORT a training programme to support workers to undertaken a 'signalling' role in recognising actual and emerging care needs of clients was appreciated. The Dutch cases also show how the professional disposition of the care workers and the personal responsibility that home support workers feel in the relationship with their clients is the Achilles'-heel for professional care workers. The growing professional discretion and responsibility coupled with cost-reductions and the growing demands on the sector lead to situations where job quality is actually threatened due to increasing work pressure and work intensification.

3.4 Other interlinkages and impacts

In most instances the empirical evidence from case studies suggests a relatively limited role in practice for *interlinkages between technological and organisational innovations*: technological and organisational innovations occurred largely independently of each other. In part this reflects a lack of funding for technological innovation. A partial exception is provided by the use of GIS to help define carers' schedules. A fuller exception is the example of the self-organised teams in the Netherlands at NL-HOME CARE, where the use of technological innovations has enriched the work of homecare nurses and made them more

efficient, but for the benefits to be reaped there is a requirement for more highly trained personnel and training of existing staff.

The openness of, and resources available to, *management* plays a crucial role in innovation. In UK-FAMILY PUBLIC – a family-owned company – theoretically the manager exercised a good deal of discretion with regard to implementation of innovations, but in practice action was curtailed by a harsh funding environment curtailing the sphere of action. Also in the UK at UK-FRANCHISE PRIVATE – where local franchises had central support – and operations were (almost entirely) in the privately-funded care market, there was greater scope with regard for innovation. The example of UK-METRO PUBLIC – a company running under its own name as part of a wider group delivering publicly-funded care, suggests that it is care commissioners, as opposed to managers, who are the most powerful actors in setting the context in the publicly funded care market in the UK. The evidence from Hungary and the Netherlands points to limited room for manoeuvre for management in the face of financial constraints.

Budgets/financing arrangements emerge as the dominant factor on the job quality-innovation nexus. On the basis of the case study evidence the impact of funding in curtailing innovation and imposing a ceiling on improving job quality is the dominant factor, summarised for each case study as follows:

| | |
|---------------------------------|---|
| HU-SOCIAL INSTITUTION | The organisation is operating under constant financial instability, therefore even the tiniest innovation is considered to be too costly. (This is an example of a low road nexus of innovation and job quality [i.e. no innovation, poor job quality]). |
| HU-CHURCH PROVIDER | The organisation is maintained by a church ensuring a slightly better financial condition than in the other two cases in Hungary. These limited extra opportunities are exploited by an active, creative and employee-orientated management. It would be an exaggeration to call this a 'high road' job quality-innovation nexus, but these two mutually reinforce each other providing much better job quality and much more innovation than was observed in the case of the other two organisations in Hungary. |
| HU-GOVERNMENTAL PROVIDER | Poor financial situation is a prime reason for the bad job quality-low innovation nexus. |
| NL-HOME CARE | Public sector, budgets are a dominant factor. Activities are structured following the financing structures dictated by the insurance companies and municipality level agreements. |
| NL-HOME SUPPORT | Cost pressure is a very limiting factor. |
| UK-FAMILY PUBLIC | Financing arrangements (i.e. the money available for care at national level) is of key importance in impacting on job quality an innovation, given the reliance of a (publicly funded) block contract. Severe financial constraints limit scope for action on extrinsic aspects of job quality and financial resources for innovation. |
| UK-FRANCHISE PRIVATE | The fact that the franchise operates in the privately funded care market means that financial pressures (although important) are less severe than for companies operating in the publicly-funded care market. The franchise model offers opportunities for learning (between franchises and internationally) regarding job quality and innovation. |
| UK-METRO PUBLIC | Financial pressures on the care sector nationally are a dominant factor in limiting scope for improvements in job quality and also innovation. At local area level differences in monies available from different local commissioning bodies means that scope for extrinsic improvement in job quality (and to some extent innovation) varies between local areas. |

4 Conclusions

The context for consideration of the innovation, job quality and employment nexus in the care sector is one of greater demand for care in the context of an ageing population and more complex care needs, with an increasing emphasis on client-focused care at home. These trends along with harsh budgetary constraints have led to a need for greater collaboration between care providers and also with other stakeholders in the wider health, social support and related spheres. National legislative and regulatory changes also impact on care organisations, with ongoing reforms meaning that they have to operate within a complex and fast changing policy environment. All of these are drivers of change.

Care workers face a high workload with generally increasing demands. There is a need for a re-appreciation of the role of care workers and associated professionals. Education and training programmes and some associated support structures recognise this and a positive development would be for to build further on good practice in this regard. However, as re-emphasised below, stringent budgetary constraints limit the scope for radical action or for increases in pay. Many care organisations face labour shortages and ongoing recruitment and retention problems. Factors indicative of poor extrinsic job quality, notable relatively low pay and the often physically and emotionally demanding nature of care work are factors here. However, the relatively low barriers to entry (for home support and carer roles without nursing elements) mean that this is an inclusive sector – offering opportunities for job entry to those with no/low qualifications even in slack local labour markets.

From a positive viewpoint the case studies and wider literature reveal examples of organisational innovations such as geographically-based self-managed teams in the Netherlands which seek to provide holistic care embedded in the local community. The example of the organisational champions within the UK operate in the same direction to give workers voice and promote some enhanced discretion within their job roles, while providing them with peer support while incurring little, if any, extra costs for the organisation. Likewise education and training initiatives seek to enhance their skills sets – including to deal with a greater proportion of clients living with more complex and challenging conditions than had formerly been the case as provision of care services has become ever more focused on more needy clients. In general, these types of organisational innovations serve to enhance job quality for workers while also having a positive impact on clients. However, the fact that such initiatives are operating in a context of cost-reductions and growing demands in the sector lead to work intensification, which in turn compromises job quality. The case studies also showed cases of education and training programmes and support mechanism that were valued by organisations and workers alike being curtailed in the face of funding constraints. A policy desire for more collaborative working, requiring enhanced management and negotiating skills can break down when (nearly) all individuals and organisations concerned are under financial pressure and are having to prioritise/ration what they do to meet their own individual/organisational needs.

For a positive dynamic to exist between job quality and person centred care workers need to have the necessary training to perform their tasks and also to have the skills to ‘set boundaries’ regarding what is part of their job role and what is outside it and to negotiate with others accordingly. They also need to prioritise tasks within their job role as to which are most important. This is necessary to avoid work spilling over into the non-work domain. However to some extent this curtailment of work tasks which can be necessary to maintain work-life balance and avoid burnout runs counter to what lies at the heart of their intrinsic job quality: pride in doing a good job in caring for their clients and developing and growing a good and mutually appreciative relationship with them.

Much of the technological innovation highlighted in the case studies has focused on enhancing the efficiency of administrative functions, such as scheduling and rostering, monitoring of care visits, ensuring regulatory requirements are dealt with and invoicing. In general such innovations have been positive in terms of organisational efficiency and helping business growth. Use of GIS-type software for planning can help in planning more efficient routing and allocation of care visits, so reducing travel time. On balance this is positive for care workers. Other technological innovations have enabled more care functions to come within the ambit of care workers, so leading to increased complexity of work and enhanced skill requirements. On the one hand this may lead to greater job satisfaction, while on the other hand making job roles more complex – which in turn may lead to greater segmentation within traditional carer roles.

Most of the innovations detailed above are ‘top down’ innovations, often driven by regulatory and/or financial imperatives. This suggests that external drivers are important in triggering innovation that does take place. While some care organisations have sought to take more account of the voice of carers and other home support staff – who are in effect often those closest to the clients and who are in a position to ‘signal’ to others within the health and care system changing client needs – such mechanisms are often relatively poorly developed (although there are exceptions, as the case of NL-HOME SUPPORT illustrates) and relatively low-skilled workers who make up a sizeable proportion of the workforce are not necessarily well-placed to make use of them. In part this also reflects the primary concern of many care stakeholders and workers with survival, which in turn squeezes the time and space necessary for innovation; most energy is devoted to day-to-day operational matters concerned with ‘keeping their heads above water’, rather than long-term strategic thinking. This suggests both that external constraints limit innovation and that a minimal threshold of job quality may be necessary to foster innovation. Hence it follows that poor job quality hinders innovation and stifles better employment outcomes. For the situation to improve a step change in funding availability for the sector would be required.⁹⁵ This is a moral as well as an economic consideration.

⁹⁵ It is salient to note here that care organisations with relatively more resources (such as HU-CHURCH PROVIDER and UK-FRANCHISE PRIVATE) were better able to implement their own ideas for innovations.

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6 List of Case Study Reports and Industry Profiles

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| HU-SOCIAL INSTITUTION | Tróbert A.M., Makó C. and Illéssy M. (2017). <i>HU-SOCIAL INSTITUTION - Poor Job Quality as a Hindrance for Innovation</i> . Case Study Report for WP6 of the QulnnE project. Unpublished manuscript. |
| HU-CHURCH PROVIDER | Patyán L., Makó C., Illéssy M. (2017a). <i>HU-CHURCH PROVIDER - Innovation in the periphery: The role of supportive management in enriching intrinsic job quality</i> . Case Study Report for WP6 of the QulnnE project. Unpublished manuscript. |
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7 Annex – Summaries of Case Studies

HU-SOCIAL INSTITUTION (Tróbert et al., 2017)

Brief characteristics of the company's structure and business strategy

HU-SOCIAL INSTITUTION operates in a small city with a population of more 30,000 situated not far from Budapest, Hungary. There are more than 5,000 people aged above 65 in the city and around 50 of them use the home care service offered by HU-SOCIAL INSTITUTION. The service is provided by six carers, one of them has a fixed-term employment contract while the others have permanent contracts. Their employment conditions are defined centrally as they are all public service workers. The carers are aged between 40 and 60 years and are all women. They have worked for HU-SOCIAL INSTITUTION for between five and 20 years. The most important challenge for the management at HU-SOCIAL INSTITUTION is constant uncertainty both in terms of financing and professional and administrative regulations. The other major challenge is the need to ensure the labour supply of qualified employees as working conditions are poor, wages are low, there is no opportunity for promotion and HU-SOCIAL INSTITUTION does not have adequate financial resources to promote training of their employees.

Important innovations in recent past

In HU-SOCIAL INSTITUTION, one failed innovation was found. The previous director of HU-SOCIAL INSTITUTION introduced the use of electric bicycles in order to ease the daily transportation of the carers. Financial support from abroad was received to fund this initiative. However, before purchasing the bicycles the director did not listen the opinions of their employees about the innovation and this led to many practical problems. In particular, the bicycle itself is heavy and very difficult to use on uneven surfaces; the maintenance of the bicycles also proved to be a significant problem and the initiative was financially unsustainable. No the innovation activity was evident in HU-SOCIAL INSTITUTION.

Key findings on interrelationships between innovation and job quality, employment and inclusiveness

In the absence of any identifiable innovation activity, the case is an illustrative example of the necessary minimum preconditions of innovation in terms of job quality and the supportive wider institutional arrangements. In particular, frequent changes in the legislation have a substantial impact on the everyday life of institutions such as HU-SOCIAL INSTITUTION, resulting in continuous internal instability. The legal instability concerning eligibility for care, the process of the care work itself coupled with heavy administrative burdens at the employee-level and permanent under-financing at the organisational level. Consequently, the organisation is pushed to its limits in its daily operation. The employees are simultaneously faced with high workloads, low wages, limited career opportunities and a lack of support for further training in the organisation. In addition, care work has a low social status, high psychological strain and high physical demands. It is true that care work does have some positive sides, but overall these jobs are not very attractive. It became obvious at HU-SOCIAL INSTITUTION that the main motive behind why employees decide not to leave their employment was because their job fit well to their individual, specific needs (either they have lower qualification levels or they have a family member who also needs daily care, etc.). The role of these 'stretchy' jobs is to enable extension of the working life, to accommodate disabilities, and to reach a balance work-life balance by offering sustainable employment/social mobility via employee-centred flexibility which is often suitable for older workers and for employees at a transitional stage of their life course. It seems that in a workplace where the management is unable to make mid-term plans and most of the employees are in stretchy jobs, the minimum preconditions are missing for any kind of innovation.

HU-CHURCH PROVIDER (Patyán et al., 2017a)**Brief characteristics of the company's structure and business strategy**

HU-CHURCH PROVIDER is operated by a church in a city with a population of over 100,000 situated in the north-eastern region of Hungary. It started home care provision in 2011 with around 80 care receivers, however, the number of the care receivers multiplied by six within a five-year period. In 2016 HU-CHURCH PROVIDER provided home care services for almost 500 clients and it employed more than 50 care givers. The congregation of HU-CHURCH PROVIDER operates three social institutions in the city. These institutions are operated under separate management, but with unified financial and professional coordination. The head of the HU-CHURCH PROVIDER and the financial and professional coordinators play a key role in both the daily operational tasks and in the planning of subsequent activities. The middle management has been minimised in order to reduce costs.

Important innovations in recent past

Although HU-CHURCH PROVIDER is not particularly rich in financial resources, the management actively seeks out areas where an innovation could be implemented. The objective of these attempts is mostly to make the care givers' work easier. The management has been successful in integrating public employees into the organisation providing some of them with the chance for long-term employment (in the other institutions we investigated this was not case). The head of HU-CHURCH PROVIDER also identified that the employees were suffering from burnout syndrome and tried to lighten these burdens both in a short-run by hiring a trainer and in the long-run by introducing an open door policy. New software was developed to make the administrative work of the care givers easier and to support the professional and financial monitoring activity of the management.

Key findings on interrelationships between innovation and job quality, employment and inclusiveness

Domestic care usually offers low quality jobs in an ever increasing service market. Care giving is traditionally a female occupation in Hungary and care giver jobs are typically open to middle-aged people with lower qualifications. The case study showed that an economically depressed area – like the north-eastern part of Hungary – creates a special atmosphere for job seekers: an unemployment rate that is three times higher than the national average and poor quality jobs offered for middle-aged women before they reach the national pension age. These factors have led to a strong engagement from the employees toward both their employer and their job, despite them earning only the legislative national minimum wage. The fast development of the church-oriented services opened up the possibility to hire unemployed people in the form of public employment who can go on to finally become full-time employees. In this way, it is possible for home care services like HU-CHURCH PROVIDER to offer sticky jobs for the new entrant public employees and/or stretchy jobs in the case of those employees who go on to obtain new professional qualifications yet are able to remain employed by the organisation. Two main differences compared to the other two cases in the Hungarian home care sector were apparent. On the one hand, the management at HU-CHURCH PROVIDER seemed to be more active and more innovative. On the other, the church as the owner of the organisation was able to provide some additional financial resources, even though relatively small and definitely not on a regular basis. So, generally speaking, the everyday life of employees in HU-CHURCH PROVIDER does not differ very much from those working in public home care service providers. However, due to the innovative efforts of the management the workers feel valued, which is the basic source of their job satisfaction.

HU-GOVERNMENTAL PROVIDER (Patyán et al., 2017b)**Brief characteristics of the companies' structure and business strategy**

HU-GOVERNMENTAL PROVIDER is a government home care service. It is situated in a city with a population of more than 100,000 located in the north-eastern part of the country, which is one of the most disadvantaged regions of Hungary. It supports approximately 2,000 people with more than 200 employees. Its activities include day care centres, meals on wheels and the home care services of the elderly in a municipal associative form. The vast majority (85%) of employees are involved in care for the elderly although it also provides care to people with disabilities and patients with mental health problems. The most important challenge the organisation has faced is the dramatically increasing number of clients, especially in the past 10 years. An important consequence of this sharp rise has been a gradual increase in the burden on care givers. In 1995 one care giver had to provide care for an average of 3.6 clients, but as a result of a continuous rise in demand by 2014 the average number of clients per care giver had risen to 8.9. Despite the constantly growing service need, the organisation is experiencing financial problems due to increased competition coupled with state support schemes that is maintained by the local municipalities that are unfavourable for service providers. Fierce competition has been experienced, especially in recent years, when ecclesiastic and private service providers reached the same service capacity as the municipal institutions. HU-GOVERNMENTAL PROVIDER is facing serious labour shortage problems as other organisations operating in the home care and health care sector are offering higher wages, better working conditions and/or clients with less demanding care needs.

Important innovations in recent past

For the staff working in HU-GOVERNMENTAL PROVIDER the interpretation of the notion of innovation was a serious challenge. The unpredictable changes in the regulatory environment, care protocols and tasks, and in the related funding arrangements create a highly unstable situation. Constant underfinancing has meant the local authority has tried to save money and in an attempt to gain economies of scale, it merged its different service provider institutions: two formerly independent elderly care services, a service for disabled people and a day care centre for mentally ill clients. During the organisational integration, units representing different organisational and management models were united into the organisation. Management developed a unified hierarchical organisational model typical of bureaucratic organisations. The organisation is divided into professional units, where mid-level managerial staff are responsible for carrying out the tasks. The objective was to create a unified organisational identity.

Key findings on interrelationships between innovation and job quality, employment and inclusiveness

The transformation of the organisational structure has not affected the employment level of the organisation. There has been no job loss, neither has there been additional recruitment. The new organisational structure has not increased or reduced the budget, it did not require any investment. As this is a very recent organisational change, it is not yet possible to identify whether there will be any impacts on job quality. Yet the increasing bureaucracy has reduced the autonomy of the employees so they cannot be cooperative partners of the management. The increasing competition changed the profile of the service provision from a quality-based to a quantity-based approach. HU-GOVERNMENTAL PROVIDER has struggled in the increasingly competitive market partly because of the lack of any additional resources and partly because the bureaucratic organisational culture has not enabled the organisation to meet the challenges arising from the fast changing environment.

