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WHY DO EMPLOYEES PARTICIPATE IN INNOVATION? SKILLS AND ORGANISATIONAL DESIGN ISSUES AND THE ONGOING TECHNOLOGICAL TRANSFORMATION

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RÉSUMÉ

La littérature récente sur les conséquences de la transformation technologique la décrit comme un choc exogène entraînant une restructuration des tâches au sein des emplois et des compétences requises. Cet article adopte une position différente, selon laquelle la transformation technologique est façonnée par des choix organisationnels. De ce fait, le contenu des tâches ainsi que l'utilisation des compétences ne découlent pas mécaniquement de la diffusion des TIC et des technologies numériques, mais plutôt de décisions d'origine organisationnelle motivées par les nouvelles opportunités technologiques. La section 1 de ce document propose une revue de la littérature économique et de gestion décrivant comment des choix organisationnels spécifiques permettent de tirer un meilleur parti des technologies numériques. D'abord, elle pointe une dynamique de décentralisation accrue avec une plus grande participation des salariés aux processus de prise de décision. Un autre concept majeur pour comprendre la transformation technologique est celui des complémentarités productives. Elles impliquent qu'un avantage concurrentiel plus élevé peut être atteint en adoptant simultanément toute une gamme d'outils technologiques et organisationnels innovants dans un modèle d'entreprise davantage cohérent. Les complémentarités productives contribuent à façonner les structures organisationnelles ainsi que les faisceaux de tâches au sein des emplois. Les effets attendus de la décentralisation et de l'autonomisation évoquées par la littérature théorique en lien avec la transformation technologique ne sont pas clairement mis en évidence dans la littérature empirique basée sur des enquêtes sur l'organisation et les conditions de travail. Ainsi, les solutions en termes d'organisation et de conception du travail entraînées par les nouvelles technologies qui sont en théorie les plus rentables ne semblent pas se répandre aussi rapidement que les innovations technologiques elles-mêmes. Afin d'approfondir l'analyse, la section 2 offre une révision de la littérature économique et de gestion sur la conception de formes organisationnelles adaptatives. Cette littérature fournit des indices importants sur les défis associés au changement organisationnel. En effet, comme une organisation adaptative est conçue pour être flexible à faible coût, elle doit surmonter les obstacles habituels au changement organisationnel. Deux concepts y sont mis en avant, le concept d'organisation ambidextre et celui de bureaucratie habilitante. Se pose alors la question de savoir si les technologies digitales changent la donne concernant les formes organisationnelles adaptatives. Il y est montré que l'expérience des salariés est essentielle pour déterminer la mince frontière entre changement disruptif ou changement soutenable. En effet, les tensions et arbitrages existantes entre forces opposées dans des contextes de changement organisationnel ou de formes organisationnelles adaptatives remettent en cause l'hypothèse implicite décrite dans la théorie des complémentarités productives d'une solution gagnant-gagnant pour les différents acteurs et, en particulier, pour les salariés. En dernière section, on explore les conditions permettant de gérer la participation des travailleurs au changement organisationnel ou à l'innovation. La littérature propre aux relations industrielles sur l'organisation du travail à haut rendement ou à forte implication et celle relevant de la psychologie organisationnelle sur les comportements et les lieux de travail innovants fournissent des résultats empiriques utiles pour contribuer à l'élaboration de lignes directrices pour les praticiens. Rendre soutenable un environnement de travail changeant ou innovant à l'ère du numérique est primordial car cela a un impact à la fois sur les performances économiques des entreprises et sur la qualité de vie au travail et le développement des compétences des travailleurs. Cependant, cela repose sur la mise au point d'un équilibre fragile qui garantit un usage habilitant des technologies numériques et des nouveaux outils de gestion.

Mots clés : transformation technologique, ambidextérité, comportement de travail innovant, changement organisationnel, compétences

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Abstract

There is a recent and growing literature on the consequences of the ongoing technological transformation on skills. Most of the time it views technological progress as an exogenous shock that impacts the relative demands for labour with different skills. This chapter takes as a starting point that the technological transformation is the results of organisational choices. Hence it reviews a literature relating to what is going on upstream rather than downstream in the innovation process. In particular, it addresses how organisations take advantage of new technological opportunities to reform their designs, how they create work environments that favour innovative work behaviour and why employees engage their resources by participating to innovation.

Keywords: ***technological transformation, ambidexterity, tensions, innovative work behaviour, organisational design, skills***

1. INTRODUCTION

Technical change and digitalization are driving a radical and unprecedented change concerning a number of domains. Among these, the design and organisation of work are particularly affected by constantly evolving and truly cross-cutting technologies such as robotics, the internet of things, big data, machine learning and artificial intelligence.

In the economic and management literature, a technological determinism prevails. In contrast, this chapter builds its analysis on the idea that organisations' strategic choices are central drivers of change. To understand the current digital transformation what matters is how and why Information and Communications Technologies (ICTs) and digital technologies are developed within organisations through innovative processes, how they are embedded into organisations and shape their forms as well as working styles and how organisational choices impact on employees and other stakeholders.

The number and variety of options that organisations face when implementing, developing or adopting a technology simultaneously concern technical, organisational and skills-related dimensions. These choices usually are interconnected and show synergies among them that reinforce one another, but they can also be in competition or contradictory.