NL-HOME CARE (Balhuizen and Koene, 2017)**Brief characteristics of the companies' structure and business strategy**

NL-HOME CARE is a regional Dutch care organisation that offers welfare, care, living and comfort facilities to more than 20 municipalities in the south-west Netherlands. It is a broad regional organisation that values the local networked nature of care services. It has a divisional structure with, in 2016, care, welfare and comfort divisions. It included both intramural and extramural activities. In 2015 it employed almost 2,000 employees (just over 1,000 full-time equivalent). The Care and Comfort divisions cared for a total of just over 3,000 clients in 2015, of which half were homecare clients. The case study focuses on the care division. In previous years, the organisation had been subject to many health care reforms, putting pressure on income, effectiveness and efficiency. The period until 2016 was characterised by cost-cutting, integration of previously independent organisations into NL-HOME CARE, reorganisation and layoffs. At the same time, NL-HOME CARE had been innovating the coordination of home care in neighbourhoods. Since mid-2016 the organisation has experienced growing demand and increasing pressure on the organisation due to emerging structural labour market shortages of medical personnel.

Important innovations in recent past

The combination of a shifting policy emphasis, changing financing structures, increased cost pressures, the wish to improve the client-focus of homecare, and a call for a re-appreciation of the professional role of home care professionals, has driven initiatives in many homecare organisations to introduce geographically based self-organising teams, embedded in the local community. NL-HOME CARE introduced self-organisation with a central role for the district nurse, who fulfilled a key role in helping clients take a holistic view of their support needs and coordinating and connecting the activities of different actors in the field of welfare, homecare, and other kinds of support that could be required by clients in their neighbourhood environment. Each district nurse also acted as coach and 'captain' of two self-organising home care teams, each embedded in their own neighbourhood. In technological terms an important innovation has been use of video-calling to replace some physical visits to selected clients.

Key findings on interrelationships between innovation and job quality, employment and inclusiveness

An assessment of the case of NL-HOME CARE shows that developments in the home care sector led to top-down management directed efforts at organisational development and change. These were aimed at increasing operational efficiency and dealing with increasing budget cuts and cost pressures, but also at developing a more effective client-focused model of care, with more operational responsibility and discretion for professional nurses and carers. The initiatives were welcomed by the nurses as they reduced bureaucracy, increased professional discretion and replaced bureaucracy with a positive client-orientation. At the same time the cocktail of pressures driving the initiatives created a situation where growing professional discretion and responsibility coupled with cost-reductions and the growing demands on the sector led to increased work pressure and work intensification: developments that challenged job quality. These developments required organisations to shift their focus from downsizing and cost-reduction, which were necessary to cope with the changing societal demands of home care over the past years, towards a focus on recruitment and support of the self-organising home care teams and smart cooperation with other actors in the field. Relatively complex and formalised external financing streams complicated change.

NL-HOME SUPPORT (Oosting and Koene, 2017)**Brief characteristics of the companies' structure and business strategy**

The NL-HOME SUPPORT case study documents the developments around the home support unit of a regional Dutch care organisation. The home support unit was part of the Welfare division which included youth support, regional help and support at home. It employed 130 home support workers and provided home support for 900 clients. The home support unit has been subject to several organisational restructurings influencing the jobs and the work environment of the people working within the unit. After the introduction of market forces into the home care sector in 2007, the home support unit was outsourced to a subcontractor. This subcontractor's business was cleaning, with a cleaner's corresponding collective labour agreement for the workers. In 2015, the cleaning company filed for bankruptcy, following budget cuts and a very rate of sick leave (20%). At the request of the municipality NL-HOME SUPPORT took the home support activities back.

Important innovations in recent past

Both parties agreed that changes would be made regarding the role of the home support unit in the care process. The quality of support needed to be improved and innovation through a better inclusion of the home support activities in the care process was agreed by introducing a signalling function into the role of the HS workers. A coordinating nurse was appointed and a training program of four workshops was set up to help the home support workers grow into their new signalling role. At the same time, the responsibilities of the home support workers were redefined from task-based to outcome-based: to ensure 'a clean and liveable home', supporting the client's self-reliance, and providing more person-centred care. Whilst much appreciated by the home support workers, the training programme was put on hold after the first workshop. The coordinating nurse was not only helping the workers with their new signalling role, but also felt the pressure to deal with the signals, which required a lot of informal organisation; much of the work also required coordination between different actors to find efficient and effective solutions.

Key findings on interrelationships between innovation and job quality, employment and inclusiveness

For the home support workers, the relationship with their clients was very important. Helping their client – whom they had been with often for many years, no matter which organisation employed them – gave them a certain dignity and made them very loyal to their clients and the work that needed to be done. The shift towards outcome-based performance, together with the requirement to stimulate self-reliance and involvement of the informal network (neighbours, family) of the client placed the home support worker in a vulnerable position. Finding it difficult to co-opt others and feeling responsible, home support workers often end up doing part of the work in their own time. This came on top of other examples of their already limited ability to influence their working conditions (e.g. finding it difficult to request the right cleaning tools from their clients). Organisational support for these workers, now offered mostly by the coordinating nurse, helped them cope with the increased requirements to set professional boundaries and negotiate with clients and their informal network. Ambitions to extend the role of home support workers, the workshops, and the ability to meet each other were much appreciated by the Home support workers, although it added to their already high workload. The subsequent discontinuation of the workshops, together with the limited resources at the disposal of the coordinating nurse to support the home support workers reflected the remaining ambiguity regarding the position of the home support workers in the care organisation.

UK-FAMILY PUBLIC (Wright and Green, 2017a)**Brief characteristics of the companies' structure and business strategy**

UK-FAMILY PUBLIC is a privately-owned family-run care company in eastern England, characterised by a strong ethos to deliver high quality care. Established in 2006, it has seen ongoing growth since start up and ten years later had around 180 employees with recruitment continuing. In the hope of providing a period of guaranteed income stability to invest in provision of quality care the company took a decision to bid for, and won, a 'block' contract (i.e. a sizeable contract guaranteeing provision of care for a set period) from the local commissioning authority to provide publicly-funded home care to vulnerable elderly (and disabled) people in four towns. However, the result of the commissioning process did not work out quite as the commissioning authority or the care company expected: some large care companies exited the market for provision of publicly-funded care while smaller companies remained to compete for smaller 'spot' contracts which proved more financially lucrative than the block contract. The company does not require new staff to have had previous care experience or qualifications; rather they seek to find people with the right values, qualities, attitude and behaviours (i.e. values-based recruitment) and then offer vocational skills training to employees once in post, in line with good practice as set out by the industry workforce development body, Skills for Care. The workforce is overwhelmingly female and White British. Most employees work the equivalent of full-time hours and are engaged on zero hours contracts; take up of guaranteed hours contracts had been low.

Important innovations in recent past

The company is seeking to improve care and intrinsic job quality through the introduction of organisational champions from amongst existing staff members. The impetus behind creating the new roles revolved around improving the quality of care provided to clients, empowering staff and helping them to work better as a team. 'Community champion' and 'dignity champion roles' have been created, with plans for additional champions in the future. Creation of the champion roles links to the company's commitment to providing staff with opportunities to develop their skills and build career pathways. Moreover, the growing size and complexity of the business meant that the owner found that she did not have as much time as she would have liked to directly manage and support her staff. So rather than creating a new layer of management in the organisational structure, the champion roles were a non-hierarchical way of providing additional support to her fast-growing workforce. On the technological front there are plans to move away from paper-based systems for rostering and recording to implement digitalised care plans in order to align with the local commissioning authority's expectations that all contracted care providers have electronic monitoring systems in place, and to provide easier and more timely access to details on the care that has been delivered to all of its clients.

Key findings on interrelationships between innovation and job quality, employment and inclusiveness

Creation of the champion roles may be regarded as an enabling innovation strongly interlinked with job quality. The champions are recruited from amongst existing carers and develop specialist skills in their relevant areas and cascade their knowledge throughout the organisation through provision of peer support to colleagues. It is envisaged that this cascading of knowledge will result in a general upskilling of all employees. The 'champions' innovation also has implications for the way the company interacts with its clients and their families as well as how the company embeds itself in the local community. The innovation is not linked to any change in pay levels or pay principles but rather represents a pragmatic way forward given external financial constraints. Shifting to digitalised care plans is expected to make rostering and monitoring more efficient, but whether this will lead to a change to employment levels or structures is not yet known.

UK-FRANCHISE PRIVATE (Wright and Green, 2017b)**Brief characteristics of the companies' structure and business strategy**

UK-FRANCHISE PRIVATE has a franchise structure, with a national office and a number of local franchises across many parts of the UK. Its business model is one of focusing on high quality, privately-funded care. The case study involved interviews at the national office and two local franchises (1 and 2) in the English Midlands. It has decided not to take on large local authority (i.e. publicly-funded) contracts due to the funding constraints associated with them. Rather the business model is one of offering flexible care packages to clients with private funding. Local franchise owners are drawn from backgrounds in senior management across a range of different sectors; generally they have very limited experience (if any) of care before taking on their franchises. The company aspires to be an 'employer of choice' and carers are typically paid slightly above local norms and generally they are engaged on zero hours contracts. The number of workers varies by franchise according to the size of the business; in local franchise 1 there were around 80 workers compared with around 180 in local franchise 2. Women comprise the majority of the workforce. There is a particular emphasis on actively employing older workers. In part this reflects the ethos of the national office team, but it also fits with the company's special emphasis on companionship (i.e. relationship-led care), as well as provision of personal care (as appropriate).

Important innovations in recent past

The franchise model itself may be regarded as innovative, as it allows for local discretion (since each local franchise is independently owned and operated) coupled with national support. At national office level there has been considerable use of geodemographic data in drawing up local franchise territories, while at local level there has been investment in a digital people planning system to enable enhanced scheduling of care visits, with associated improvements in efficiency enabling business growth. In organisational terms considerable attention is paid to matching of carers to clients on the basis of common interests, etc. The company is innovative in terms of the emphasis it places on learning and development to improve the standard of care for clients and to provide enhanced job quality for staff. In local franchise 1 the embedding of a learning culture goes well beyond statutory requirements. There is a particular focus on dementia training but support for education and training extends beyond this. In local franchise 2 a Learning and Development department has been established. The focus here is on improving training in general, developing specific courses for carers and also offering individualised development opportunities for staff members identified as having management potential.

Key findings on interrelationships between innovation and job quality, employment and inclusiveness

Although recruitment criteria were considered slightly more stringent than other care companies given the company's market position at the premium end of the care market, the company is relatively inclusive in that recruitment prioritises finding individuals with a "caring disposition" – rather than formal qualifications. Nevertheless in objective terms many features of extrinsic job quality were similar to, or only marginally better than those in other UK care companies. Given a general ethos that to deliver quality care it is important that workers do not work over long hours the capacity for carers to work very long hours to increase their earnings was curtailed. However, opportunities for learning and development were seen to have a positive impact on job quality in general and also on supporting possibilities for progression. The fact that the franchise operates in the privately funded care market means that financial pressures (although important) are less severe than for companies operating in the publicly-funded care market. The franchise model offers opportunities for learning (between franchises and internationally) regarding job quality and innovation.

UK-METRO PUBLIC (Green and Wright, 2017)**Brief characteristics of the companies' structure and business strategy**

UK-METRO PUBLIC is a branch of a private company operating in a large metropolitan area in England, trading under its own name but within a broader group of companies which is one of the largest in the UK providing community-based social care services. The Group was established eight years previously and has grown by acquiring companies of all sizes and by winning new business. The Group is backed by private capital. The branch that is the focus on the case study delivers publicly-funded care under several different contracts in an ethnically and socially diverse metropolitan environment across seven geographically congruent local commissioning areas in a hostile financial environment in which historically cost has been the major factor in commissioning decisions. The precise details of funding available and of procedural and reporting requirements relating to care provision varies across commissioning areas, so creating challenges for the company since it has to deliver care services to nationally prescribed standards of quality within a cost envelope and procedures for dealing with different scenarios set out by different local commissioners. The branch has between 250 and 300 employees (often there are several unskilled vacancies), the vast majority of whom are engaged in carer roles. Over 90 per cent of employees are female and in excess of 80 per cent are from ethnic minority groups (the largest single group being Black-African), encompassing a mix of UK and non-UK citizens.

Important innovations in recent past

A particular focus for innovation in the case of UK-METRO PUBLIC is the contracting arrangements for one of the seven local commissioning areas it has dealings with. In this commissioning area an Ethical Care Charter was introduced by the local council, and the commissioner works closely with contractors to improve care services. The Ethical Care Charter sets certain minimum standards for job quality: it stipulates that care workers will receive a (voluntary) Living Wage (higher than the statutory National Living Wage), will receive recompense for travel time between care visits and will be offered guaranteed hours of work. Another innovation is close collaborative working with the local commissioning authority to raise quality standards for the benefit of clients. Other examples of organisational innovation relate to improvements in dealing with medicine management (prompted by a regulatory need to raise standards) and use of narrative reporting in an attempt to provide enhanced client focused care. Technology has been introduced to facilitate reporting to commissioners and to improve administrative efficiency regarding administrative and workforce planning requirements, while GIS is used to enhance planning of care worker schedules to minimise travelling between calls.

Key findings on interrelationships between innovation and job quality, employment and inclusiveness

Higher pay rates under the Ethical Care Charter raise the floor of extrinsic job quality and are welcomed by care workers. Such rates stimulate different recruitment and retention challenges for the company as more (unsuitable) applicants present themselves for jobs in the sector. The company can be more demanding about its expectations of recruits in local areas where the Ethical Care Charter is implemented than in local areas elsewhere. With regard to guaranteed hours local supply and demand dynamics mean that many care workers choose to retain the flexibility of (objectively worse) zero hours contracts rather than move onto guaranteed hours. The move to increased collaboration with commissioners and other care providers, the introduction of narrative reporting and improvements in medicine management put greater emphasis on literacy skills and operate in the direction of enhanced skill requirements (albeit from a relatively low initial base stipulated for carer recruits). Use of GIS in planning care schedules improves job quality by minimising travel times between calls.

CHAPTER 9 – Innovation, Job Quality and Employment in Hospitals in Spain and Sweden

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1 Introduction

This chapter focuses on the innovation-job quality-employment nexus in hospital settings. Hospitals are central institutions in the wider healthcare system that make vital contributions in all societies to the population's welfare. Hospitals are critical as they secure the primary dimension human welfare – health, and do so when people are most vulnerable and in need. Hospitals are also extremely complex organisations due to their breadth *and* specialisation – with highly interested stakeholders, from politicians to patients, healthcare professionals to administrators, often engaged in high valence situations. Thus, the quality of the activities of hospitals is of the utmost importance. The medical, social and organisational complexity of hospitals is mirrored in the multiplicity and complexity of activities and assessments of quality found in hospitals. Hospital treatment and care quality is greatly impacted by various aspects of the personnel's job quality and (hopefully) improved via innovation, underlining the importance of both phenomena, both discretely, and in combination, along with staffing levels (Ball et al., 2017; Montgomery et al., 2011; Scheepers et al., 2015; Van Bogaert et al., 2013).

Within the wider health and social care field, we elect to focus on one specific organisational form – hospitals. This means that other domains of healthcare are not encompassed – largely the whole domains of preventative healthcare, primary healthcare, geriatric, social and palliative care as well. Hospitals themselves, while having common characteristics, vary amongst themselves. They vary in size, array and depth of specialisations, ownership (private or public) as well as their focus on three main parameters – clinical practice (diagnosis, treatment and care), teaching (what kinds of formal and informal teaching and training activities take place within the hospital), and research (what types and scope of research activities are routinely carried out in these hospitals). A common distinction is made between university or teaching hospitals which have a direct association to universities and thereby are heavily involved in teaching and research as well as clinical practice, and clinically oriented hospitals that are primarily oriented towards clinical activities, though all hospitals are in some ways inevitably engaged in training and research activities. Though there are a number of ways of defining hospitals, what differentiates for example a clinic from a hospital is the range of specialisations, providing emergency or acute treatment and care as well as elective or planned treatment and care. The collection of cases in this chapter comprise public and private hospitals, as well as university and clinically-oriented hospitals.

Though healthcare and hospitals are found globally, healthcare *systems* and the hospitals they are part of are highly nationally or locally specific, depending on how (at which level) various aspects of responsibility for healthcare are distributed in a particular society. This specificity comes especially to light when looking at the challenges for cross-border hospital collaboration. Even within the EU the specificity of national/local healthcare systems is underlined by Glinos and Baeten (2014) in their study of seven cases of cross-border hospital collaboration. Borders in healthcare can be national or subnational, and mark the boundaries between hard systems that limit mobility and display particularity. The core of these systems are regulation and funding. Regulation of healthcare is usually national, but funding can be national or subnational. Both private insurance schemes and public insurance/provision is based on agreements between funders and providers, governing whose services can be accessed by which patients, which in turn influence the conditions under which healthcare is produced. In both public and private cases, any agreement must be based on mutual advantage for funders and providers, when moving beyond a consolidated funder/provider construct, which is the norm in public healthcare provision. Again, the funder/provider construct can be national or subnational. What Glinos and Baeten (2014) find is that any collaboration across borders requires extensive negotiation, and a durable, long-term confluence of

interests between the authorities behind funding and provision. This attests to the importance and power of political decision-making organs within healthcare administrative borders. As Glinos and Baeten (2014:22) argue “health care actors are bound by the rules, regulations and standards of the domestic health care system covering everything from how medicine is practiced, how health care professionals are trained and remunerated, the scope of benefit packages, how health services are paid for, to the safety and hygiene criteria which hospitals must adhere to. [...] the institutional differences create innumerable points of divergence and mean that [cross-border] collaboration needs exceptions, derogations and permissions from the competent authorities when it does not play by the rules. This can imply years, sometimes decades of negotiations and trips to the capital. [...] Second, just as institutions, also incentives are often determined at the domestic level. - stakeholders react first and foremost to the incentives and constraints of the domestic scene.”

The boundedness of healthcare systems means that many things in healthcare do not flow freely over boundaries, and are subject to political-administrative decisions – most notably patients, services, and even labour (those occupational categories that are subject to certification/accreditation).