To address these issues, Section 1 reviews the economic and management literature targeting how organisations take advantage of new technological opportunities to reform their designs and organisation of work. Using the notion of productive complementarities, it discusses the expected progressive decentralization and flattening of hierarchies within organisations and the increasing possibilities to create highly flexible and creative new organisational designs such as virtual enterprises, platforms or project-management organisations (Section 1.1). It also analyses the expected increases in autonomy and empowerment of workers, their higher participation in decision-making processes and implications in terms of skills utilization and skills requirements (Section 1.2). The empirical literature is then reviewed to analyse whether the observed trends reflect what is advocated by the theoretical or futuring literature. The transition to new forms of organisations and work appear to be challenging, especially when changing workplaces require the alteration of different work dimensions or incentivizing for radical transformation rather than incremental change.

In order to move forward in the analysis, Section 2 discusses how organisations create work environments which allow overcoming the challenges of transformation and how they can favour innovative work behaviour in the digital era, building on the notion of adaptive organisational forms, ambidexterity and enabling bureaucracy. Section 2.1 discusses why changing organisations which target multiple and competing objectives face challenges and then focuses on the emergence of tensions, trade-offs and conflicts between new and old systems. It questions the idea implicitly advanced by productive complementarities theory of the possibility to simultaneously obtain increased productivity for the organisation and positive outcomes for employees in terms of quality of working life and workers' well-being. In so doing, it discusses the literature that focuses on how organisations and individuals influence one another and considers technological change as a social process. Section 2.2 then explores which are the organisational conditions, also related to the use of ICTs and digital technologies, that favour employees' participation in workplace innovation and what

may motivate workers to engage their resources and collaborate to the organisational transformation.

2. ORGANISATIONAL TRANSFORMATION IN THE DIGITAL ERA

This first section reviews how the economic and management literature addresses the consequences of the diffusion of ICTs and digital technologies on organisational structures and on working styles. The concept of productive complementarities is key in understanding how managers coordinate choices of input quantities with discrete technological and organisational design choices. Productive complementarities contribute to shaping the design of organisational structures as well as the bundles of tasks within jobs. The empirical literature that has analysed the trends in the dimensions of organisations and work measured in organisational and working conditions surveys is then examined. Some gaps between expected evolutions and observed trends are identified.

2.1 Digital technologies and organisational structures

2.1.1 Productive complementarities and decentralized forms of work

The progressive decentralization and flattening of hierarchies are identified as key digital-linked developments in the internal designs of organisations. Coordination mechanisms become more articulated and interdependent, as technologies remove the constraints imposed by time and space. Internal boundaries between departments and sub-units are progressively removed. Decision making responsibility is increasingly delegated to the individual worker level.

The future-oriented management literature thus identifies digital technologies as main drivers for the adoption of decentralized forms of work organisation with a higher participation of employees in more democratic decision-making processes. For example, Malone (2004) argues that ICTs lower costs of communications and provide employees with readily available information to make sound choices. As a consequence, workers have more opportunities to feel flexible, motivated, creative and free to decide for themselves. McAfee et al. (2012) also identify in the availability of data at low cost the possibility to leave leadership to small and autonomous teams that work on specific projects. They believe that the use of big data may improve decision-making and thus invite managers to abandon the traditional intuition process of decision, based on experience and internalization of previously observed patterns and relationships, in favour of data-driven decisions, which are evidence-based and therefore more reliable. Managers' expertise is in any case required to ask the right questions and to understand problems in order to effectively exploit data.

The adoption of digital technologies by organisations seems thus to drive escalating changes within organisations, which simultaneously touch upon technical aspects, organisational practices and skills utilization. They may further involve relationships with the external environment. In this regard, the economic literature argues that the subsequent organisational transformation requires tangible and non-tangible investments and that these investment choices usually show some synergies, meaning that they may reinforce one another. The concept of productive complementarities between different practices accounts for those technical possibilities to obtain a combined effect with a higher gain than the sum of gains

from separate individual increases (Milgrom and Roberts 1990). As practices tend indeed to cluster, conflicts may arise between old and new systems. The transition may thus be difficult, especially when decisions are decentralized, and there may be strong incentives for a radical transformation instead of an incremental change (Brynjolfsson and Milgrom 2013).

The pace of change is a related issue that merits further investigation. The pace of digital innovation is not uniform, it is accelerating in some segments with a rapid renewal of products and services, but remain slow in others, related to infrastructures like internet backbones, broadband mobile networks or large scale cloud computing as they are path dependent and require substantial financial investments as well as the setting of standards (Yoo et al. 2012). On the other hand, the evolution of organisational structures is slowed down by the inertia of routines. This questions the simultaneity of changes assumed in the lack of temporal depth of the concept of productive complementarities. Co-evolution could well be a more appropriate term which adds an explicitly dynamic element to complementarities as well as the idea of co-specialization in business ecosystems (Kay et al. 2018).

At the turn of the millennium, some empirical studies tried to assess the productive complementarities between computerization and organisational forms and provided evidence of a progressive decentralization and flattening of hierarchies within organisations. Caroli and Van Reenen (2001) used a panel of British and French establishments and found that organisational changes such as decentralization of authority, delayering of managerial functions and increased multitasking were complementary with human capital and technological change. Bresnahan et al. (2002) used firm-level data of US firms and found evidence of productive complementarities between information technologies, labour demand and computer-enabled organisational changes such as autonomous team-based work and decentralization of decision authority. Greenan (2003) showed, using French data on manufacturing, a positive correlation between technological, organisational and skill changes. Decentralization of decision-making, delayering and increased skill requirements were simultaneously observed together with automation and computerization.

More recent studies analyzing the productive consequences of the adoption of digital technologies identify similar relationships. Brynjolfsson and McElheran (2016) focus on data-driven decision-making and find evidence of productive complementarities among high levels of information technologies, educated workers and data-driven decision-making, which are in turn correlated to better performances. Gal et al. (2019) assess the adoption of a range of digital technologies (high-speed broadband internet, simple and complex cloud computing, Enterprise Resource Planning and Customer Relationship Management software) and find positive impacts on productivity at the firm level, especially in manufacturing and routine-intense activities, and particularly when complemented by human and organisational capital. Using European macro-level data, Corrado et al. (2017) demonstrate the existence of productive complementarities between ICT use and intangible capital resulting from investments in R&D, design, brand, firm-specific training and organisational change.

The innovation literature also assessed productive complementarities between different forms of innovation and organisational practices associated with innovation. A strand of empirical literature based on the CDM model (Crépon, Duguet and Mairesse 1998) provides some evidence on the innovation-productivity relation. The CDM model uses a production function augmented by a knowledge function relating investments in R&D with innovation outputs. More recently, the model has been further developed by expanding the definition of innovation to include innovative usage of ICTs and organisational innovation. Polder et al. (2010) consider ICT investment and R&D as innovation inputs to assess their relevance in

obtaining three types of innovation outputs (product, process and organisational) as well as their complementarities or substitutability. Using Dutch data, they find that organisational innovation has the strongest productivity effects and that it is complementary with process innovation. Bartelsman et al. (2017) look at the use of three related Enterprise Systems software (Enterprise Resource Planning, Customer Relationship Management and Supply Chain Management) considered as important organisational innovation whose adoption captures ICT-related innovation spillovers. The probability of adopting these Enterprise Systems increases with the use of broadband intensity and the firm's engagement in e-commerce. As these systems present some overlapping functionalities, they can be substitutes in adoption. Nonetheless, when combined, the adopted Enterprise Systems create synergies that are reflected in higher productivity.

Another strand of the innovation literature focuses on the complementarities between employees' skills and firms' innovation activities, highlighting that the skill endowments are especially valuable when the organisation is affected by technological and organisational change. In 1997, Duguet and Greenan, using French firm-level data, estimate a model where the share of labour and capital costs determine innovation outputs, which in turn influence the evolution of companies' cost structure. Except for process improvements, they find that companies with a higher share of skilled workforce and more advanced capital have a higher probability of achieving innovation than companies which productive mix mostly incorporates unskilled labour. Piva and Vivarelli (2009) investigate the role of skill endowments in increasing a firm's R&D investment, considering that high-skills endowments are expected to lead to faster implementation of new technologies and to increase the absorptive capacity of externally available knowledge. Using data for Italian manufacturing firms over 1995-2000, they find a significant positive link between the ex-ante available skills and the R&D expenditure, providing further support for an "endogenous skill-bias hypothesis".

In terms of managerial implications, this strand of literature stresses that human resources management practices such as team-based organisation, continuous learning, decentralization of decision-making or internal knowledge dissemination enhance the firm's R&D efforts by supporting innovation behaviours (Laursen and Foss 2003; Piva and Vivarelli 2009). In other words, high technical skills may be seen as an input of the innovation production function, which are expected to enhance the individual and organisational learning capacity and thus to make possible a virtuous cycle towards increased productivity (Leiponen 2005).

2.1.2 Ambiguous trend towards decentralized structures

Digital technologies are seen to make it increasingly possible for small dispersed enterprises to come together in virtual networks on a temporary basis around specific projects and objectives. On this account, the digital revolution resulting in a dramatic reduction in communication costs and ready access to relevant decision-making information regardless of physical location is likely to undermine the very rationale for the existence of large organisations in terms of economies of scale. Malone (2004) and Anand and Daft (2007) claim that the high flexibility and organisational performance of decentralized structures respond to a globalized hyper-competitive knowledge-based economy.

As a result of these trends, the virtual enterprise and, more recently, the platform economy as well as project-management organisations can be identified as key examples of new and creative organisational designs. The virtual enterprise is a temporary network of independent companies who assemble themselves to exploit a particular market opportunity, to share

costs, skills and core competencies and to access global market that could not be reached by one enterprise only. Virtual enterprises enable agile manufacturing and facilitate a customer oriented approach, by being able to respond quickly to changing customers' needs and to function in an environment of continuous and unanticipated change. Platform economy is part of the broader digital economy and is characterized by the role played by online platforms in facilitating interactions between two or more distinct but interdependent groups of users. As well, many new initiatives rely on project-management organisations, where horizontal hierarchies come through the creation of interdepartmental task forces to cut across the silos bureaucracies.