Employment outcomes, one of the focal interests of QulnnE, has to be understood in this context where healthcare production and provision is impacted by political and administrative decisions. Here, employment volume is largely steered by political budgetary allocations, rather than “market” forces. Even in longitudinal studies of an extremely ‘marketised’ healthcare system, the US system, employment in healthcare does not follow business cycles, being primarily impacted by “non-economic” factors (Goodman, 2006). Political decisions impact employment directly by increasing, decreasing or freezing budget to hospitals and other healthcare establishments; allocations which in turn are predominately used to employ staff, as well as indirectly via funding the educational and training programmes that produce core medical and care hospital personnel (specialist and general doctors; nurses and nursing assistants; medical secretaries, etc.). This means that the primary factor impacting volume of employment is tax-revenues and political willingness to invest in healthcare/public sector employment and education. One can conceive of potential “product for personnel” substitutions based on innovations in hospital care, such as psycho-pharmacological medications replacing psychotherapy, direct dictation and machine transcription of medical journal entries replacing medical secretaries or diagnostic or surgical technologies decreasing the need for certain tasks or occupational activities and thereby decreasing personnel needs. While in some fields, like mental health care, pharmaceutical advances have led to less employment as treatment and care techniques change, new medical advances also increase healthcare utilisation, leading to the conclusion that “the overall effect of new medical technology on hospital staffing requirements is ambiguous” (Goodman, 2006: 4) In our case studies we find no evidence of decreased volume of employment based on such substitutions. Where we find fluctuations in volume of personnel, this has to do with macro-economic factors affecting public investment in general, or recruitment difficulties at the local level in recruiting and employing specific occupational categories. However, in the case of the one private sector hospital in our sample, we find highly expansive growth in both employment and organisational diversification.

While employment volume in public sector healthcare systems is largely governed by political budgetary processes, the composition of employment – which occupations and which tasks are carried out by which occupational groups – is changeable, though these are also relatively stable. While we find little market-based variation in employment levels, with the exception of the Spanish private hospital case, in Sweden we find a direct link between job quality and employment levels, especially with regard to medical professionals – where low levels of job quality lead to recruitment problems. We also find that some

innovations are a direct result of, and attempt to deal with, these recruitment-based changes in employment caused more or less by job quality factors.

For readability's sake, whenever possible the material and discussions in this chapter have been grouped under subject heading. However, as most of the cases and examples taken up have multiple, and often recursive dimensions, many of the discussions have implications for topics treated elsewhere in the chapter as well. For specific quotes, the name of the organisation and the interview persons' organisational role is given, and in cases where there are multiple holders of the same role at the organisation an interview identity number (IP) is also given to differentiate between specific respondents.

2 Innovation in hospitals

Innovation at hospitals is an increasing focus area, in part because of its importance for healthcare quality, as mentioned above, but also because hospitals are increasingly recognised as important sites of innovation. Venturing away from previous conceptions of hospitals as highly conservative and recipients of innovations at best, especially if the hospital is part of the public sector, hospitals are now seen as locations of innovation and entrepreneurial activity (do Carmo Caccia-Bavae et al., 2009; Lunt et al., 2015; Miller and French, 2016; Rey-Rocha and López-Navarro, 2014). Rey-Rocha and López-Navarro (2014) go so far as to argue that innovation is the fourth basic mission of hospitals, alongside the well-established trinity of clinical practice, research, and education/training. In the Spanish case, most of the funds for innovation come from external sources, this being 6 times greater than the funds from the Public Administration (RegioPlus Consulting, 2016).

Systematic and comprehensive investigations find that hospitals play multiple roles in relation to innovation. Thune and Mina (2016) discern four basic functions that hospitals play in medical innovation processes: 1) idea generation; 2) idea development; 3) selection; and 4) implementation and dissemination. Each of these categories contains component processes. *Idea generation* contains: a) basic and clinical research; and b) experiential learning in clinical practice. *Idea development* entails: a) clinical testing; and b) generating documentation. *Selection* entails a single process – advisory functions. *Implementation and dissemination* entail six processes: a) lead users; b) development of complementary (service) innovations; c) teaching / training; d) development of routines / protocols; d) dissemination of solutions to new users; and e) post-implementation improvement and adaptation. The authors posit a general developmental trajectory going from idea generation to idea development to selection to implementation and dissemination, with recursive effects from implementation and dissemination on idea generation, selection on idea development and idea development on idea generation. The over-arching four processes are rather generic, applying to a wide range of innovation processes beyond strictly *medical* innovations (see below for a discussion of medical contra other forms of innovation at hospitals), whereas the sub- or component processes are quite specific for medical innovation.

In addition to delineating these processes, Thune and Mina (2016) identify five types of actors with regard to innovation in hospital settings. The first, and most prominent is *hospitals* themselves, with hospitals being involved in all eleven sub-processes named above. The second is *firms*, enterprises that develop and distribute innovative products (and processes). Firms are primarily engaged in clinical and basic research, generating documentation [and products and processes], and dissemination of solutions to new users. The third actor is *universities*, which are primarily engaged in basic and clinical research, as well as teaching and training. The fourth is *policy makers* (national health authorities), who are primarily engaged in advisory functions and dissemination of solutions to new users. The final actor is termed *health care*, and

is involved in dissemination of solutions to new users and post-implementation improvement and adaptation. Together, according to Thune and Mina (2016), these actors and processes they are primarily engaged in comprise the hospital proximate “ecology” of medical innovation.

Djellal and Gallouj take a wider perspective than narrowly focusing on *medical* innovations, writing: “Our assumption is that medical innovation is not synonymous with hospital innovation [original emphasis], in other words, that hospital innovation is a category much broader than medical innovation. It is thus necessary for the actors in hospitals, the public authorities and researchers in the social sciences to take into account these various reservoirs of innovation and the actors involved in them, both individually and in terms of the interactions between them (reciprocal effects, conflicts).” (Djellal and Gallouj, 2007: 190).

From this expanded perspective, Djellal and Gallouj (2007) find in their review of innovation at hospitals four broad areas of innovation: 1) the production functions of hospitals – innovation on how the hospital produces the goods and services it does – “medical care” in sum, through the combination and deployment of production factors; 2) medical innovation *per se* which can take the form of biomedical or biopharmacological innovations, tangible medical innovations technical systems and equipment, or intangible medical innovations, diagnostic or treatment protocols or strategies; 3) new Information and Communication Technologies (ICT), viewing hospitals as and via information systems; and 4) as service providers and healthcare system hubs, where a broad array of medical and non-medical services are provided to the patient/consumer. Another way of looking at the four domains of Djellal and Gallouj (2007) is that the first domain has to do with process innovations (oriented towards efficiency) across all activities at the hospital, from HR to research to medical treatment. The second domain focuses on technical and processual aspects of medical treatment *per se*, with an emphasis on the use of products (the products themselves, their application – protocols, procedures, etc. – and capabilities necessary to use them). The third, like the second, looks at a type of innovation, but instead of medical technology and techniques, it is information technology and techniques. The fourth domain looks at a relational, attitudinal dimension, the service perspective. This perspective takes up a different dimension than efficiency (domain 1, and to some extent domain 3) or treatment effectiveness (domain 2), foregrounding expectations and demands, often of a qualitative nature, beyond technical aspects of interactions at hospitals which may in turn affect efficiency and treatment effectiveness. We see this fourth area of innovation most clearly in the SP-PRIVATE and SW-CLINICAL cases below.

Part of the “discovery” of innovation processes within hospitals, and the role of hospitals in wider innovation processes is coupled with the shift in conceptions of innovation from exclusive focus on the linear Science, Technology and Innovation (STI) mode as the predominant perspective on innovation to the Doing, Using and Interacting (DUI) mode (Jensen et al. 2007, Consoli and Mina 2009). In crude terms, from the former perspective, innovation takes place through a research and development (R&D) process that is largely divorced from the everyday practice that its innovations are to be implemented in. This approach would see hospitals as R&D laboratories, with *science* based (as opposed to clinical practice) inputs and processes as the central dimension. The latter perspective emphasises *practical* knowledge emerging out of work or practice settings. Here the emphasis is on the proximate identification of needs, alternatives and contextual experimentation and implementation in a recursive manner.

The DUI approach (which is complementary rather than mutually exclusive to the STI approach) emphasises the role of practical experience and innovations oriented towards altering workplace practice as the central dimension of innovation. Rather than innovations as being remotely invented, developed and then diffused for implementation, the DUI practice based approach emphasises proximate iterative

approaches to innovation, and thus identifies and can study the myriad of such activities in everyday work contexts, rather than merely what comes out of R&D or similar departments. This has led to an increasing focus on workplace innovation (Oeij et al., 2017). This shift in approaches opens up for studying a wider range, and thereby larger volume of innovations in hospitals. As evidenced below, the vast majority of innovations discussed in this chapter are of the DUI, workplace innovation type, though hospitals are also deeply involved in STI type of innovations as both co-producers and recipients.

In sum, Thune and Mina (2016) chart out the processes and actors within medical innovation, one of the four domains or approaches that Djellal and Gallouj (2007) discern. The same four basic processes would also apply to the other three domains Djellal and Gallouj (2007) discuss, though the component processes would in many cases be different as several are unique to medical innovations. The differentiation between the STI and DUI modes theoretically broadens our conceptions of innovation processes, encompassing both more remote, linear, science based processes with more proximate, recursive, practice based processes of innovation. The innovations discussed below can readily be mapped onto the typologies presented above.

3 Job quality in hospitals

Few occupational groups are as well-studied social-scientifically as nurses (Lee and Cummings 2008; Zangaro and Soeken, 2007). Far more so than the second most prominent occupational category in hospitals, doctors or physicians. As these labour categories are unique to the healthcare system, they receive the lion's share of attention on job quality in hospital settings, whereas other occupations which are found in hospitals, but also found in other types of organisations and sectors, such as managers, administrators, cleaners, cooks, HR personnel, accountants, ICT technicians, etc. (who comprise a sizeable proportion of employees at hospitals) are less often treated in the hospital specific literature (with the exception of directors and senior managers of health care facilities). This leads to most studies and surveys of job quality in healthcare focusing on treatment and care occupations in the healthcare system - physicians, nurses, nursing assistants, orderlies, etc. (Misfeldt et al., 2014).

Studies of physicians tend to show comparatively high degrees of well-being and job satisfaction, though burnout is taken to be an indicator of more problematic job quality issues (Montgomery, 2011). Physician well-being is also a primary component in the quality of patient care (Scheepers et al., 2015). Not treating the corps of physicians in a uniform manner has led to the identification of both differentiated working conditions and reactions to working conditions among male and female physicians, residents/interns, as well as over medical specialisations. The aspects of job quality, or more specifically, work satisfaction, identified by Bovier and Preneger (2003) in a European sample of physicians that were generally deemed positive were contact with patients and patient care, "professional relations and personal rewards" including intellectual stimulation, opportunities for continuing medical education, and enjoyment at work, whereas the most problematic or negative aspects of work had to do with workload and stress, administrative tasks, work-life balance issues coupled to workload (such as too little time available for family, friends or leisure) work-related stress, as well as unsatisfactory occupational income and prestige.

There are far more studies of nurses' job quality, and these largely focus on the same dimensions. A great deal of the literature focuses on temporal issues, but for nurses this takes the form of concerns about such as scheduling, length of shifts, shift work and temporal flexibility (Ball et al 2017; Lee and Cummings 2008; Van Bogaert et al., 2013; Zangaro and Soeken, 2007). Here a direct relationship to work life balance comes in, as both volume and timing and flexibility of work impinges upon what and how other interests and

demands in life can be reconciled with work (Boamah and Laschinger, 2016; Ghislieri et al., 2017). The combination of nursing being a female dominated profession and the mainstream gendered domestic labour regimes in contemporary societies makes this a generally acute and pervasive issue. Other central topics include rewards – economic and social in terms of wages and prestige; career progression opportunities; knowledge and skill development; the intensification of work; job composition (the addition and subtraction of attractive and unattractive tasks from nursing jobs); the relationship of nursing to other occupations – both in the workplace and in society at large; the forms and levels of occupational support available; and the myriad of issues around emotionally satisfying and taxing work in dealing with persons – from premature infants to the elderly – in high valence situations characterised by physical and emotional contact.

While many of the topics laid out above apply to many or most occupations, two factors are of paramount significance and relatively unique to healthcare. The first is associated with the temporal aspect of work in the healthcare sector for healthcare professionals. As illness, treatment, and care are in many cases round the clock phenomena, the attendant work also has to cater to this need. Some treatment (acute, emergency treatment usually in emergency wards) and care (intensive care units) must be carried out immediately and with a high degree of attention. Other types of treatment (elective) and care can be planned and carried out in a more deliberate manner and with less intensive or continuous attention. This sets the temporal parameters for the work of physicians and nurses. As elective treatment can be scheduled, this means that the majority of the work of physicians and operation theatre nurses can be carried out during regular working hours (not just for work quality, but patient safety reasons), though jour/on-call and emergency work also exists for these groups outside of normal working hours. As post-operative and convalescent care is required around the clock, more nursing staff is involved in occupational activities outside regular working hours. In most cases three shifts exist: a morning shift which usually equates to normal working hours, and afternoon/evening shift and a night shift.

The second has to do with the joys and burdens of working in (at least quality of) life and sometimes death situations (Bolton, 2000; Costa et al., 2014). Here, what one as an individual healthcare practitioner can and cannot do largely depends on material and social resources or support from one's organisation and colleagues (Ghislieri et al., 2017; Laschinger et al., 2001). Both physicians and nurses are frontline employees with direct interface with patients and relatives. Job quality in this regard has to do with being able to deliver expected (from oneself, colleagues, supervisors, patients, relatives) levels of treatment and care quality, which in turn is a matter of training, financial and physical resources, social support, and other facilitative factors; and the opposite – few unnecessary constraints and high levels of discretion (Freidson, 2001).

4 Context: The Spanish and Swedish healthcare systems and hospital sector

The Spanish and Swedish healthcare systems are similarly organised. The national government has the role of initiating and regulating healthcare, but provision is the responsibility of regional governments. In Spain, it is the Ministry of Health, Social services and Equality that has the overarching responsibility. In Sweden, the Ministry of Health (often combined with other portfolios, currently Social Affairs) has the overarching political responsibility for healthcare, but the regulation of healthcare at the national level is carried out by state agencies, of which the National Board of Health and Welfare (*Socialstyrelsen*) and

Health and Social Care Inspectorate (*Inspektionen för vård och omsorg - IVO*) are the most significant (Huzzard, 2016)

Healthcare provision is provided at the sub-national level. In the Spanish case, public healthcare is carried out by the Autonomous Communities (ACs). Funding for the ACs healthcare activities is derived from taxes collected both at the national and regional level. In addition to the public healthcare system, a relatively large private healthcare sector exists, used by approximately 30% of the population (RegioPlus Consulting, 2016: 3). One explanation for the increase in private sector healthcare can be linked to the declining investment in public healthcare as a result of the finance crisis of 2008 in Spain. According to national statistics, investment in healthcare per capita declined from €1510 in 2009 to €1309 in 2013. Since 2014 the trend is towards increasing spending by the ACs. The private healthcare system is increasing both in terms of percentage of the population using the services as well as private spending in percent (RegioPlus Consulting, 2016: 5).

In Sweden, healthcare provision is carried out by county or regional governments [*landsting or regioner*] (Huzzard, 2016). Aside from provision of healthcare, each county or region in Sweden finances its healthcare activities via direct taxation of the residents who live in the county or region. In this sense, patients are bound to the county or region that they are resident, and thereby pay tax in. There are however national laws that dictate that certain medical procedures can only be carried out in specific hospitals, and in these cases the county which sends its patients to these facilities pay compensation to the county where the hospital in which the treatment is carried out is located. There are also national laws stipulating that healthcare in Sweden must be equivalent in all counties, meaning that it can be organised in different manners, but the treatment and care quality and effects must be equivalent. The case SW-NETWORK is an example of an organisation seeking to secure equality of treatment across county hospitals. There is also a national law stating that if a county cannot provide a patient with satisfactory healthcare within a normed period of time, the patient can seek care in another county's healthcare system, with again the home county paying compensation to the providing county.

Healthcare provision is also similarly divided in both countries into primary healthcare services comprised of general medicine healthcare professionals working in smaller geographically distributed clinics meeting patients on an out-patient basis and hospitals that provide comprehensive specialist healthcare on an out- and in-patient basis (Huzzard, 2016; RegioPlus Consulting, 2016). As mentioned above, the cases here focus on hospitals, rather than primary care or other parts of the broader healthcare system.

5 Methodology and cases

This chapter is based on six case studies in all, four in Sweden and two in Spain. Directly below is a table summarizing the key characteristics and methodological aspects of the case study units. Further down, the case studies are presented in more detail.

Table 1: Overview on case studies

| Country | Pseudonym | type of unit | sector | number of employees (< = 50; 51-500; 501-2500; > 2500) | number of interviews |
|---------|---------------|----------------------|---------|--|----------------------|
| Spain | SP-PRIVATE | Hospital | Private | 500 - 2500 | 9 |
| Spain | SP-PUBLIC | Hospital | Public | 500 - 2500 | 7 |
| Sweden | SW-UNIVERSITY | Hospital | Public | > 2500 | 19 |
| Sweden | SW-WARD | Ward | Public | 51-500 | 13 / 8* |
| Sweden | SW-NETWORK | Network organisation | Public | < 50 | 3 |
| Sweden | SW-CLINICAL | Hospital | Public | > 2500 | 3 (11**) |

* - 13 interviews relevant for the case study, 8 interviews with personnel unique to the ward.

** - 3 interviews with 11 interviewees in all, 1 individual, two group interviews (with 4, respective 6 participants) plus two innovation roll-out meetings observed with 13 participants each time.

Source: Own compilation based on case study reports (see the list of reports in section 12 of this chapter)

5.1 Spanish cases

The Spanish cases comprise of two hospitals, one private (SP-PRIVATE), one public (SP-PUBLIC). **SP-PUBLIC** is located in a predominantly rural province in northern Spain, opened in the early 1980s with a staff of about 300 employees and currently has a staff of roughly 800 permanent full-time employees and about 200 on other types of contracts. Recently the hospital has been afflicted by a shortage of specialist physicians, leading the Regional Health Ministry to postpone the retirement of several specialists. The hospital has a unit responsible for coordinating its innovation activities, and has been engaged in several innovation projects with national partners and other European countries. The area of telemedicine has been an especially strong focus area for this hospital. It is common in Spain that the most innovative public hospitals have an “Innovation Unit”. (Martín et al., 2017b)

The private hospital (**SP-PRIVATE**) is located in a southern port city, which attracts a large number of tourists and foreign-born permanent and semi-permanent residents. The hospital started in late 2009 as part of a larger Spanish medical group, though it is presently in negotiation with a larger European healthcare group as an object of acquisition. Since it opened the hospital has grown by over 400%. The number of employees has gone from just under 200 in 2009, to over 500 in 2016. Just under half of the employees have permanent full-time contracts, about a third have temporary full-time contracts, 7% have permanent part-time contracts and 18% have temporary part-time contracts. Salary levels are in general similar or higher than in public sector healthcare. Another significant fact is that the doctors working at the hospital, with the exception of those in internal medicine, work on a freelance, slightly less than full-time contract basis (this is described further below). The hospital competes with four similar hospitals in the city, but the hospitals treat patients who have insurance from different carriers so competition is not direct, but mediated by the distribution of insured patients across carriers. Roughly 80% of the patients treated at the hospital have private Spanish insurance, 16% have foreign private insurance and 5% are employees of international companies (Martín et al., 2017a). The foreign insurance policy holders pay considerably more than those insured by Spanish companies (Martín et al., 2017a).

5.2 Swedish cases

The Swedish cases comprise of four entities of different types. Two of the cases are of hospitals in general. One is a university teaching hospital (SW-UNIVERSITY) and the other is a provincial clinical hospital (SW-CLINICAL). The second case (SW-WARD) is a pediatric surgical ward that is a subunit of SW-UNIVERSITY, The third case (SW-NETWORK) is not a hospital per se, but a coordinating unit between hospitals aimed at improving and standardizing treatment and care of a specific illness at hospitals in southern Sweden.

SW-UNIVERSITY is a university teaching hospital that has facilities in two cities. Administratively the hospital is one unit since what was formerly two hospitals were merged in the last decade, though there exists a division of labour and specialisations between the two facilities. The hospital currently has over 11 000 employees, in 100 occupational categories and an annual budget of about SEK 8 500m (€880m) and runs at a deficit of about 5% of its operating budget. The hospital is currently divided into a central staff unit and five medical divisions. Surgery is part of all four divisions, with the exception of Division 5 which is decentralised primary care. The hospital treats all illnesses except those that are restricted by the National Board of Health and Welfare to specifically selected hospitals designated for National Specialised Medical Care (more information will be provided on this as it is one of the innovations examined below) (Mathieu and Boethius, 2017a).

The second case, **SW-WARD**, is a pediatric surgical unit that is a subunit of SW-UNIVERSITY. The pediatric surgical ward has about 80 FTEs. There are 14 physician positions that are shared by 18 doctors (some of whom have teaching, research and administrative roles that reduce their working percentages). The rest of the positions are held primarily by nurses and nursing assistants, with some other roles and occupations also being found. The nurses are divided into specialist nurses, including operation nurses, and regular nurses. The ward is physically located in the children's hospital, along with the pediatric intensive care unit and the pediatric out-patient surgery ward. The surgery robot discussed in relation to this case is physically located in the adult section of the hospital (Mathieu and Boethius, 2017b).

The third unit, **SW-NETWORK** develops and coordinates the treatment and care of a specific, but broad illness in the Southern Healthcare Region, which comprises of four different counties in the south of Sweden, but is part of a national network of such organisations. This unit does not carry out clinical activities (diagnosis, treatment and care), these are carried out at the hospitals. It rather acts as a knowledge and innovation generation and dissemination actor. The form that SW-NETWORK itself takes was identified as an innovation – a new way of organizing treatment coordination which has national as opposed to local origins and an example of a new structure, implemented on a model spread throughout Sweden. As such, this innovation is intended to both complement and replace existing structures with its role to both encourage new local innovations in treatment of this illness in the Southern region, as well as disseminate innovations from the wider national network. SW-NETWORK is thus an inter-organisational unit in two senses – it plays a coordinating role between hospitals in the Southern Healthcare Region, as well as a mediating role between these partner hospitals and the national network. In addition to these brokering roles, the unit also has autonomous research resources (Boethius and Mathieu, 2017)

The final case **SW-CLINICAL** is of a provincial hospital, with facilities in four towns. In total, the hospital has between 600-700 beds and a staff between 4000-4500 employees. Two on-going innovations were studied. The first is the introduction of a programme of *person-centred healthcare*, which removes the focus on the patient as an *object* of healthcare, and replaces her or him with his or her healthcare needs (the needs, rather than the person becomes the *object*), and thereby moves the patient to the group of

actors, including doctors, nurses, administrators and other staff members who collectively plan and carry out the patient's healthcare. The second innovation has its origins in the hospital's inability to secure a requisite amount of staff, especially in key medical professions, and is oriented towards making the hospital a more attractive workplace and employer (Mathieu, 2017).

6 The making of innovative workplaces (how aspects of job quality drive innovation)

In the following section we examine specific innovations from the case studies where aspects of job quality led to or facilitated the innovations.

6.1 Incremental workplace innovation as job quality driven

Incremental innovations in SW-UNIVERSITY are in part a result of a strategic introduction of Lean management with its emphasis on continuous improvement (Mathieu and Boethius, 2017a). The creation of forums for employees to make suggestions and work on their implementation has been found both in this case, as well as the implementation of Lean in other Swedish healthcare facilities (Mazzocato et al., 2016).

One central forum is *pulse meetings*. The pulse meeting form is widely used at the ward level now, and is an innovation in and of itself, that is also intended to catch innovations that come from the floor (pulse meetings being an innovation to promote innovation). The meetings are short, bringing together the employees who are on site at the time the meeting takes place and are focused on the current status or conditions (i.e. the pulse) of the workplace at that particular moment. The meetings can be held daily at shift changes – often when the morning shift hands over to the dayshift, or they can be scheduled as weekly or bi-weekly meeting where more persistent (rather than daily transient) issues are taken up. The meetings are usually focused on a whiteboard that schematically displays the tasks and resources that are in use on the ward. Here adjustments can be made in allocations due to current needs. In addition to immediate alterations in allocations and flows, these meetings are used to make suggestions for more larger scale improvements on the local level. Once again, a whiteboard or a bulletin board is often used in order to list, and track the progress of these proposed changes and continuous improvement projects. These boards are usually found in locations frequented by employees – such as the staff lunchroom, but not part of the public area of the ward – i.e. where patients and their family members can see them. As stated above, if the changes are minor and can be agreed upon at a meeting, the action is adopted, and then explained to those not at the meeting via a posted notice, an email, or word of mouth. The larger projects get added to the whiteboard, usually with the name of the person responsible for the activity and a timeframe. This makes it possible for anyone on the ward to contact the contact person with comments or suggestions, or join the workgroup, and chart the progress of the project. The goals of transparency are attained in this way.

These innovations are a direct effect of several job quality factors. The first is the level of competence and skill at the ward level possessed by members of each occupational group to have a qualified opinion and idea about how work processes at the ward level should be carried out. That is to say, they have knowledge and experience that feeds into improvement processes. The second is the collective autonomy granted at the ward level to engage in such work planning and change activities. In part linked to the interpretation of Lean found at the hospital, and the subsidiarity desire at the hospital (taking the right decision at the

lowest possible level – according to an organisation developer (IP13) at SW-UNIVERSITY), there is a high level of group/ward autonomy granted in specific realms. Thus, direct employee influence is encouraged and facilitated by this transparent process. These changes rarely lead to changes in employment levels, but operate primarily on the axis of interplay between innovation and job quality – though some dimensions of job-shifting have been taken up in these forums.

Sometimes larger projects lead to smaller incremental changes at the local level. In conjunction with the application to become a National Specialised Healthcare Centre detailed in the SW-WARD case study, a number of smaller incremental improvements were made (Mathieu and Boethius 2017b). In the application process, the ward had to account for its competencies, resource and routines. As part of this process it was realised that some of the routines and material were outdated or no longer in sync with current practice. An organisation developer explained it in this way:

“One can say that this whole process [writing the application] became a matter of going through everything we do at our unit, because for each thing we do we were challenged to think it through. For example, what is written in our information material, how do we really invite parents into the process. It’s one thing to say that we do, we inform the parents, but how do we do it? Because when one has to write an answer about this in the application, it’s quite flat to just say we inform the parents before each operation. But how? How do we ensure quality? And how do we know that the information we give the parents is good? How do we know that it’s what they need, what they want? So there was a lot of this type of activity that was launched, it just exploded with activity, in conjunction with the application.” (organisation developer IP8, SW-WARD).

So here we see that in addition to the actual application process – a one off, large scale innovation activity with tremendous repercussions for the ward and the hospital in terms of prestige, research and clinical activities and recruitment and staffing – how these smaller incremental activities were set in motion. Again, all these activities, including writing the application (a very extensive and resource consuming process) were undertaken largely without additional external resources. This exercise also exposed areas where specific competencies were lacking on the ward, such as the ability to formulate information in a manner that makes sense to children. Overall, the primary drive behind these smaller incremental activities is a collective engagement in work and delivering quality. And again, the initiative to this comes from the employees (primarily, but not exclusively doctors) themselves, not from above.

This theme of working from below and using the engagement of the employees on the ward floor was touched on by many of our interviewees. The quote below of an organisation developer at SW-UNIVERSITY echoes the sentiments of a former Head of Unit at SW-NETWORK, who stated, *“If there is one thing we are tired of in healthcare its directives from above.”*

This perspective on the importance of local, incremental innovations – in line with the DUI approach discussed above – was also elaborated upon by organisational developer who talks about the strategy she uses to create support for innovations:

“You have to work on problems that you experience yourself, that’s also where the drive is: innovations don’t come from above, it isn’t something that comes from outside, it’s about me being confronted with a problem that is sufficiently uncomfortable that I need to do something better. We see that wards that are best at this in moving patients are the ones that have been squeezed a while, they are motivated to correct it, to fix it, get things in order. So one has to

feel it oneself to want it. ... [on the innovation process] we change things, we test things, we try things, and then when one has come halfway, one realises that we have already changed things, you can be part of evaluating the results, and if you don't like it we can do something else. So the resistant person is the one who should do the documentation and evaluation ... you can see if it's better or worse. ... therefore you always have to measure things, measure if they get better or not. This is enormously important.” (organisation developer IP4, SW-UNIVERSITY).

To illustrate this, the organisation developer later talked about the implementation of a streamlined pulse meeting structure at the orthopaedics unit, where systematisation and standardisation, along with a more rational division of labour (including the people who have to be part of the process, and allowing this not necessary to get on with other tasks) led to an extreme reduction in time spent on the rounds and care planning activities (Mathieu and Boethius, 2017a). Here the improvement and efficiency could be directly felt by each employee – there was no need for statistical measurement, it was directly felt by each employee, appreciated and accepted.

In the following quote, a resource planner at SW-UNIVERSITY takes up one of the primary inhibitors to innovation – lack of time for reflection and an opportunity to do things differently due to all too intensive work – and a case where she foresees an ineffective result due to the fact that an innovation is being made above the heads of the employees involved:

“If you look at changes that come from below, and I am one of these Lean people, so I want things to come from below and solve things yourself. I would say that right now we run so fast, alongside, that we have difficulty creating innovation. And then the pressure from above is so strong for change, and regrettably it's like that. I have just been at a steering group meeting where we discussed changes in the operation scheduling. Now they want to go out and say that we need to work longer on Fridays in order to expand capacity. One, you are not going to expand capacity because there has to be people who can work there on Friday afternoons, and they have to be taken from somewhere else, so first, you are not expanding capacity, and second, this won't be very well received [by the employees]. What I think would have been much better is to go out and say that we have to expand our use of the operating theatres by 10 hours. Can you [the employees] come up with a suggestion? But they don't do this, they push down from above, the higher managers do the analysis and push it down. This is what we are going to do now.” (ressource planner IP1, SW-UNIVERSITY).

Here we see the two different innovation approaches contrasted – a top-down command and control model, which creates resistance, and the bottom-up model. In the latter case, even if the employees are not part of the problem identification and feel it (as the organisational developer IP 8 discussed above) the employees are at least solicited for and involved in the solution process.

6.2 Using the existing workforce's “peripheral” skills to alter the business model

Medical care is almost universally organised according to type of illness or treatment, bodily region, or the skills of diagnostic and treating medical professionals. Not the linguistic or culinary preferences of patients. The opening of an international care unit for foreign patients at the private hospital (SP-PRIVATE) in Spain displays use of existing, non-directly occupational skills of the existing hospital staff. While the impetus for opening the ward was dissatisfaction with the current level of standards and responsiveness to international patients on the medically based wards, and thereby a solution to promote customer

satisfaction, the ability to create and staff such a ward was based on the non-occupational skills and knowledge of the existing staff. This unit was created to meet the demands of middle to upper income northern European patients who were met by linguistic, cultural and culinary barriers at the hospital (Martín et al, 2017a). Though the unit is small, comprising of 20 beds and a core of one internal medicine doctor, two nurses and an administrator in charge of international patient care, staff rotate through this and other wards. From a job quality improvement perspective, this provides a degree of contextual, if not task variety for the employees, and as mentioned it draws upon their cultural knowledge and abilities. As patients are given a “personal care giver” who has cultural understanding and linguistic abilities, the care staff is given the opportunity to create closer connections with patients (something that international research shows is a very positive aspect of improving the job satisfaction of healthcare workers; cf. Bovier and Preneger, 2003; Hallin and Danielson, 2007) than in contexts where staff merely rotate through wards. This innovation (the creation of the international ward) has led to the creation of two new positions, one for the international patient administrator and one nurse, but has led to a more widespread interest in hiring personnel with broader language skills than just Spanish. Opening this new ward has changed the hospital’s view of what skills are important to consider in hiring. The creation of the new ward has had dual effects on job quality, according to one implicated employee: *“I feel more appreciated ever since my ability was recognised, and thanks to that my working conditions have changed [for the better]”* (nurse, SP-PRIVATE). For one nurse who currently works in this unit, her trilingualism has meant that she has been transferred from the night shift to the day shift so she can work in this new area. Her job quality and satisfaction have improved considerably thanks to this change of shift, and she even receives a salary bonus for her language abilities (though her night-shift position is filled by other nurses). Particularly this worker has found job quality affected positively in several domains including financially and temporally/scheduling, by the innovation implemented.

6.3 Innovation suggestion competitions

In the Spanish public hospital case (SP-PUBLIC), innovations based on the knowledge and skill of the staff and a willingness to draw upon this in a formal process is evidenced in an annual innovation ideas competition. The competition is open to all members of staff, with the first prize being rewarded with €800, second price €500 and third price €200 (Martín et al, 2017b). Most recently, the winner of the first prize was a self-swabbing programme already practiced in South America, the second price was colour-coding syringes for easier identification and the third price was a real-time telemedicine connection between primary care and specialists in the emergency services at the hospital. What the array of rewarded ideas shows is that some are the result of employees’ knowledge of programmes that are successful elsewhere in aiding patients that should be adopted here as well, while others are material or communicative innovations that are based on local inventions to meet internal processual needs. In other words, both staff knowledge of programmes elsewhere and ingenuity are drawn upon and utilised.

A similar annual innovation competition is also organised by the SP-PRIVATE through innovative ideas competitions organised by the group itself once a year (Martín et al 2017a). All the workers are invited, through this contest, to suggest ideas to improve the management and work of their unit or hospital. The ideas then considered most appropriate by the corporation will be implemented. The worker who proposed the idea receives a financial reward, so helping to foment the transfer of good practices and the interest of workers in innovation.

6.4 Robot-assisted surgery

Robot-assisted surgery has taken place at SW-UNIVERSITY for about a decade, and is regularly used in certain operations on adults. SW-UNIVERSITY is one of the few hospitals in the world that uses the technology on children. The hospital also uses ECMO machines on children, showing a broader interest in experimentation in the use of technology on this patient group. However, there is a cut-off point at around 10 kgs (about one year-old) below which they do not use the robot (Mathieu and Boethius, 2017a).

There are some basic reasons for adopting robot-assisted surgery, most of which are medical. From an operative perspective, the scope of vision is much better during the operation, and 10 times magnification is better than with conventional techniques, meaning that the surgeon can see better and thereby among other things make more precise assessments of tissue. Incisions are also generally smaller and there is generally less blood-loss and less tissue damage. It has also been found that operations take less time (in some cases almost half the time) with robot-assisted versus conventional technique (LU 2007b). The less invasive surgery also leads to less time at the hospital (LU 2007a) and less pain. Both the saving of operation time and duration of patient time in hospital should bring economic savings on an aggregate level. From a work quality perspective, one of the surgeons is sitting comfortably in a chair behind a monitor, rather than standing over a patient for hours and manually performing the operation. This has short and long-term physical health impacts on surgeons. Due to increased treatment quality, patients from around Sweden also ring the hospital to hear about the possibility of being operated with the robot (Head Physician, SW-UNIVERSITY).

There are drawbacks with the technique. One centres on the cost of the robot itself (approximately €1.5m) and the fact that it is in a physically fixed location, making it less flexible. The second is that, like with all medical machinery, there are specialist maintenance costs in addition to the purchase price. Though vision and seeing is much improved – wider scope, magnification, 3-D, what is absent is the traditional sense of touch. A higher risk for bloodclots and strokes was found in a recent Swedish study (Dagens Medicin 2015), which is now counteracted by giving blood-thinning medication after the operation.