Despite these opportunities, the economic literature finds little empirical support for a radical shift to decentralized forms of work. Trends seem to be more ambiguous than expected. For instance, using a database on large US companies, Rajan and Wulf (2006) found a flattening of firm hierarchies and delegation of authority, measured by an increasing number of positions reporting directly to the CEO and a reduced number of levels between the divisional managers and the CEO. However, Wulf (2012) furthered this analysis and came to the conclusion that, as organisations delayer, the scope of business portfolio becomes less diversified, executive teams change their structure with more higher paid functional managers making corporate-wide decisions and a CEO with higher span of control getting directly connected deeper down in the organisation to get closer to the businesses and more involved in decision making. Thus "flattening at the top is a complex phenomenon that in the end looks more like centralization" (p. 18).

Likewise, Bloom et al. (2014) studied the effect of ICTs, with a distinction between technologies that reduce the cost of accessing information and technologies that lower communication costs. Their analysis is based on Garicano (2000), who argues that the hierarchical organisation of expertise depends on these two costs. Bloom et al. found that information technologies such as Enterprise Resource Planning and Computer Assisted Design/Computer Assisted Manufacturing reduce the cost of accessing information to empower lower hierarchical level and to widen supervisors' span of control measured by the number of people directly managed. By contrast, technologies such as intranets lower the costs of communication and lead to more centralization as information can more easily flow from lower to upper levels of the hierarchy.

2.2 Digital technologies and working styles

2.2.1 Employee empowerment and digital working styles

Digital technologies also provide new opportunities in terms of working styles. The literature in organisational psychology and labour studies identifies increased flexible work and workers' discretion over working patterns as key digital-linked developments in working styles. It is often claimed that, in a knowledge based economy, especially the highly skilled workers would be able to use the empowered status associated with their expertise to exercise discretion according to their individual preferences (Donnelly 2011). This trend is expected to have a positive impact on workers' well-being and work-life balance.

Connecting technologies increase communication channels and allow removing the boundaries of firms, to create virtual networks of workers who collaborate remotely and to promote alternative and more flexible forms of work. In order to seize these opportunities, workers are provided with more discretion over their working patterns: they can decide when

to work (time schedule flexibility), where to work (ICT-based mobile work) and via which communication medium (smartphone, e-mail, videoconference, remote access cloud computing).

Cloud technologies further allow workers to connect from everywhere and at any time, log into their organisation's information system, access shared documents and exchange information about their work in an easy way. Employees become more and better informed and, as a consequence, they can collaborate at distance using groupware and such virtual teams are developing even when workers are co-located.

Digital platforms are also a source of new working styles which represent a small but rapidly growing segment of new work arrangements (Katz and Krueger 2019). Work is enabled by the platform that connect workers directly with customers for a short term job coordinated through a mobile application (gig work) or that provides a digital workplace where the worker performs fragmented online tasks (crowd work). Hence, digital technologies are used to channel and organize work activities in exchange for a compensation that often tops up income from other jobs. Autonomy in platform mediated work is thus framed by algorithmic control (Wood et al. 2019).

Spreitzer et al. (2017), through an extensive review of the literature between 2007 and 2016, document the growth of flexible work arrangements in the employment relationship, in the scheduling of work as well as in the location of work. Although flexibility may provide benefits related to reduced commuting time, a significant degree of working time autonomy and a better work-life balance, they also come with some costs typically associated with longer working hours, an increased work-home interference and work intensification.

This has implications for skills utilization. Practices that promote workers' discretion, autonomy and empowerment, usually entail lower direct supervision and control over employees. In return, workers are required to interact, communicate and cooperate more. In this respect, Green (2012) investigated the extent to which employee involvement and computer technologies promote the use of cognitive and interactive skills using British data. He found that the fastest growing required skills are communication skills (and literacy as related), and that also numerical and problem-solving skills are rising. These results echo the skill-biased technological change view according to which digital technologies require workers with higher qualifications and more behavioural resources. It can also be related with the routine-biased thesis which predicts the computerization of routine tasks, as they are easy to codify and, hence, to automate. By contrast, complex and problem solving skills, creativity and social skills such as interpersonal interaction and communication skills, teamwork and collabouration would be difficult to automate and are rather complemented by digital technologies. This would result in a reduction of more repetitive and standardized tasks and jobs. Labour studies following this line of research have provided evidence of increased polarization of jobs in the US and Europe, making the case that jobs with routine tasks are performed in occupations situated in the middle of the wage distribution (Acemoglu and Autor 2011; Goos et al. 2009).

The picture on the possibility to complement human work with digital technologies is increasingly complicated by the advances in artificial intelligence and machine learning that raise concerns related to the automation possibilities of even high-skilled jobs. These technologies may accelerate the capacity of a computer to perform cognitive tasks, by learning from observed behaviours, with no need to understand the precise rules underlying the performed tasks (Arntz 2020).

2.2.2 A paradoxical trend in autonomy

The research from economics, organisational psychology and sociology stresses that the prerequisites for empowering digital working styles are an effective sharing of information, increased communication flows between supervisors and employees and among team members, the relocation of responsibilities to team members and the capacity to collaborate. Next to that, workers are increasingly required to align their skills to the new demands due to technological transformation. In particular, generic skills such as communication, team-working, problem-solving and creativity skills are increasingly demanded.

Hence, as changing workplaces require the simultaneous evolution of different work dimensions with uncertain outcomes, they are challenging. This is likely to produce adverse impacts on employees. Empirical research based on skills and working conditions surveys, and in particular on the European Working Conditions Survey (EWCS), provides mixed results on trends in employees' autonomy and empowerment and this corroborates the ambiguous trend in the decentralization of organisational structures discussed in the previous section.