According to the interview with the head of research at SW-UNIVERSITY (IP13), who has responsibility for the “orderly adoption” of significant medical innovations that impact patient treatment quality and making sure that there is solid medical evidence for adoption, the purchase and adoption of the robot did not go through this procedure (Mathieu and Boethius, 2017a).

In adopting the robot, the hospital is acting as an innovation leader by being one of the first hospitals in Sweden to adopt a developed technology, and then applying it in conventional as well as innovative ways, such as extending it to children. One of these is building on the success in treating prostate cancer, which usually affects older men. One recent innovation on this ward is using the surgery robot recently at the hospital to perform prostate surgery on a 20 month-old boy who only weighed 8 kilograms. As noted above, this was not just a new area, but also broke the usual 10 kilogram cut-off point. It was reported that the boy was up and walking already the next day, which wouldn’t have been the case with open surgery. This case shows the primary feature of the benefits of less invasive surgery and how it is innovatively used – in this case on a very different group of patients, but with the same benefits.

The impact of the innovation on job quality is primarily in the area of work variation, as the robot allows for operations to take place in a different manner affecting how work is carried out within the operating team, and in engaging in something novel. As the work is varied and requires specialist skills, there is skill acquisition and development, skills which are transferable to other hospitals or departments where robots

are used. The training takes place in groups and has necessitated foreign travel (USA, Denmark) allowing a greater team feeling to develop alongside skill acquisition and gaining inspiration on a range of things even beyond robot-surgery. On the other side, adopting the innovation required a core group of medical staff at the hospital having been exposed to the possibilities of the technology and expressing a willingness to adopt it, as well as having the influence to convince the hospital and county officials to make a substantial investment in the technology. As the technology is novel, and the robot team contains lead surgeons, the teams has a high degree of autonomy and discretion in its use, including using it innovatively. It was mentioned that the company that makes the robot is often present when it is used *“to hear how we talk when we use it”* (Surgeon IP13, SW-WARD). In theory, the innovation would increase job security, as the robot team is a specialist unit connected to a successful technological application, but this dimension is not discussed as those who are part of the team enjoy very high job security already. The physical health benefits are discussed above. As the robot is used only for elective surgery, it is always planned, and at the moment, the pediatric unit has access to the robot one day every fortnight. As the same operations that can be performed with the robot can be performed with open surgery, and very few operations can be done with the robot due to the restricted number of diagnoses applicable, the general weight restriction and the limited availability of the robot, a selection is made. All this contributes the scheduling stability of robot operations.

With regard to employment, the robot team consists of three surgeons, three specialist operation nurses and three nursing assistants. At an operation there is usually one nurse and two nursing assistants and two doctors (sometimes other surgeons come to watch, and if they are operating tumors, then a tumor specialist may come as well). The anesthesiologists team are not specialised in robot surgery. There is always a surgeon standing by the patient (the operating surgeon is behind a computer console) and ready to take over the operation manually if that should be necessary. As all the members of the robot team also work with conventional surgery, one can say that they have a specialist competence that others do not, while their conventional competence remains undiminished, as a minor part of their working time goes to robot-assisted procedures.

Recruitment to the robot team appears different for doctors than nurses and nursing assistants. The doctor interviewed (IP 12, SW-WARD) said he was recruited to the robot team because he was good at laparoscopic surgery. He left the robot team when he went abroad, but was asked back on to the team upon his return when a position opened up, as he was already capable and there would have been a steeper learning curve for someone new coming onto the team. The operation nurse (IP 17, SW-WARD) was asked to join the team soon after the robot was acquired when another nurse left the team due to other commitments. She said she hadn't know about the robot when she moved to the ward (from orthopedics) and she had no special qualifications when she joined the team. Aside from some study trips, the learning was on the job and learning by doing. One of the negative aspects of robot surgery that this nurse took up was that it takes a rather long time to learn, especially for surgeons (Mathieu and Boethius, 2017b).

There are innovations within the innovation of using the robot on children. The specialist nurse interviewed (IP17, SW-WARD) told of an operation that was done for the first time (probably in the world she believed) with the robot. This generated a lot of collegial interest, and the procedure was documented, and was talked about as an extremely fulfilling event – being able to be part of something completely new and unique. A similar operation was carried out laparoscopically a week earlier, and because of the better precision available with the robot it was decided to try it with the robot, and it was highly successful, according to this nurse. There is a case by case process of expanding the number of diagnoses and

treatments that the robot is used on. However, it remains fairly restricted in its use at the moment, and it was deemed by the nurse interviewed that the current patient volume is adequate to use it on children fortnightly, but that either the number of diagnoses it would be used on or the volume of patients with diagnoses currently treated would have to increase in order to move to a weekly basis.

The total impact on employment is marginal. The operations take more time with the robot – both the set-up and procedure, so there is a marginal impact on the amount of working time using the robot, but the recovery time for the patient is less than with conventional techniques. The one domain where employment is positively impacted (an increase) has to do with medical technicians who maintain the robot.

6.5 Application to be a National Specialised Medical Care centre of three diagnosis areas of pediatric surgery

SW-WARD has applied to become a National Specialised Medical Care centre to be authorised to treat a set of diagnoses. If successful, this application will allow the hospital to continue to treat the diagnoses named in the application and become the, or one of two, centres with this right, and thus receive all or approximately half of the patients with these diagnoses. If unsuccessful, the hospital will lose the right to treat these diagnoses. These three diagnoses could be said to be put out to a competitive tender among the hospitals in Sweden in order to concentrate this specialist (and relatively infrequent) treatment to improve quality. The logic is to create a critical mass of patients by concentrating the treatment of these diagnoses to only a couple of hospitals.

The effects of success or failure are clear – if the hospital is successful, the treatment of these diagnoses will continue and increase in volume, if unsuccessful, they will disappear and the volume of work will decrease. The increase or especially decrease in work volume would be relatively small however, as it is only the few patients currently treated for these specific diagnoses and procedures that disappear. This is unlikely to impact staffing levels. If successful, the hospital may be the only hospital in the country to perform these operations or become one of two centres, and thus splitting the national volume. This probably will not, or only marginally affect the number of surgeons, but it would have an impact on other occupational categories. It will probably lead to an increase in nursing staff, both for care and contact with parents and the sending hospitals.

Where the organisational innovation dimension is most profound is in creating a new infrastructure for receiving and following up patients who are treated at SW-WARD (Mathieu and Boethius 2017b). In the event of the application being successful, the ward will need to build up a new structure for receiving patients from hospitals far afield, which play a preparatory and brokering role. Thus, rather than direct and sole contact with patients and their parents/relatives, the ward will have to establish roles and routines for receiving and returning and following up patients at other hospitals, rather than running the who diagnosis, treatment and care procedure in-house. If unsuccessful, the opposite will be the case – the ward will have to develop roles and routines around being a sender, rather than a receiver, and doctors and nurses would be affected by no longer being able to treat and care for these patients. Regardless of how things go, there will be a qualitative change in the organisational operations of the ward, rather than merely a change in volume of patients and work.

If successful, it was reported that most of the increase in staff would be in contact and training activities (training sending hospitals how to care for their patients upon return from treatment at a national centre). These para-treatment activities would lead to an overall, but slight increase in employment at the hospital,

but a widening of types of activities and skills undertaken on the ward as well creating new structures and roles at the ward.

Along with an expanded clinical treatment dimension, attaining National Specialised Medical Care status carries an expectation to carry out research on these diagnoses and treatment procedures, and the increased volume of patients facilitates a larger sample for research. Thus, a quantitative increase leads to a qualitative change, with research activities being expected to increase, and with it an increase in the number of staff to cover for lost effort in clinical activities by staff engaged in research.

While not a decisive factor, the presence of a robot-surgical team (discussed in the section above) at the hospital helps the chances of success with the application, in part because this hospital is the only one that uses a robot on children, which has medical advantages, and some aspects of treating these diagnoses can be operated on with a robot. The use of the robot also shows a willingness of this hospital to innovate and master leading edge procedures. So there is a synergy effect between the two innovations.

If successful the innovation will increase job quality in several ways. One, it increases the variety of tasks and activities, both medical and para-medical (administrative and training), to be carried out on the ward. Second it increases the prestige of the ward, as it becomes an acknowledged leader in its field. Thirdly, it continues to open further opportunities for education, training, development, innovation and research in these fields. Fourthly, and of great significance is that retaining the opportunity to treat these diagnoses preserves an “unbroken treatment chain” – i.e. that the ward can continue to treat all diagnoses at the hospital and not send certain cases away. This has symbolic, motivational, and practical repercussions on the ward in terms of knowledge development and transfer. A further dimension of retaining the unbroken treatment chain is that it is easier to recruit the best staff if a ward can offer the entire range of activities to potential recruits.

The innovation itself, i.e. the success of the application is dependent upon high degrees of certain forms of job quality. These are a high degree of skill training within the unit, and a demonstrably good working environment. As the stability, reliability and credibility of the unit is a central point of evaluation, a good working environment and skill and training track record are vital and important to secure for the future as these units cannot fail. As with the robotics innovation, the application to become a national centre is dependent upon and a manifestation of the influence and agency of the employees at the ward, and persons from a variety of personnel categories were involved in the writing of the application. Much of the activity around the application and its writing is not budgeted for, nor directly compensated for, relying on a great deal of voluntary or “discretionary” effort, on part of the ward and wider hospital staff. This also displays a high degree of commitment on behalf of the personnel to this project.

The application process in turn has led to extensive contacts and collaborations across the hospital, and significantly has also led to interrogating virtually all practices on the ward as these needed to be described and argued for (as discussed above). This process has set in motion an examination and in many cases changes in procedures and ways of doing things. This review process has also evidenced and been based on extensive employee involvement in workplace rethinking and change.

6.6 Knowledge sharing and collegial influence as the foundation for the SW-NETWORK organisational forms

SW-NETWORK is in itself an organisational form that is an adaptation to the strong organisational power of physicians in hospitals. (Boethius and Mathieu, 2017). The purpose of SW-NETWORK is to generate and

diffuse knowledge and practices regarding treatment of a specific illness via a collegial ‘voluntary’ adoption process based on negotiation and influence between units and colleagues, rather than administrative or political power. Paradoxically, though the model is national, and mandatorily spread to the healthcare regions of Sweden, the way it works is via collegial influence, driving up ideas from the grassroots, as well as evidence testing and evaluation.

Much of the work is project based and inter-occupational, combining research in medical/clinical domains with research and implementation on service, delivery and administrative dimensions. Diffusion is based on best-practice, collaborative and persuasive processes rather than top-down decision-making and command and control models, affording employees and organisational members’ opportunities to influence work and developments.

The members of SW-NETWORK who represent member hospitals/clinics are selected in part due to their legitimacy and authority to engage in negotiations within SW-NETWORK, as well as being able to persuade their constituents to act in accordance with SW-NETWORK’s recommendations (Boethius and Mathieu, 2017).

“...there’s some psychology in it. It is a question about credibility...if it is something in the health care area that we are tired of it is top down directives. They are all over the place. One of the most important things I used to teach my surgeons was to be ready to sort out all of it. We used to joke about it. We don’t need patients, we are all busy anyway. So if SW-NETWORK is to introduce a new process...it will be from a whole other credibility standpoint if I say it to my colleagues, because we know each other. And I have still a finger remaining in clinical work and will be affected myself by this (change). And I have, I hope, credibility, they know I’ve been working with this for 30 years. If I believe in it, so will we [the broader collegial circle].” (former Head of Unit IP2, SW-UNIVERSITY).

In sum, the form that SW-NETWORK takes is an adaptation to the organisational power of health professions in hospitals as well as a way of respecting and harnessing the engagement of healthcare professionals in forming organisational practice.

6.7 The aspect of discretion and power of specific occupations in the innovation process

In SP-PUBLIC, there is a highly centralised system of innovation development and implementation, with the implementation of technological innovations’ being the responsibility of the service unit in question, but always under the supervision and support of the Innovation Unit (Martín et al 2017b). However, the guidelines for establishing the pace of execution and the elements necessary are defined in a coordinated way between the Innovation Unit and the professionals themselves who, in the end, are the ones who possess the applied knowledge necessary to ensure the optimal development of the ideas. In the final phase, while there is no tendency to paralyse or discard innovations, it is the case that the moulding takes place in the final implementation of the innovations, given that “not everything suits everyone”, suggesting a degree of negotiation and discretion in adoption and implementation. Again, worth noting is the fact that these negotiations take place between the Innovation Management Unit (made up of a multidisciplinary team incorporating personnel with medical, technological, innovation technician and healthcare management profiles) and *professionals*, with no mention of lower occupational groups included in these negotiations (Martín et al 2017b).

What the latter two innovations discussed in this section show is the power of high-standing occupational groups, certainly physicians, possibly nurses to impact and facilitate innovations. The earlier innovations presented in this section indicate that the implemented innovations were dependent for their origins on employees' knowledge and skills – evidence of specific aspects of job quality. The latter two innovations demonstrate the power or control of specific personnel categories over decision-making processes – i.e. that the existence of innovations in their expressed form are the result of knowledge and skill, as well as their status and power.

7 Innovations oriented towards employment challenges in hospitals: impacts on and effects of job quality

7.1 Innovation per se as a component of job quality, and telemedicine to increase flexibility

At the Spanish public hospital (SP-PUBLIC), innovation efforts of a grander scale are only possible with external funding and external collaboration (Martín et al., 2017b). It was estimated that expenditure on innovation activities in the past 5 years totalled about € 1m in funding obtained from national (FIS) and EU (INTERREG, FP7, H2020) programmes. As the innovation manager at the hospital stated:

“Without external resources there are no possibilities of carrying out innovation projects. The organisation has a deficit of financial resources for its own activity, and therefore it is difficult to allocate extra resources to innovation.” (innovation manager, SP-PUBLIC).

In this sense, innovation activities, leading to opportunities to engage in research and development activities, and ensuing job quality aspects of learning opportunities, training and new skill acquisition are dependent upon securing external funding via collaborative innovation projects.

With the exception of one project oriented towards increasing patient involvement in their own healthcare process, the other major recent innovation projects are in the telemedicine field, either linking patients with healthcare professionals (consultation contact and monitoring), healthcare professionals with each other, or increasing diagnostic and therapeutic capabilities via different uses of telemedicine in somatic and psychiatric domains (Martín et al., 2017b). These innovations mix product (new technologies/technological platforms) and process innovation (use of these technologies in service delivery and inter-occupational contact), with the primary aim being able to create more geographic and temporal flexibility for patients, and healthcare workers in their occupational roles.

This flexibility is experienced as a positive improvement of job quality:

“In the project, I can access the data necessary to respond to patients, activate alarms, etc., from my phone or computer, and then from home I can activate, call the patient in situ, it's great.” (emergency services doctor, SP-PUBLIC).

As with most technologies that increase flexibility by lifting temporal, physical and spatial barriers, there is always also the risk of controlling boundaries, which can potentially lead to both the extensification and intensification of work. But at present, the flexibility for the doctor interviewed was experienced as positive. What should also be noted is that in the quote, the fact that this innovation was part of a project plays a role, and the routinisation of this more flexible work process will likely be accompanied by formal and informal negotiations about how these new opportunities (threats) are governed. Coupled with the

reported low degree of union affiliation and activity (Martín et al., 2017b), there is a risk that the two-edged sword that flexibility is (i.e. employer or employee advantageous flexibility) is negotiated in an asymmetric power relationship between hospital management and individual employees or groups of employees who in turn have varying degrees of power.

In addition to the flexibility entailed by the several telemedicine innovations, these innovations also entail a need for increased skills training and education, both in terms of using the ICT hard- and software, but also in terms of new capacities for diagnostic, therapeutic and care activities. A tripartite fit and continuous negotiation and adaptation based on perceived needs and benefits is discussed by the innovation manager:

“The process has to be accepted by users, appropriate to the priorities of the professionals, and a good fit with the strategies for the sector set by management. This is not a constraint: if organisational innovation is needed, it's done.” (innovation manager, SP-PUBLIC).

7.2 Structured training in peer-to-peer learning

An innovation at SP-PRIVATE aimed at improving both the quality of work and the quality of service provided by employees is a “new employee worksheet,” going through the main activities and procedures that the employee is expected to be familiar with after one month on the job (Martín et al 2017a). The worksheets are developed by an employee on the same ward that the new employee will work. Thus, this innovation promotes peer-to-peer learning, and is thereby premised upon the existing knowledge of current employees and their positive disposition towards training their colleagues. The worksheet provides a transparent and structured framework for this type of collegial knowledge transfer, making it clear to the new employees what they are expected to learn and by when, as well as providing the collegial trainer with a self-developed reference document. Analysing this context in terms of QuInnE’s job quality index, the collegial trainers enjoy greater task variety (training as well as production tasks), provide collegial and initially ‘supervisory’ support, and this scheme grants discretion to the trainers in devising the worksheets and defining what is important to know and learn. For the new employees, this system addresses health and safety issues, gives the new employee access to a “mentor” and peer-group social support, and facilitates systematic on the job training within a defined parameter.

7.3 Person-centeredness: altering and improving the quality of relationships

SW-CLINICAL is in the process of rolling out a programme aimed at altering the premises of the relationships between all actors in the healthcare process at the hospital. (Mathieu 2017) The core of the activity is an attempt to transform the basic content of relationships from that of an active subject acting on an object or role to an interaction between two active subjects, or persons. In other words moving away from a disposition that healthcare professionals meet patients to an encounter between two (or more) persons who all bring various resources and experiences of different types to a meeting focused on improving a condition or circumstance. This objectifies the condition and the resources, rather than the persons involved. The same orientation is practiced not just in the hospital staff-patient relationship, but also between the hospital staff members themselves – between managers and staff, and between staff members themselves.

This is an organisational innovation that does not change the structure of the relationships, but rather the qualitative content of relationships between hospital staff and patients and between the hospital staff members themselves. The basic job quality dimensions are to legitimate and elevate the status of the

personal encounter between “staff” and “patients” on the one hand by making this a recognised and management-supported activity and parameter, rather than a “peripheral” activity seen from management’s side, as well as laying the foundations for a different type of encounter between management and staff.

There is a symmetry between the ideological orientation of the programme – improving the quality of relationships and premises for dialogue between persons in the hospital environment – and the manner in which this innovation is carried out. There have been a series of dialogue meetings, starting with unit or ward managers about what “person-centeredness” means for the way the personnel in their units work with patients, as well as what this implies for the way they interact with their staff, and horizontally with the other ward or unit managers within their division of the hospital. The concrete changes that this innovation brings is a new and active premise for dialogue and negotiation in encounters between the various actors in the hospital setting, where aspirations and worries and personal and occupational resources and abilities that go beyond role encounters are brought up and utilised in making improvements. Again, this is both between staff and patients, as well as between management and employees and between staff members themselves. This programmatic change towards person-centeredness is also linked to the use of “individual care plans” where patients are to take an active role in planning their treatment and care, as well as the contemporaneous work at the hospital to become a more attractive employer and workplace in order to facilitate attraction and retention of sufficient levels and quality of staff.

7.4 The bright-spots and burdens of internships

The following discussion focuses on a more systematic means of distributing internships at SW-UNIVERSITY (Mathieu and Boethius, 2017a). It deals with occupations below the level of doctors, and focuses primarily on three occupations: nurses, assistant nurses and medical secretaries, though other groups such as social workers are also included.

Several challenges have led to changes in the way the hospital deals with its internship programmes. Three basic conditions have led to an increased focus on the importance of internships and an increased volume of participants in various internship programmes: 1) the high number of refugees and immigrants to Sweden, especially since 2015; 2) a general shortage of healthcare staff in all important categories (except doctors); and 3) general political mandate to improve employment prospects for vulnerable groups.

What was highlighted recurrently was the mindset that the people in the various internship positions “are our future co-workers.” This was expressed both from a strategic recruitment perspective, but also in terms of the need for quality training and meeting them in a professional and considerate manner. That it is “*very important for them to have a good experience here,*” as the responsible HR manager at SW-UNIVERSITY stated.

The fundamental change (or innovation) in this area is the systematisation of the internship programmes at the hospital, from what was an *ad hoc* means of placing people in internships to a (somewhat) more systematic means of dealing with internships. As the HR manager in charge of the internship programme stated “*I can no longer call around [to different wards] and they say, ‘yes we can take two or three’, everything has to be more systematic now.*”. There are two reasons given for this. The primary reason is the sheer volume of persons who need to be placed in internship positions. The responsible HR manager stated that of the 8000 educational internship places that the Region has, 4000 come through the hospital, of which 1000 are nurses. The other reason is that the groups that participate in the programmes are much

more varied and diverse. Despite the unitary nature of the hospital, in one location there is a computer system for registering most of the interns, while in the other location it is still done manually.

Training and education are part of the core responsibilities of a university hospital in Sweden, but as noted above, a shift in how this is thought and organised has taken place. Training and internships are seen as strategic dimensions of recruitment, which have become more important now that there are shortages of almost all staff. As the HR manager stated:

“We no longer recruit from the National Labour Exchange (Arbetsförmedlingen) but rather directly from institutions of higher education. We need to be there, not just in medical training programmes, but also at the school of social work, where we are once a week and have direct contact with the students to meet them before they come here. We then develop their competence in this environment, so they know what a University Hospital environment is like. We work the same way with assistant nurses, nurses and medical secretaries, we work allot with advisors, occupational training institutions, the adult education academy.” (HR manager IP6, SW-UNIVERSITY).

Internships at the hospital are important not just for the nursing education programme, but also for assistant nurses, as they cannot complete their education without an internship in emergency medical wards, even if they want to work in the social care as opposed to medical care sector. In all this puts a great deal of pressure on the internship system to deal with large volumes – not just in terms of booking internees into places, but finding places and especially making sure that the activities and advisors are of high quality.

Job quality is part of this development on several fronts. On the one hand, several interviewees (nurses and medical secretary) state that being involved in teaching students and new employees is one of the important and enjoyable aspects of being at a university hospital (i.e. being part of an education system and imparting new knowledge on students). In other words, this activity is one of the reasons for choosing to work in this setting. However, having interns is also demanding. The HR manager named above stated that the wards expect interns, but that *“it is taxing to have allot [or interns].”* Interns are not extra labour on the wards, but are persons who need attention and advising. In a situation characterised by work-intensification, in part due to too few nurses available on the labour market and employed by the hospital, having time to assist interns is problematic. This exacerbates work intensification by adding an extra task, and bifurcating the employee’s attention to the intern and their learning needs in addition to the employee’s initial tasks at hand. At the same time those advising the interns know that these are potential future colleagues, who can alleviate the labour shortage, and that the quality of their education and training also depends upon the quality of their internships. A second job quality dimension is that the hospital has increased the training given to the advisors in order to lift their skills in this teaching capacity. In other words, a lynchpin in this programme is developing the skills of the advisors, which the hospital invests in. thus the hospital recognises the learning and training implications of the internship programme, but due to a general lack of human resources, the problem of work intensification cannot be dealt with while the intrinsic satisfaction of teaching and assisting potential colleagues is highlighted as *“compensation.”*

7.5 Task-shifting as job-enrichment or purification

In one of the innovation projects in the realm of psychiatric care at SP-PUBLIC we see an example of a wider trend of task-shifting from one occupational group to another. In this case we see a shift of patient

follow-up tasks from higher level professions - doctors, psychiatrists, psychologists – to mental health nurses. This shift can be interpreted as improving the job quality of both professional categories, as it relieves the higher level professional strata of less qualified tasks, allowing them to concentrate on tasks where their professional knowledge and judgment is more necessary, while providing job enrichment by expanding the number and complexity of tasks for nurses upwards. The dimensions of expanded challenge, responsibility and task variation is taken up in the following quote from a nurse at SP-PUBLIC involved in a telemedicine psychiatric care innovation:

“As a nurse, the training and follow-up by telephone of the patients included in the project (patients with mild depression) has been transferred to me by the Mental Health Unit. In the case that I detected some alarm or symptom, I had a protocol for warning the psychiatrists/psychologists. The reaction is good, it's more work but it allows you to vary your tasks.” (nurse, SP-PUBLIC).

Worth noting is the fact that though tasks and frontline responsibility is shifted downward, there is a protocol and reporting procedure that allows the nurses receiving new tasks to always refer questionable or problematic matters back up to the psychiatrists/psychologists, meaning that the nurses are not put in an exposed and overwhelmed situation. While these changes entail doing work that was previously done by more qualified occupational groups and are additional tasks (no shedding of tasks from psychiatric nurses was reported), no changes in either pay or working hours was reported. As the hospital staff are public employees, their salaries are linked to national and regional statutes and schedules, and not impacted by task-shifting. Looking at the situation from the opposite perspective, how dimensions of job quality impact innovation, one can say that the nurses have a positive disposition to taking on these tasks (accepting the innovation), as well as a skill level to do so in a capable manner (ability to carry out the innovation). While task-shifting in this and other cases is a matter of relieving more senior occupations of tasks that they previously had but can be accomplished by lower occupational categories, the innovation manager at the hospital stated that the general trend goes in the other direction, towards increased specialisation as a result of innovations, leading to *“a reduction [in the volume of work] for the lower categories and an increase for the higher ones”* (Martín et al, 2017b).

In SW-UNIVERSITY there are also examples of task-shifting (Mathieu and Boethius 2017a). One recurrent issue during the interviews had to do with the labour shortages and lack of nurses available to work in the hospital sector. Task shifting, job shifting or work shifting were all terms used to describe innovations needed or implemented to solve this problem.

The goal with job shifting is to use the right resources and competence in the health care in the best and most effective way. This can be done in mainly two ways:

- Task/job shifting between professions/occupations,
- Task/job shifting between care levels (*vårdnivåer* – i.e. what gets carried out at hospitals versus primary and other care facilities).

In the case at hand, the innovation focus on task shifting between professions. In an official report from the Swedish government it is recognised that there is a great possibility to make the health sector more effective by reorganising tasks and make better use of the competence already inside the hospitals (SOU, 2016:2; also Lindberg and Rosenkvist, 2003). This is also something that is discussed by our interviewees. However, instead of a general push towards organisational efficiency, the primary animating factor behind task shifting at SW-UNIVERSITY was an acute shortage of nurses, and to a lesser extent other occupational

categories. One way to tackle this challenge is to swop tasks between co-workers within a ward from one profession or occupation to another. This is a way of refining some professions/occupations, taking away tasks from one over-worked group and having the task done by members of other professions/occupations. For example, this can mean that some of the administrative tasks could be taken from doctors and/or nurse and shifted downwards, as in the Spanish case above. Sometimes job shifting resulted in creating new occupations or bringing in new professions to a ward. It also became apparent that job shifting not only made the work more efficient but also improved the job quality as such for the personnel by allowing them to concentrate on primary tasks (i.e. reducing job variety).

One example of how a new occupation was created due to task shifting making job quality better for nurses and assistant nurses, was given by a nurse, working in a unit for intensive care for newly born:

“A really big change for the staff was something that happened a year, a year and a half ago, when we got personnel working in the milk-kitchen permanently, doing the preparations, all the protein powders and weighing the food for the babies. That was a big difference for us...”
(nurse IP16, SW-UNIVERSITY).

The impact of this innovation on job quality is primarily the possibility for the assistant nurses and nurses to manage their limited time differently. The milk preparation used to be a task belonging to the assistant nurses. Every day the assistant nurses spent some time in the milk kitchen preparing milk for the infants, and were during this time replaced in the patients’ rooms by a nurse. This was no longer needed by having a person in the milk kitchen permanently.

The interviewed nurse described later on in the interview how the implementation of the new occupation was hard for some assistant nurses to accept in the beginning, because being in the milk kitchen gave the assistant nurses a possibility to get out of the patient’s rooms for a short time, but how after three months none of the assistant nurses wanted the task back due to better job quality. The task shifting not only made it safer for the patients, having the same person preparing the food and milk, but it also made it possible for the assistant nurses (and the nurses that replaced the assistant nurses in the patient’s rooms) to spend more time with the patients and other job quality increasing tasks:

“We now have more time with the patient in the room and for the babies and parents. We have more time for lunch and breakfast and I think everybody would agree. It is 20 to 40 minutes per patient and room we save, and that is a lot of time.” (nurse IP 16, SW-UNIVERSITY).

Another example of when task shifting has created a new job, staffed by a new profession to the ward can be taken from the same ward, neonatal intensive care. In this case the head of the ward decided to create a new role at the clinic for which a different profession was qualified. This innovation, a pharmacist mixing and preparing all the medicine and injections for the infants, brought in a new profession to a task that before belonged to the nurses. This innovation was also a response to the lack of available nurses. With no available nurses to hire, this innovation was a way of using the existing nurses in a more efficient way. Instead of hiring more nurses they spent their budget on hiring a pharmacist, offering the existing nurses a possibility to get rid of a time-consuming task. This new profession in the unit made it possible for the nurses to spend more time with the patients and to do other profession-specific tasks. A nurse interviewed estimated that every nurse in the unit saved 40 minutes per shift by this innovation. This is described as being an increase for job quality.

“We are under less time pressure and are able to finish more things before we go to lunch and we have more time for the babies and families, one does not have to stress. We are not supposed to do that. This is a very special type of care.” (nurse, IP 16, SW-UNIVERSITY).

7.6 The best of both worlds? The internal temporary staffing agency

Demands from two different points of origin have led to the creation of an internal temporary staffing agency (ITSA) at SW-UNIVERSITY. What in effect is a temporary work agency (TWA) organised within the hospital meets an organisational need for staff to fill short-term urgent vacancies at the hospital while at the same time meeting a demand from some employees for more flexibility, control and variety in their work life. These are the same factors found in a Finnish study on what healthcare professional find appealing about working via TWAs rather than direct contracts with hospitals or healthcare facilities (Palukka and Tiilikka, 2011) At the moment, the ITSA functions as a means of being able to retain highly skilled and experienced workers within the hospital (preventing them from leaving for commercial temporary work agencies, other occupations, or other domestic or international employers) and reduce reliance on commercial temporary work agencies (Mathieu and Boethius, 2017a). However, the origins of the ITSA lie in the opposite situation, so here we see how an innovation can fill not just a variety of demands, but also demands under diametrically opposite conditions. The ITSA started as a project 1997-1999 to meet the challenges of having too many nursing assistants, but at the same time wanting to keep all the nursing assistants employed at the hospital. This because it was predicted that this oversupply of nursing assistants would not be the case for ever. The ITSA became the solution making it possible to keep less experienced nursing assistants at the hospital until they were needed in the hospital clinics again.

The idea of the ITSA came from two HR-specialists (Mathieu and Boethius, 2017a). Nursing assistants with a lot of work experience were asked to join the team, making it possible to keep the less experienced nursing assistants working out in the hospital wards. Experienced nursing assistants could work effectively in a variety of new contexts and ‘hit the ground running’ making them ideal for filling temporary vacancies, while less experienced nursing assistants would be kept in more stable environments facilitating learning and training and being supervised to a higher degree than their more experienced colleagues in the ITSA. In 2000 the ITSA became a permanent unit at the hospital.

At the end of the 1990’s, the hospital started to face another challenge regarding its work force, an awareness that there was starting to be a lack of nurses. The ITSA was asked to expand their activity to meet also this challenge. Nurses as well as nursing assistants were included in the team and in January 2000, 15 nursing assistants and 15 nurses was a part of the ITSA-team (Mathieu and Boethius, 2017a). Today ITSA has expanded their team even more, and now includes nursing assistants, general nurses, specialist nurses, medical secretaries, and a couple of interim managers, with 100 employees, all offered a full-time employment. The ITSA is now also working to be able to include doctors in the future.

The ITSA administration is financed by the hospital but the rest of the unit is income financed, meaning that the ITSA has no budget of its own, obtaining the money for salaries and other personnel costs by hiring out their staff per hour.

The employees of the ITSA have a highly flexible work situation, working in many different units every month, sometimes up to 5 different units in one week. Often the team members first are informed about where they are going to work the day before, making flexibility an important skill.

Job quality is crucial to this development. The whole system depends upon this being an attractive form of work for experienced healthcare workers. The job quality benefits raised in interviews are as follow:

- To be able to influence one’s schedule and work situation
 - To be able to work more during some periods of the year, and less other parts (making it possible to get more days off in a row in preferable seasons)
 - Influence over weekly schedule and work time (this works out well for divorced parents, being able to work less the week they have the kids and more when not having the kids. It also works out well for team members that want a specific day of the week off all year round).
- To be able to work in different units in the hospital
 - See many different units, get a comprehensive view
 - Various work tasks
 - Exiting to have a different day every day.
- To not be fully a part of the units, being a consult
 - No need to be a part of conflicts
 - Being able to focus on the work tasks
- Still be a part of a unit
 - Not alone, having co-workers in the team
 - Having a manager close by
- To be a specialised generalist
 - To have the opportunity to learn a little about a lot
 - To be able to do various tasks
 - Great possibilities for development
 - Be able to spread knowledge from one unit to another
- Income:
 - ITSA employees earn an additional 5000 SEK [ca €550] / month above their occupational wage.

The vast majority of individuals in the ITSA-team are female – although there are more men proportionately in the team than at the hospital in whole. The flexible work skills needed and the character of the units that often employ ITSA workers (trauma/emergency units) are explanations given by a manager of the ITSA, SW-UNIVERSITY, as to why working in the ITSA team may be more appealing for men.

With regard to employment, the ITSA wants to be an alternative employment option for workers at the hospital, leading staff to stay within the hospital rather than going to temporary work agencies outside the hospital organisation. This reduces costs and increases reliability for the hospital. The ITSA-unit also works closely with the HR department of the hospital in contact with nurses that have been outside the labour market for a longer time. The cooperation between ITSA and the HR department is designed to make it possible for nurses that need to expand their competence to follow along with a nurse from the ITSA-team as a type of mentee, making it possible for the mentee to obtain wide insight into work and opportunities at the hospital. Thus, this innovation seeks to have a direct impact on employment levels, employment conditions via job quality improvements.

One challenge for the ITSA-team is to find workers with the right competence. A manager for the ITSA, explains:

“We need more nurses, we need more nursing assistants with the competences that our nursing assistants have, because our nursing assistants have the old education, and the old type of experiences, the newly graduated nursing assistants we get today they do not have the competence needed for working in emergency care, even if they have the education called ‘emergency care for nursing assistants’ they have very little competence for this. And today when we look at this with work shifting, and that other categories should do some of the work that the nurses do, this leads to greater requirements for competence for the nursing assistants, so we need more from the old tribe, with the old education. “(manager IP 18, SW-UNIVERSITY).

Another problem is to recruit people from outside the hospital, rather than poaching. This manager continues:

“One dilemma for us is when we advertise (for new employees at the ITSA), we do have a lot of candidates, but we want people from outside, the optimum is to find people that are working at external temporary staffing agencies. To get these people to the hospital. To steal people from inside the hospital clinics takes us nowhere, to empty the hospital units.” (manager IP18, SW-UNIVERSITY).

This problem with not getting enough candidates from outside the hospital sometimes leads the unit withdraw positions, even though many people from within the hospital want the job. The ITSA wants to bring in employees from the external temporary work agencies, but the wages are higher in the external temporary work agencies and they have an even more flexible work situation and greater possibilities to impact their work time, making this a difficult task. This organisational innovation can be seen as a hybrid measure attempting to meet workforce challenges by to a limited degree mirroring the attractive dimensions of TWAs, while at the same time drawing upon and reinforcing sentiments of organisational loyalty and doing good, rather than a preoccupation with personal wages and working conditions.