In the British context, Green et al. (2016) directly measure changes in skill use, task discretion, team working and employee participation as experienced and reported by representative samples of employees between 1986 and 2012. They observe, in all occupational groups, an unambiguous tendency for the average skills levels of jobs to rise over time and a significant decline in task discretion. As well, the proportion of jobs involving teamwork has steadily grown but self-directed team is not the most widespread form of teamwork. Finally, the proportion of jobs with employee participation schemes tended to grow over the whole period, with the exception of quality circles where a decline in use is observed after 2006. Overall, these findings suggest that changes in the job characteristics only partially fit with the idea of autonomy and empowerment.

Using the EWCS for EU-15 countries, Green et al. (2013) assess trends in the different dimensions of job quality between 1995 and 2010. They find that working time quality is the only job quality dimension which is clearly improving over time, and mainly because of declining work hours and falling use of shift work at weekend and night time. However, this positive trend is counterbalanced by reduced employees' discretion over their working time. Hence, according to employees' perceived work experience, flexible time schedules do not seem to be on the rise.

With data from the same survey, Greenan et al. (2014) measure trends in work organisation over 1995-2005. They create a synthetic indicator of the degree of work complexity to proxy empowered jobs. These jobs indeed entail complex tasks, require decision latitude and are associated with on-the-job learning. The authors find an average decreasing trend for work complexity in EU-15. As strong structural forces at the micro and macro level should drive an increase in work complexity, they describe this trend as paradoxical. Indeed, higher educational attainment, growing experience of an ageing workforce, higher computer use, globalization, increasing female participation and the development of the knowledge economy should boost work complexity. If the low access of women to jobs with innovative work characteristics and the increasing share of limited contracts and part-time work could explain part of the puzzle, more detailed information at the employer level would be needed to further the analysis.

Holm and Lorenz (2015) create a taxonomy of forms of work organisation with the EWCS and characterize how the share of these different forms of work organisation evolve in EU-25

countries over 2000-2010. The form of work organisation characterized by high level of employee learning and problem solving as well as employee control over work methods and pace of work is declining in Europe. The authors label it the discretionary learning form as it is close to the model elabourated by Lam (2000) and to Mintzberg's (1979) adhocracy. It is the most flexible organisational form, shaped by complex and dynamic business environments. Its coordination mode relies on mutual adjustment and informal communication and work is usually organized around projects and teams. The declining trend in discretionary learning forms would be linked to the economic climate: the great recession would have reinforced the use of more hierarchical forms of work organisation.

Finally, Bisello and Fernandez-Macias (2019) construct more than 30 indicators of task content in European jobs from the EWCS over 1995-2015. Among these, they capture the extent of routine tasks involved in occupations as measured by the degree of repetitiveness required by the job and the degree of standardization of the work activity. They find that routine jobs tend to be more frequently destroyed than non-routine ones, but that workers in most types of jobs, including high-skill ones, have nevertheless experienced growing levels of repetitiveness and standardization in their work.

3. ADAPTIVE ORGANISATIONAL FORMS AND INNOVATIVE WORK BEHAVIOUR

The expected decentralization and empowerment trends advocated in the economic and management literature in relation with the technological transformation are not clearly evidenced in the empirical literature based on organisational and working conditions surveys. Thus the solutions in terms of organisational and work design that are in theory the most cost effective combined with the new technologies do not seem to spread as quickly as technological innovations. In order to further the analysis, the economic and management literature on the design of adaptive organisational forms is first reviewed. This literature gives some important clues about the challenges associated with organisational change and identifies in the adaptive organisational forms, designed to be flexible at low cost, the capacity to overcome these usual barriers. Two concepts are put forward by this literature, the concept of ambidextrous organisation and the concept of enabling bureaucracy. Whether digital technologies are a game changer for adaptive organisational form designs is then discussed, bringing about the conclusion that the experience of employees is critical in building the thin line between disruptive and sustainable change. Indeed, tensions and trade-offs between opposing forces in contexts of organisational change or adaptive organisational forms question the implicit assumption in the theory of productive complementarities of a win-win solution for the various stakeholders and, in particular, for employees. The chapter ends by exploring the framework conditions for managing the participation constraint of workers to organisational change or innovation. The industrial relations literature on high performance or high involvement work organisation and the organisational psychology literature on innovative work behaviours and innovative workplaces provide some useful empirical results.

3.1 Trade-offs in the design of adaptive organisational forms

3.1.1 Ambidextrous organisational designs

An adaptive organisational form is a stable organisational structure with some dynamic properties. Teece et al. (1997) identify dynamic capabilities, which are the firm's ability to integrate, build, and reconfigure internal competences, as crucial for securing competitive advantage in rapidly changing business environment. The managerial ability to design and adjust business models is a key element of a firm's dynamic capabilities (Teece 2018), which also encompasses the idiosyncratic characteristics of entrepreneurial managers and the historically built routines and culture of the organization. Changes or innovations induced by adaptive forms of organisations have to be sustainable, that is they have to be in a range that do not put the structure into question and preserve inertial forces. Hence, such organisational forms need to strike the right balance in a number of trade-offs: between new opportunities/change and established practice/continuity; between exploration/innovation and exploitation/standardization; between flexibility/agility and productivity improvements/cost reductions; between creativity and control.

One assumption explored in the management literature since the seminal paper of Benner and Tushman (2003) is that best practices targeted to improve operations in the fifth technological revolution based on computers and telecommunications have hampered the innovative potential by being too much focused on exploitation (Benner and Tushman 2015), leading to persistent slow growth. The evolutionary model by Dughera (2020) would describe this unbalanced path as the result of an evolutionary trap depending on intra-organisational conflict or path dependency. However, Bisel (2009) and Putnam et al. (2016) stress the centrality of tensions, dualities and paradoxes in organisational studies when organisational change is at stake.

As it is difficult to find the right balance between these opposites, the strategic management literature argues that organisational design might be a way to "deal with the paradoxical strategic challenges of simultaneously exploring and exploiting" (Benner and Tushman 2015, p 6). The solution is an ambidextrous organisational design. It can be of three types with some implications on who innovates, how and when in the organisation. First, ambidexterity can be sequential, implying that exploration and exploitation do not happen simultaneously within a firm. In the model of Acemoglu et al. (2012), sequential ambidexterity follows from multiple equilibria where separate firms choose to explore or exploit depending on framework conditions such as the degree of protection of intellectual property rights or the size of the skill premium. In the empirical work of Archibugi et al. (2013) and Walrave et al. (2017), it is a choice of senior executives to dynamically orient the business model towards one option or the other according to the phase of the business cycle. Structural ambidexterity is the second type, based on two loosely coupled structures, one dedicated to exploration and the other one to exploitation (Adler et al. 2009). For instance, a hierarchy performing routine operations meshed with a decentralized network dedicated to exploring and experimenting new ideas could be a possible form of structural ambidexterity. The network could be composed of a separate group of consultants or new hires, or by a group of volunteers from the managerial and employee groups. Finally, contextual ambidexterity is achieved when individuals are empowered to judge how to best divide their time between exploitation and exploration activities (Gibson and Birkinshaw 2004). It is based on an organisational context where performance monitoring is used together with social support and a culture that encourages cooperation and trust among individuals and teams.

3.1.2 Digitization as a game changer for the design of adaptive organisational forms?

In the digital era, some researches consider ambidextrous organisation as an archetype of adaptive organisational form. Vinekar et al. (2006) advocate structural ambidexterity as a viable solution to systems development organisations attempting to harness the benefits of both agile and traditional development. Napier et al. (2011) show how contextual ambidexterity can improve firm-level coordination in a software company. Singh et al. (2020) describe how a US health delivery organisation responded to technological, regulatory, and demand changes over a 15-year period by applying a portfolio of sequential, structural and contextual ambidexterity approaches. It allowed her to invest in remote patient monitoring and other ICT-enabled services while also managing its day-to-day operations.

Some papers go one step further by arguing that ambidexterity could be built on digital technologies, by combining the exploration of digital innovation with the exploitation of existing resources (Svahn et al. 2017). For instance, in their study of 25 companies, Sebastian et al. (2017) found that ambidexterity relied on a firm's ability to maintain both a well-established operational backbone based on analogue technology and new digital services platforms.

However, Benner and Tushman (2015) revisited their initial views about ambidexterity as an archetypal adaptive form by considering that the digital era was a game changer inasmuch as it changes the locus of innovation, from the organisation to its boundaries. There is a shift from controlling or participating in a linear value chain to operating in an ecosystem or network of diversified actors (Nadkarni and Prügl 2021). The whole value creation process is transformed through new value propositions, value networks or digital channels (Vial 2019). It renders firms' ability to sustain their competitive advantage more fragile than ever as they control fewer elements of their operating environment.

Challenges associated with the pursuit of multiple and competing objectives generate additional tensions in organizations: they need to move global while preserving their local embeddedness; they have to combine social and business demands as they engage in corporate social responsibility; they integrate the environmental constraints of sustainability and yet they have to remain profitable. Hybrid forms combining dual core elements could be viable organizational responses to these new challenges as demonstrated by the case studied by Smith and Besharov (2019). This social enterprise succeeded in sustaining hybridity over time through structured flexibility founded on the interaction of stable organizational features with adaptive enactment processes.

Adler and Borys (1996) argue that like most technologies, bureaucracies have a dual nature: as tools for coordination, they are enabling, while as social relations for control, they are coercive. Ambidexterity is then an organisational capability that maintains an enabling-oriented use of bureaucratic structures in front of the capitalist search for more market power and profit. Based on this approach, Bodrožić and Adler (2018) propose a neo-Schumpeterian theory of the evolution of management models. First, management models succeed when they respond to the opportunities and challenges of successive waves of technological revolutions. Second, within these waves, there are two successive management model cycles. A first one when a new management model, complementary to the ongoing technological transformation, emerges and a second one when the balance between dual components within this model is corrected to mitigate the dysfunctions observed in the primary cycle. Hence, adapting Perez's (2002, 2010) approach of technological revolutions, the authors argue that the fifth wave of technological revolution had a primary cycle, relying on the optimization of operations up and down the value chain thanks to business process reengineering or redesign, which met its turning point in the first decade of the new millennium. The business process

model contributed to the establishment of a new organisational paradigm designated as the Network that progressively supplanted the Corporation. In the Network, units within and across organisations are connected and operated by rationalized processes supported by digital technologies. However, in this primary cycle, the coercive nature of new management tools and digital technologies became predominant, focusing on cost reduction and tearing apart the fabric of collective tacit knowledge shared among experienced employees both within and across interdependent firms. This neglected human element ultimately weakened the innovation generating capacity of companies. In the wake of the secondary cycle, the management of knowledge in networks becomes central as well as open innovation in communities of practice.