8 Innovation, job quality and employment effects on particular groups: Women, immigrants, youth and the low-skilled

Healthcare is a largely field with a large majority of female employees. Work-Life balance issues are of central importance, as women to a much larger extent also have domestic care responsibilities than men (the so-called second shift, Hochschild and Machung, 2012). The ranks of physicians in Sweden already has a female dominance and is continuing to feminise. In 2014 there were 16 404 male physicians, and 17 016 female physicians, with the figures for 2015 being 16 582 male physicians and 17 383 female physicians (SCB 2017; also Huzzard 2016). All other healthcare occupations have clear female majorities.

In Spain, the situation is similar, 73.4% of healthcare jobs are carried out by women compared to the 26.4% that men do. In 2016 there were 247.974 physicians of which 124.608 (50.25%) were men and 123.366 women (49.75%) (RegioPlus Consulting, 2016)

Physicians’ time is more strictly regulated and there is not the same deficit of doctors as there is of nurses. Where there are too few doctors, wards are closed or patients are transferred to other facilities. The chronic understaffing of nurses is dealt with through overtime.

The establishment of the international care ward at the Spanish private hospital was facilitated by the presence of skilled immigrant labour (nursing training) with mother-tongue language skills in minor, but highly relevant European languages. These immigrants come primarily from other EU countries (Martín et al 2017a). The impact of immigration and immigrants on innovation in the Swedish cases is discussed below.

In one Swedish case, SW-UNIVERSITY, we have documented evidence of efforts to bring in low-skilled, often first or second-generation immigrant youths, both male and female, into employment in the hospital/healthcare sector (Mathieu and Boethius, 2017a). The programme uses targeted internships to incorporate disadvantaged groups into the labour market and hospital work in specific. The groups targeted are recently arrived immigrants who have some training and/or work experience in healthcare, who lack Swedish language skills and familiarity with the Swedish healthcare system and work practices, and low-skilled/educated youths. As discussed below, this is part of a political mandate from both the county [Regional] government, and the city government where part of the hospital is situated. Thus, being a public sector entity and responsive to the political context and demands of local authorities plays a key role in expanding the programme. In addition to being a programme directly oriented towards providing a stepping stone into the healthcare labour market for disadvantaged groups, the fact that this clientele has increased rapidly in the past couple of years, as well as including new groups, innovations in how the hospital's internship programme functions have been made in response to the increased volume and diversity of interns.

As a HR manager at SW-UNIVERSITY stated several times, “*new groups and categories [of interns] crop up all the time*” and that these groups demand specific and novel solutions. The following extended quote from this HR manager takes up these central themes:

“And now we have recent immigrants and persons with foreign [medical/care] educations, and they need much longer internship periods. First they need to have a language-training internship of varying lengths, and then they can do their internships. And there are more and more of these persons. When they have completed their internships they can go out and work immediately, but before that there is an awful lot of guidance, because we don't really know at what level they are. And then there are the youth interns who also need places. We have three periods a year where 50 youths come out in each period. So here there are 150 young people between 18-24 years old without an (secondary) education who also need internships. And there are more and more all the time, and now they want to start a new trainee programme. And then some of these youth workers discover that they want to be assistant nurses or something else in the healthcare sector and then we have to be ready to take them too the following autumn in some form of 50% education, 50% internship. So they get into an education programme that the City of XX arranges, but the internships, we need to find places for them.” (HR manager IP6, SW-UNIVERSITY).

These groups are deemed as important both for alleviating the short supply of various types of care workers, but also because these are socially and politically prioritised groups. Among the employees at the hospital interviewed, nurses and HR staff there was a feeling that this was socially responsible behavior and something to be proud of which was recognised across the hospital even if it posed challenges. But the HR manager also brought up that there is an institutional dimension behind these activities. She stated that there are agreements with different actors (and the involvement of the City of XX mentioned above

indicates this) from the Region to municipalities to educational institutions. This came up in a discussion with the same HR Manager about how the internship process works and is changing:

“We are not there yet, we cannot prioritise now [who and how many], maybe soon. One of our goals is to map this and see what it looks like. But we also have agreements that are made at the Regional level that we have to take into consideration, and its written into these agreements that we have to take on these people somewhere, and it keeps increasing and there are more and more categories [of people to create internships for] so we have to systematise what we do. Is it written that we have to have them during dayshifts, or these exact weeks, or can we turn things upside-down? We already have some working evenings, night and weekends.” (HR manager IP6, SW-UNIVERSITY).

What we hear in the quote above is essentially that the increased volume and diversity of the persons to be placed in internships causes a rethinking of how the internship programme is run, especially as there are limited resources as summed up in the following statement: *“All the while there is an increase in more and more different groups that have to come out on the same floorspace and volume of patients.”*. Here we see the parameters of time, attention, space and case that are limited and have to be used for the dual purposes of care (the highest priority) and training that both require and contribute to different dimensions of job quality.

With regard to the increased number of immigrants and refugees as patients (as opposed to those who are moving into care occupations discussed above), a couple of other situations arise. One is the fact that this increasing sector of the patient population leads to linguistic and cultural skills among care staff becoming recognised and important (as in the Spanish private hospital case discussed above, though in this case the target group is tourists rather than permanent residents) and increases the importance and recognition of integrating immigrants, especially those with healthcare occupation backgrounds, into the Swedish healthcare system as quickly as possible. There is a national programme for “fast-tracking” immigrants with qualifications in high demand occupations onto the Swedish labour market as well (Vårdfokus, 2015a). The second dimension is that many of these patients fall under the authority of the National Immigration Board or other authorities, so new activities and even positions for administratively coordinating and dealing with this diversity have been created at the hospital.

9 Discussion

Job quality and innovation cannot be disentangled as there is such a high degree of reciprocally generative and impact dynamics in the relationship between innovation and job quality. This is the reason for presenting the qualitative material above thematically, and in a manner that preserves the contextual and interactive processual dimensions of the phenomena. Having established a processual and interactive understanding, here in the discussion it is possible to pick out specific factors, not as independent variables, but as significant contributors to processes and outcomes.

Revisiting the six QulnnE job quality dimensions, the following observations can be derived from the qualitative case studies for the hospital sector in Spain and Sweden.

9.1 Wages

Wage levels are deemed generally appropriate and unproblematic in Spain. In Sweden, the wage levels of especially nurses is accorded blame for many nurses leaving the profession, or choosing to be employed by commercial temporary work agencies and hired by the hospitals at a higher hourly wage (Vårdfokus 2015b). This higher hourly wage is split between the worker (nurse) and the temporary work agency, resulting in a situation where temporary agency workers earn more than equivalent permanently employees (Huzzard, 2016: 4). In our interviews in Sweden, it was clear that two issues stand out as reasons for persons in medical occupations choosing to work for temporary work agencies rather than in direct employment at a healthcare facility. One is control over scheduling, the other is wages. The internal temporary staffing innovation discussed above pays about €550 per month above the basic occupational wage level. Comparatively low wages in relationship to emotionally and temporally taxing working conditions coupled with perceived low career-advancement opportunities are also given blame for too few persons choosing nursing (as well as other care and hospital work) occupations. This causes several of the innovations discussed above – the internal temporary staffing agency (ITSA), task-shifting, and the programme to become a more attractive workplace and employer at SW-CLINICAL in Sweden, and the opening of the international care ward at SP-PRIVATE in Spain has resulted in higher wages for some healthcare professional on this ward, possibly due to a recognition and compensation for language and cultural skills that previous went unrecognised and unrewarded.

In the case studies we see wages as being both causes and consequences of innovations in different respects. Dissatisfaction with wage levels in Sweden is a partial contributor to recruitment problems and more or less chronic understaffing at both Swedish hospitals in certain occupational categories, leading to both innovative attempts to deal with and remedy this situation, as well as negative impacts on other aspects of job quality, such as training and temporal issues discussed below (in SW-CLINICAL, the lack of key care professional staff has led to closing wards, Mathieu, 2017). On the other hand, satisfaction with wage levels leads to lower employee turnover, leading to workplace stability and participation that is innovation conducive (Gallie, 2017).

9.2 Employment quality

In Spain, the share of hospital employees on *temporary contracts* is high and rising in both the public and private sectors. While the impacts of this for job quality and innovation in general can only be extrapolated, as stated above, workplace stability is generally associated with innovative capacity, and the example of the peer-to-peer learning worksheets in SP-PRIVATE is related to employment quality both with regard to ability and willingness to train new employees (Martín et al, 2017a).

As the majority of the cases are of public sector workplaces with high union coverage, if not activity, *job security* is promoted by both a regulatory regime of national labour laws and collective bargaining agreements and current high demand for personnel in healthcare occupations. While these two factors currently reinforce each other, leading to a generally high degree of job security, it is worth recalling that the origins of the internal temporary staffing agency at SW-UNIVERSITY was in a period where there was an oversupply of nursing assistants, and this was a means of keeping this overabundance of labour close to the hospital and regional healthcare sector, for both organisational strategic as well as labour relations reasons. Job security and workplace employment stability is also a central background variable leading to the large “discretionary” investment of time and effort in the National Specialised Medical Care

application, and the use of the surgery robot (due to the steep and long learning curve required for team members).

Involuntary part-time or fewer *working hours* than desired is rare in our case studies. It is rather the opposite, either being compelled to work overtime or feeling obligated due to feelings of commitment to patients, colleagues or one's supervisor that can lead to working more hours in a specific period than desired. Again, this is most frequent in contexts with temporary or chronic understaffing. Most of the innovations discussed above relevant to this domain seek to alleviate involuntary long hours or overtime, rather than increasing it. One exception is the application to become a National Specialised Medical Care centre, which temporarily (but under several months) increased work intensification and extensification – both compensated for and uncompensated. While this can be seen as a one-off activity of high and broad interest, rather than something that is regularly scheduled or recurrent, healthcare is prone to medically and organisationally critical events that frequently demand overtime (Mathieu and Boethius, 2017b).

Internal progression opportunities are found both within and between occupational categories in hospitals, as these are hierarchically arranged, as well as entering the 'management' or administrative stream of the hospital. However, mobility both within and between occupational categories is usually dependent upon returning to formal education or training in order to become a specialist nurse or doctor (the internal ladder within these professions) or to go from nursing assistant to nurse, for example. An example of internal progression opportunities opened by innovations is the international care ward in SP-PRIVATE: Most of the other innovations discussed have to do with horizontal progression opportunities – such as the opening up of more research and diffusion activities in various occupational groups in SW-NETWORK, the ITSA in SW-UNIVERSITY which allows persons in specific occupational categories to work broadly across the hospital instead of being employed in a single ward, robot surgery which opens up a new area of specialisation for doctors, nurses and nursing assistants. The other progression opportunity is to become an administrator or manager of a ward, or division, or become an organisation developer. These avenues are attractive in the sense that they do not require studying a full-time educational course, but rather internal competence development, but they also lead the individual out of the occupation they are trained for and practiced, and into a different occupation, but one with increased decision making and organisational influence capacities.

9.3 Education and Training

As mentioned above, most occupations in healthcare require some degree of formal educational qualifications, and frequently certifications. Hospitals also usually are part of the formal occupational training system, meaning that employees at hospitals usually have gone through formal training, frequently can move up within and between occupations via reentry into the formal education system, and also often are engaged in teaching or advisement activities a part of their job for interns or students placed at the hospitals. This double role in the formal education system is supplemented by various forms of in-employment on-the-job training. Thus most employees in healthcare are regularly exposed to formal education as students and advisors/mentors, as well as workplace based competence development. Some innovations, such as the "new employee worksheet" at SP-PRIVATE are direct examples of peer-to-peer job training, whereas the formal and informal learning in the robot surgery team is a combination of formal training from the company that developed the robot, study trips to other surgical wards internationally that use robots, and a large degree of internal, informal experimentation, knowledge development and transfer. While in interviews training levels and quality were reported as satisfactory, in interviews with regard to the ITSA it was reported that older workers who had the older formal training and broad hospital

experience were those who had the requisite competence and ability to work as temporaries across the hospital, and that younger employees who have gone through formal training more recently were less capable and suitable to work for the ITSA.

9.4 Working conditions

Autonomy and discretion are central to the work of all professions (Freidson, 2001), even heteronomous professions (Scott 1965). As noted above, there are two authority systems in hospitals – the medical authority system headed by doctors, under which nurses have a degree of autonomy with regard to care (in distinction to treatment), and an organisational or authority system, headed by hospital or medical group directors, with cascading managers down to the ward manager or supervisor. The notion of heteronomy qualifies autonomy, indicating that different power structures exert power over, but also are channels upwards for, various occupational groups. The most striking example of adaptation to the complex power relations found at hospitals is the basic manner in which SW-NETWORK operates, as a collegial soft-governance organ seeking to persuade and diffuse evidence based practice in treatment of a specific illness based on knowledge creation and dissemination via respected representatives from partner hospitals (Boethius and Mathieu, 2017). A similar respect for and deference to professional knowledge and power is found in SP-PUBLIC with reference to the professionals at the implementing unit in question having the final say on adaptations of proposed innovations. The two major innovations at SW-WARD, the acquisition and use of the surgery robot and the application to become a National Specialised Medical Care Centre were physician-led initiatives (Mathieu and Boethius 2017b). The work of the robot team is an example of a specialised work team with broad ranging autonomy, which clearly has led to its innovative practices discussed above.

With regard to *job variety* we see tendencies towards both narrowing and broadening as results of innovations. The ITSA can be seen as broadening the jobs of those who work on a temporary basis across the hospital in terms of the locations they carry out their work in varying almost day to day, which probably also entails doing different tasks as well as the same tasks in different ways, in different locations. This was indirectly corroborated by the head manager of the ITSA in an interview stated that only workers with vast experience and broad competence can work well in this type of position. So the ITSA draws upon, and further develops job variety in several ways. The application to become a National Specialised Medical Care Centre is also based explicitly on a desire to retain the opportunity to treat (and increase the treatment volume) for three basic diagnoses. If successful, this application will retain and expand job variety for doctors and nurses; if unsuccessful, this will slightly decline as these patients vanish from the hospital. The most explicit examples of an innovation that directly targets job variety is task- or job-shifting. Here the tendency in Spain as well as Sweden is towards ‘purifying’ specific jobs by taking tasks that can be accomplished by other employees (and cheaper employees in the case of downward shifting). The task-shifting in SP-PUBLIC was downward, with follow-up activities transferred from psychiatrists to nurses, though a hospital administrator commented that the general tendency was towards more sophisticated, high qualified jobs (Martín et al., 2017b). Two examples of task- or job-shifting in Sweden discussed went in different directions. Relieving nurses of tasks in the milk-kitchen on the neo-natal intensive care ward turned these tasks over to less formally qualified personnel (Mathieu and Boethius, 2017a). With regard to preparing medicine for patients on one of the wards, the task was turned over from nurses to another profession – pharmacists, who may not be cheaper, but are in greater supply than nurses. All of these are examples of ‘purifying’ or reducing task variety in jobs, with the exception of the Spanish case where the devolution of tasks from psychiatrists to nurses was a welcome increase in tasks for the nurses, especially

as this this was supplemented by a detailed protocol to be followed and support in cases where this was needed.

9.5 Work-Life Balance

The primary problematic issue, especially for nurses, but also physicians to a lesser degree, has to do with *working hours* and to a certain extent *job intensity*. As healthcare is a round the clock activity, medical care staff is required to work evening and night shifts, with doctors being on call at certain times during a weekly or monthly schedule. These temporal issues lead some doctors and nurses to choose to work in primary as opposed to specialist care fields, where working time can be better regulated (i.e. only working normal office hours). One local innovation spoken about in SW-UNIVERSITY, but not discussed explicitly above is an agreement between the Region as employer and the nursing trade unions to reduce the total full-time workweek for personnel who continuously (rather than on a rotation basis) work night shifts to 32 hours, as opposed to 40 hours for a fulltime workweek at the local level (Mathieu and Boethius, 2017a). Those who work 20% night shift work a 36 hour week, and those who work 30% night work 34 hours. This reduction of total hours for employees who regularly work night-shifts is to both ease work-life balance as well as improve physical health and recuperation effects of night work. Scheduling flexibility is accomplished both in direct communication between employees and their supervisors as well as informal shift-swapping between members of the same occupational groups. The efforts of SW-CLINICAL to become a more attractive employer directly target work-life balance issues, including scheduling, flexible holiday periods, and mixing work and education. Though healthcare is largely based on physical presence and co-presence of care and treatment professionals with patients, the extensive experiments with various forms of telemedicine in SP-PUBLIC promise to lessen the current demands for physical co-presence, potentially increasing opportunities for increased work-life balance via temporal and physical flexibility.

9.6 Consultative participation and collective representation

Other QuInnE findings (Muñoz-de-Bustillo, 2017) show that innovative companies have a higher percentage of managers than non-innovative companies. A generative hypothesis is that managers are more creative, having been promoted to managerial positions because of their creative capacity or contribution to innovation activities (Cohn et al., 2008). A different hypothesis, which seems to be borne out in the investigation of hospitals, is that two parallel power structures coexist in hospitals – one administrative (with managers per se), the other medical (with decision-making prerogatives within the medical sphere and influence on organisational issues), and that doctors enjoy a position as highly empowered actors who are based in the operative dimensions of the hospital – clinical, research and training – but also have a high degree of influence within the hospital, even on major innovation initiatives, like the acquisition of a surgery robot and the application to be a National Specialised Medical Care Centre which were both initiated and driven by physicians. Final ratification or acceptance of the task-shifting at SW-UNIVERSITY were also subject to acceptance from the nurses involved, and in both cases resulted in comprehensive acceptance and appreciation of the innovations. The actions of SW-CLINICAL to become a more attractive employer comprise of active formal consultation with current and potential employees and their union representatives to ascertain what can be done to attain the ends of becoming a more attractive employer and facilitating recruitment. The directly abovementioned innovation in terms of a reduction of working hours for nurses working night shifts is a result of direct negotiations between the unions representing nurses and the Region as employer showing that collective representation is also a significant channel for innovation in the hospital sector.