The literature on the organization design of ambidextrous organizations accounts for the simultaneous and mutual influence of organization and individual on one another. In sequential and structural ambidexterity, managerial attention and vision play a key role. Unlike in the ecological tradition, leaders are not captured in inertial forces. The locus of integration between the opposing forces of exploration and exploitation is the corporate level or the business unit's senior team for sequential or structural ambidexterity. Likewise, creative agency plays a role in the evolution of management models described by Bodrožić and Adler (2018): engineers, consultants, gurus and scholars influence the evolution of technology, paradigms and models. Organizational and technological change is a social process embedded in historical, institutional and cultural contexts. The separation between management and organization studies and technology studies puts a limit to a fine grained understanding of how the emergence of new technologies and management models are intertwined.

Besides, in contextual ambidexterity the locus of integration between exploration and exploitation is decentralized throughout the firm and in dualist approaches the tensions between the enabling and coercive facets of technologies and management tools are experienced throughout all the levels of the organization. In their review on the digital transformation literature published between 2001 and 2019, Nadkarni and Prügl (2021) acknowledge a very dominant focus on leadership and capabilities in a digital context while the pace of transformation, the company culture, the work environment or the middle management perspective are significantly under developed. In addition, the limit that Bodrožić and Adler (2018) identify in the business process model has to do with how to regain, retain or improve the innovation capacity of employees and individuals dispersed throughout networked organisations. Hence a main issue at stake in the ongoing technological transformation is related to the work environment and to how it contributes to committing employees and self-employed to share their knowledge and new ideas with their co-workers and partners. Bodrožić and Adler (2018) state it as a knowledge management issue. The next section reframes this neglected albeit key concern as a matter of managing the participation constraint to organisational change and innovation.

3.2 Managing the participation constraint to organisational change and innovation

3.2.1 Sustainable and meaningful organisational change

Organisational changes are expected to destabilize the smooth functioning of organisations and to put their survival at threat as they do not always succeed. Theories that are part of an

evolutionist-ecologist perspective maintain that the selection process within populations of firms tends to favour stabilized organisations, relying on standardized routines, at the price of a high level of inertia. Companies that introduce major organisational changes thus run a greater risk of failure or mortality (Nelson and Winter 1982). Modern theories of evolution do not postulate that adaptive processes always reach a stable, optimal and unique equilibrium. Furthermore, following March (1962), organisations can also be considered as political coalition. Hence unresolved conflict and divergent interest is part of the everyday life of an organisation, generating a complex coordination problem around production, which outcome is necessarily uncertain (Marengo 2020). This conflict is likely to gain momentum in face of organisational change. Contradiction is often seen as a driving force of organisational change and actors deal with it by simultaneously enacting both changes and continuity (Putman et al. 2016).

As argued in the previous section, the digital age creates new opportunities for the development of both more enabling and more coercive organisational and work practices. ICTs and digital technologies can enhance the sharing of data. Integrated enterprise data systems provide horizontal data visibility for peers and even for subordinates, technologies like e-mails or social networks increase communication channels in all directions within the organisation. They also escalate the opportunities for control: electronic performance monitoring systems allow following up in real time individual level performance indicators and big data technologies have high tracking and information visibility properties. The dual nature of digital processes (Farjoun 2010) thus needs to be effectively managed through a careful design of the uses of digital tools. For instance, through a field experiment conducted in an outsourced call centre, Gillet et al. (2015) showed that real time availability of performance indicators could contribute to help call agents in materializing the virtual task that they performed, increasing their feeling of self-efficacy. The access of supervisors to real time information on call agent performance was more debatable. This data did not help them in better coordinating the call campaigns they were responsible for and it was not used for developmental feed-back in difficult or complex situations. It rather induced a level of monitoring intensity that diverted supervisors' time from more productive uses and was accepted by call agents only because ICTs allowed it to be discreet. This use of electronic performance monitoring tools by supervisors was prone to generate a spiral of excessive control and distrust. Analysing the relationship between technology pacing in the context of computer work, work stress and learning with data from the EWCS, Kraan et al. (2014) argue that positive employee outcomes may easily be foregone if computer work is not combined with a sufficient level of worker control over methods of work and order of tasks. Optimal ICT solutions, adapted to the needs of organisational practices and to the diversity of workers, are likely to be tailor-made. These two examples show that the coercive and enabling dimensions of ICTs (Sewell and Barker 2006) have to be addressed and balanced out to improve both organisational performance and workers' quality of working life.

Mazmanian et al. (2013) point to similar tensions between flexibility and organisational control in telecommuting practices. Line managers often hold negative attitudes towards telework and even though teleworkers have autonomy to decide when and how they do their work, the drive to complete the job in time and a fear of not complying with office routine exert a strong pressure on work effort. Socialization practices, workplace norms or images of ideal workers such as in project work settings exercise influence and regulate worker effort towards excessive working hours. The authors argue in favour of reframing these tensions through changing organisational cultures, making workplace flexibility an employee right and exploring third spaces solutions.