10 Conclusion

As mentioned above, job quality, innovation and employment outcomes are inextricably intertwined in most cases, and largely recursive. Complex causalities of problems and solutions permeate the case studies. Many of these revolve around staffing issues. Both the Swedish and the Spanish public hospital case are set against a backdrop of seeking innovative solutions to shortages of skilled staff. Solutions range from the attempts to become a more attractive employer in part by altering the quality of intra-staff relations, staff management relations and the staff-patient relationships at SW-CLINICAL to the investments in telemedicine allowing the staff and hospital more geographic flexibility at SP-PUBLIC, to the expansion and systematisation of the internship programmes at SW-UNIVERSITY, the founding of the ITSA at SW-UNIVERSITY, the efforts to retain treatment opportunities at SW-WARD via the application to become a National Specialised Medical Care centre, to the task-shifting innovations found across the cases. Most of these activities are oriented towards improving various aspects of job quality, primarily in the realms of temporal and geographic flexibility, and improved education and training.

A concurrent thread running through many of the cases discussed above is the power of certain occupational groups. One element of power derives from the structural factor of a broad shortage of skilled labour, especially nurses. This however is set in most cases in a non-market setting of public finance which leads to innovations seeking to improve conditions other than wages. The other parameter of power is the double power structure within hospitals with a managerial power system and a medical power system. The medical power system, with physicians at its pinnacle creates an opportunity to initiate innovations, such as the purchase of the surgery robot in SW-UNIVERSITY, the initiative to become a National Specialised Medical Care centre, as well as a myriad of smaller incremental local innovations. Recognition of the implementation and even veto power in the medical hierarchy is found clearly in the SP-PUBLIC case, as well as the basic structure of the SW-NETWORK. Associated with this is the power to experiment at the local level with various products and procedures which derives from the autonomy afforded by the professional discretion that healthcare professionals experience, even under conditions of heteronomy (Scott, 1965). This opportunity to experiment and develop new initiatives is simultaneously the basis for innovative workplaces – i.e. generating innovations, and even accepting innovations as there is an experienced opportunity to adapt and modify imported innovations – as well as central plank in job quality touching on both autonomy and influence as well as learning and skill development.

11 References

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12 List of Case Study Reports and Industry Profiles

| Case studies | |
|-------------------|---|
| SP-PRIVATE | Martín, F., Corchado, L. and Fernández, N. (2017a). <i>SP-PRIVATE - Private Hospital</i> . Case study report for WP6 of the QuInnE project. Unpublished manuscript. |
| SP-PUBLIC | Martín, F., Corchado, L. and Fernández, N. (2017b). <i>SP-PUBLIC – Public Hospital</i> . Case study report for WP6 of the QuInnE project. Unpublished manuscript. |
| SW-NETWORK | Boethius, S. and Mathieu, C. (2017). <i>SW-NETWORK</i> . Case study report for WP6 of the QuInnE project. Unpublished manuscript. |
| SW-CLINICAL | Mathieu, C. (2017). <i>SW-CLINICAL</i> . Case study report for WP6 of the QuInnE project. Unpublished manuscript. |
| SW-UNIVERSITY | Mathieu, C., and Boethius, S. (2017a). <i>SW-UNIVERSITY</i> . Case study report for WP6 of the QuInnE project. Unpublished manuscript. |
| SW-WARD | Mathieu, C., and Boethius, S. (2017b). <i>SW-WARD</i> . Case study report for WP6 of the QuInnE project. Unpublished manuscript. |
| Industry Profiles | |
| Spain | RegioPlus Consulting (2016). <i>Industry Profile: Health Care – Spain</i> . Report for WP6 of the QuInnE project. Unpublished Manuscript. |
| Sweden | Huzzard, T. (2016). <i>Industry profile: Health Care – Sweden</i> . Report for WP6 of the QuInnE project. Unpublished manuscript. |

13 Annex –Summaries of Case Studies

SP-Private hospital (Martín et al., 2017a)

Brief characteristics of the company's structure and business strategy

Origin and type of activity: Private hospital which operates as a medical service provision centre for the different branches of medicine.

Number of employees: Since the inauguration of the hospital there has been a rapid increase in its workforce. It currently has 556 workers, including the nurses, porters and other workers belonging to the internal structure of the hospital. Growth has been dizzying from the start: just in the last two years 200 people have been hired due to the opening of new wards and new specialities. Of the total of workers, 46.40% have a permanent full-time contract, 7.19% have a permanent part-time contract, 28.96% have a temporary full-time contract and 17.45% have a temporary part-time contract

The hospital operates as a medical service provision centre for the different branches of medicine. Overall management of the hospital is performed through the operation of two companies: one is responsible for the healthcare itself and is primarily made up of healthcare personnel (nurses, assistants, porters, etc.) and the other is essentially a services sector company supporting the hospital work (maintenance, kitchen and cleaning). There is also the work of dealing with the insurers and OHS, which takes place at a third level. Similarly, it should be highlighted that all the medical staff (doctors) are external to the company, as will be explained later.

Important innovations in recent past

Innovation constitutes a basic pillar in the management and operational strategy of the hospital, and continually, new technology is acquired, new medical procedures are implemented, or the organisation is restructured, at this young centre.

The hospital implements technological, organisational and procedural innovations. In general, new technologies tend to imply changes for the better in the daily work activity of workers, as the tasks become simplified. Given the different types of innovations, the setting up of the "International patient care unit" has been selected as an innovation to be analysed in depth.

Key findings on interrelationships between innovation, job quality, employment and inclusiveness

Likewise, the new technologies affect the work-life balance in different ways, depending on the purpose of each and what it is like. For instance, all the IT improvements in the area of information handling are intended to eliminate rudimentary tasks in patient management and monitoring and to make the activity simpler, so reducing the working time needed.

The most positive consequences for job quality have been the result of the enhanced value of the abilities of the workers. This has increased their motivation. Indeed, two jobs directly related to the setting up of this unit have been created. The consequences for workers of the creation of the International patient care unit, as an innovation, are scattered, and are related to specific profiles. This is a social innovation which can be easily extrapolated to other healthcare centres which find themselves in similar situations, addressing the potential market.

SP-Public hospital (Martín et al., 2017b)**Brief characteristics of the companies' structure and business strategy**

Origin and type of activity: This is an acute care hospital built in the 1980s, which currently has 160 hospital beds and 5 operating theatres. For outpatients, it has consulting rooms both in the hospital itself and in two specialist medical centres, lying 17 and 75 km away respectively. In primary care, there are 14 health centres and 136 doctor's surgeries. The social healthcare centre has 10 long-stay beds

Number of employees: The hospital, which had 312 workers when it opened, currently has a workforce of 800, and manages over 1000 contracts, including permanent and temporary workers and monthly substitutes.

The sector is divided into fifteen health zones, each of which is led by a health centre where primary care is offered around the clock. There is one general hospital located in the middle of the territory, which has two specialist centres, and we also find a social health centre in the extreme south of the sector.

Important innovations in recent past

It is considered in practice as a necessary element for getting the most out of collaboration between the associated members, optimisation of resources, reduction in costs and simplification of the management model, as able to transform experience and knowledge into assets, products and services for SALUD and the productive sector (wealth and employment) at both local and regional levels.

This is seen clearly in the creation of the Innovation Unit, whose objective is to use information and communication technologies (ICT) at SALUD to drive an improvement in knowledge management, in the professionals' networking and, therefore in the quality of their work itself, in the excellence of the services provided and sustainability.

The permanent activity in this area has led the hospital to become a pioneer in telemedicine in Aragon and to lead technological innovation and telemedicine projects together with partners from other European countries.

Key findings on interrelationships between innovation, job quality, employment and inclusiveness

In general, this activity has a direct influence on job quality, particularly through the implementation of ICT which enhance the possibilities of teleworking with the corresponding reconciliation of work and family life; the higher level of specific training for the use of those technologies; reduction in the time needed to perform certain tasks and the possibility of undertaking new professional challenges.

The hospital has notable participation by its staff in relation to innovation through the channels established by the Innovation Unit itself, among which is the Innovation Committee, responsible, with others, for running the Innovative Ideas competition.

SW-University (Mathieu and Boethius, 2017a)**Brief characteristics of the company structure and business strategy**

The organisation is a university hospital located in two geographic locations, but with one administrative structure. The hospital is part of the Swedish public healthcare system and therefore financed and administered by the county/regional government of the county it is located in. The hospital has over 10 000 employees and an annual budget of between SEK 8-9m. Like hospitals and other healthcare facilities throughout Sweden, SwUniversity also experiences a shortage of personnel, especially nurses – both specialist and general nurses.

Important innovations in recent past

One important innovation expanding and systematizing the internship system at the hospital. This allows for a greater volume of trainees ranging from trainee-nurses to trainees for low-skilled occupations from several educational institutions to be placed throughout the hospital. A second innovation is the creation of an internal temporary staffing agency (ITSA). The ITSA places nurses, administrators and other occupations below the physician level (though this is an ambition) at wards throughout the hospital, lessening the reliance upon external, commercial temporary work agencies. A third innovation, taking different forms across the hospital is task-shifting, a process whereby specific tasks that previously were part of one occupational groups job are shifted to another occupational group. This can be down vertically (shifting tasks to lower ranking occupations) or horizontally (i.e. shifting tasks from nurses to pharmacists), but is usually undertaken to free up time from occupational groups where there is a labour shortage. A further innovation is the creation of mechanisms such as “pulse meetings” to capture and facilitate local incremental innovations.

Key findings on interrelationships between innovation and job quality, employment and inclusiveness

The internship system allows to hospital to have a direct recruiting channel in a wide variety of occupations. There are also specific programmes to get recent immigrants with healthcare backgrounds quickly integrated in the Swedish healthcare systems, as well as expose low-skilled, low educated youth to occupations in healthcare. The internship system also allows hospital staff to engage in advising and mentoring activities, which are deemed rewarding by the staff, though they are time-consuming activities. The ITSA is a way of retaining staff under more attractive conditions who might otherwise leave the hospital for commercial employment agencies or leave healthcare all together. The task-shifting initiatives are meant to relieve occupations where there is a labour shortage of work tasks and moving these onto personnel categories that are in greater abundance. The task-shifting initiatives studies were initiated on a voluntary basis (i.e. employees wishing to retain the tasks could do so) but soon were accepted as desirable by both the occupations shedding and receiving tasks. Though decreasing task variety, task-shifting was broadly interpreted as positive as it allowed the occupations shedding tasks to focus on core tasks, while those receiving tasks viewed the arrangement as positive as it provided employment opportunities at the hospital for other occupational groups in greater numbers or as a form of job enrichment if receiving tasks from above. Incremental innovations are voice and improvement opportunities.

SW-Ward (Mathieu and Boethius, 2017b)**Brief characteristics of the company structure and business strategy**

SwWard is a pediatric surgical subunit of SwUniversity. The pediatric surgical ward has approximately 75 employees, about 20% of whom are physicians with the rest of the positions being held primarily by nurses and nursing assistants, with some other roles and occupations also being found. The nurses are divided into specialist nurses, including operation nurses, and regular nurses.

Important innovations in recent past

The acquisition and use of a surgery robot for pediatric use is unique in Sweden and puts this ward on the forefront of this frontier. The robot was acquired by the hospital and is predominantly used on adult patients, but the pediatric surgical team was part of the acquisition process and has pioneered its use on children, pushing the frontiers of diagnoses and patient ages that can be operated on with the robot. While the volume of patients treated with the robot is fairly low, the patient quality results are high and it allows SwWard to be at the forefront of this technological development. The ward is also participating in a more systematic procedure for recruitment for physicians applying to become specialists in surgery. The new procedure comprises of a set of physical aptitude tests along with a structured interview and a personality test. The tests and interview are conducted annually during the specialist training process. The third innovation is applying to become a National Specialised Medical Care centre for three specific diagnoses. The three diagnoses are currently treated by the ward, but being named a centre for treating these diagnoses will result in an increased volume of patients from all or half of Sweden allowing the ward to conduct research on treatment of these diagnoses, and a new organisational set-up to deal with incoming patients and follow-up on patients returning for care to their home hospitals. Not being named a centre entails losing the right to treat these diagnoses and thus be a negative innovation, meaning that this treatment would disappear from the ward and eventually the skill and competence to treat them. The application process itself has also caused a comprehensive review and innovations with regard to administrative, care and informational procedures at the ward.

Key findings on interrelationships between innovation and job quality, employment and inclusiveness

The acquisition and use of the surgical robot displays the power of physicians at the ward and hospital in general to initiate large, and expensive, innovations where they can argue for medical and patient benefits. The subsequent opportunity to experiment with its use by treating new diagnoses and patient segments displays the discretionary autonomy of specialist physicians in the medical sphere. The robot also allows for the creation and further development of unique skillsets among the members of the robot surgery team on this ward, increasing job satisfaction, and potentially occupational mobility. The new recruitment procedure for specialist surgeons is aimed at improving selection and the subsequent training process, aimed at producing more competent surgeons and social, collegial and leadership skills. The application to become a National Specialised Medical Care centre will keep a wider range of skills and research opportunities for several occupations at the ward.

SW-Network (Boethius and Mathieu, 2017)**Brief characteristics of the company structure and business strategy**

The unit studied is a network organisation within a broader regional healthcare administrative unit that comprises four county governments. The unit is also part of a larger national network of identical organisations. The primary purpose of the organisation is to promote research and dissemination of best practices with regard to a specific but broad illness. The ultimate aim of the organisation and the national network is to improve the detection and treatment of this illness and secure equal treatment and opportunities for patients throughout Sweden. The organisation has between 20-30 employees, some with medical backgrounds, others with non-medical educations. The organisation has no clinical activities, it advises on clinical activities. The organisation operates largely on a collegial basis, with representatives from the hospitals where this illness is treated who both share experiences with treatments and innovations at their hospitals, as well as carrying back recommendations from this organisation to their home hospitals.

Important innovations in recent past

The unit itself is an innovation in the sense that it is a collaborative organ between the units of several different county government's hospitals focused on treating a specific illness. It is also of recent date, being started in the past 5-10 years and novel in the sense that it is a hybrid between a national and local coordination form, operating largely via a collegial influence mechanism.

In addition to the overall structure and operation of the organisation, three specific innovations have been developed and disseminated by SwNetwork. The first is what is called the "Red Telephone" which is a direct telephone number for patients who find blood in their urine to call in order to commence a diagnosis procedure directly, with specialist healthcare, rather than going through the normal referral system. The Red Telephone has halved the time that it takes from the moment blood is found in urine until a diagnosis is made. The second innovation is a "diagnostic centre" where patients are brought in and kept until a diagnosis is set or diagnoses are ruled out, rather than moving around the healthcare system from one unit to another. The third is the institution of "contact nurses" who are personal contact persons for patients with the diagnosis of the illness that the organisation specialises in. This innovation was disseminated downward via the national network as part of the individual care plan reform, and thus was obligatory rather than following the collegial model.

Key findings on interrelationships between innovation and job quality, employment and inclusiveness

The innovations discussed above are all examples of innovations in the way healthcare processes in diagnosing and treating a specific illness are carried out. The Red Telephone and diagnostic centre are based on proposals from healthcare professionals associated with SwNetwork, while the predominant collegial means of SwNetwork's operation is a testament to the power and influence of physicians in the healthcare system. The organisation itself has led to a minor increase in employment, but all in positions requiring high levels of education.

SW-Clinical (Mathieu, 2017)**Brief characteristics of the company structure and business strategy**

The organisation is a provincial hospital located spread over four geographic locations, but with one administrative structure. The hospital has a degree of research and training, but its primary focus is on clinical activities and is not formally associated with a university. The hospital is one administrative unit with locations in four towns, and is one unit within a larger county healthcare system comprising of several other hospitals, primary care and other healthcare facilities. The hospital is part of the Swedish public healthcare system and therefore financed and administered by the county government of the county it is located in. The hospital has between 4000-5000 employees, again spread over the four physical locations.

Important innovations in recent past

The hospital has won prizes for its innovation activities, such as mobile care teams, and has a very active quality improvement agenda. The two innovations focused on in this report are two on-going projects. One project is oriented towards improving the hospital across the board as an employer and workplace. This project should be seen in the light of difficulties in recruiting and retaining skilled medical staff in sufficient numbers. Wards at the hospital have been closed and patients shifted to other locations and hospitals due to staff shortages. This has led to alternative temporal and compensation arrangements for staff being entertained as well as training, education and career path efforts. Linked to this more overarching project is an innovation to shift the basis of relationships at the hospital away from traditional role-based relationships to “person-centered” relationships. This innovation seeks to shift the way in which actors at the hospital approach and interact with each other from for example doctor/nurse-patient or manager-employee, or nurse-nursing assistant to relations based on whole persons and the occupational and personal resources and experiences they possess. This innovation seeks to improve quality of care, as well as job quality in two ways. The first is by improving the relationship between hospital management and employees, and the second is by improving work satisfaction by setting focus on the quality of the relationship between staff and patient.

Key findings on interrelationships between innovation and job quality, employment and inclusiveness

The two innovations investigated in the case are largely related to the staffing situation at the hospital. The project to become a more attractive employer and workplace is expressly oriented towards improving employment and working conditions at the hospital in order to be able to attract and retain skilled staff. A wide range of parameters are included in these efforts, and by one metric – number of employees on sick-leave – the project is successful in decreasing sick-leave. The goal of recruiting and retaining more personnel if successful will lead to more organisational stability and workforce planning. The second project, “person-centeredness” has a dual focus on improving staff-patient relations and the relations between staff members, as well as between management and employees. Though this is primarily an attitudinal shift, it is seen as a central innovation for improving the quality of work by recognizing and legitimating the non-instrumental, human dimensions of healthcare and work.