On the management tool side, the flourishing of standards is another interesting example. Standard setters have multiplied over the last decades in the private and the public sector (Brunsson and Jacobsson 2000), which is at odds with the traditional view that predicts the decline of formalization due to the difficulty to devise efficient rules in a more complex and uncertain environment. Yet, some argue that in a globalized world, standards facilitate coordination among people and organisations that are far apart. Here again, increased formalization associated with carefully designed standards may be enabling, but when standards stemming from different areas inside and outside the organisation put contradictory pressures on the productive process, then they become coercive and are sources of underperformance and stress. Further analysis is needed to understand under what circumstances, in a digitized context, increased formalization can be associated with flexibility given the increasing information intensity, complexity and uncertainty of work environments.

Professional bureaucracies have traditionally favoured flexibility, but standards and controls have progressively been introduced to better achieve cost efficiency. Hence occupations like teachers or health care professionals have become particularly exposed to tensions. Bolin and Härenstam (2008) suggest that they have heavy responsibilities with no power over situations as they perform standardized job routines with quantitative performance assessments and they have internalized the goals by self-directing under restricted forms, generating a high level of strain.

Although it is not so common in the economic and management literature, it seems essential to address the work experience of employees facing organisational change in increasingly turbulent organisational environments. Putnam et al. (2016) stress the existence of tensions which are defined as "stress, anxiety, discomfort, or tightness in making choices, responding to, and moving forward in organisational situations" (p.69). Related with these tensions, four main sources of risk may jeopardize workers' health and wellbeing by imposing physiological, psychological and behavioural threats: uncertainty (Bordia et al. 2004), conflict (Godard 2004), violence (Salin 2003) and disequilibrium between constraints and resources (Karasek 1979, 2008).

These occupational risks could be alleviated by enabling practices to support change and foster the participation of employees to the change process. Managing the participation constraint of employees allows maintaining the psychological contract in the face of changing work and employment prospects while preserving a balance between exploration and exploitation. It implies the recognition of increased job demands at least in the short run, transparency about the consequences of choices as well as the pursuit of fairness and justice.

Enablers of such framework conditions are not well identified as the scientific literature lacks consensus regarding basic change processes (Stouten et al. 2018). The industrial relations literature on high performance or high involvement work systems evaluates employee outcomes associated with bundles of work practices intended to favour industrial excellence. However, it explores the consequences of the use rather than the adoption of such practices and highlights the existence of both positive and negative outcomes (Boxall and Macky 2009; Han et al. 2020). As the targeted practices are related to business process optimization, they are likely to be biased toward exploitation and unsuited to manage the participation constraint to organisational changes in the balancing cycle of the so-called Network organisational paradigm (Bodrožić and Adler 2018).

The skills and vision of management should first of all lead to depart from techno-centric or management-centric approaches where the alignment of interests and resources are thought

of as proceeding in an automatic or natural fashion. The existence of productive complementarities in organisational design and the need to balance contradictory dimensions in organisations imply that the use of new technologies and management tools have to be carefully analysed before implementation. The cost of transition is thus high. There is no one-size-fits-all approach. Adequate timing, experimentations and locally tailored approaches are needed to anticipate the stickiness of pre-existing organisational structures and arrangements and take advantage of constructive social dialogue (Alasoini 2011, Bryson et al. 2013).

3.2.2 Workplace innovation and innovative work behaviour

Change has lower costs in adaptive forms of organisations. However, the way the tension between creativity and control is dealt with in an ambidextrous organisation is key for supporting innovative work behaviours. This challenge is not only structural but also cultural and cognitive, involving models of continuous learning as well as learning culture (Nonaka et al. 1996; Nonaka and Von Krogh 2009; Lam 2000, 2010). Organisational behaviour and social psychology literatures have concluded that freedom over one's work enables creativity while control is a barrier to innovative work behaviours as it induces routine responses and risk avoidance. Janssen et al. (2004) propose a psycho sociological analytical frame to identify the factors that regulate innovative work behaviours and favour workplace innovation. They argue that the leadership style of supervisors is an important factor. Close monitoring of employees creates a negative climate for workplace innovation. Innovators need some autonomy from organisational rules and procedure. Participation, direct support and developmental feedback stimulate creativity. A participative leadership implies consultation and delegation and support and developmental feedback relates with providing resources and recognition for innovation. Supervisors who approach and manage innovative ideas from a mastery orientation rather than a performance orientation favour the development of innovative capability. Besides high level of autonomy, an enriched work design entailing task variety, identity and significance promotes creativity, employee learning and skills development. The organisational context further generates barriers and drivers to workplace innovation. Silo mentality, blame culture, poor communication, short term perspective, risk avoidance are organisational traits that impede positive outcomes from creativity and thus negatively impact innovation. Innovating in a mechanistic organisation, designed to protect established courses of action, is more likely to provoke conflict than in a more organic one, where employees are expected to coordinate through mutual adjustment. In the opposite direction, support for change, customer focus and organisational learning are three characteristics of the organisational context that contribute to the promotion of an innovation culture. A small but growing literature provides empirical evidence of the human resource management practices that enhance innovative work behaviours. Laursen and Foss (2003), mentioned earlier, relate HRM practices and innovative outputs. The review by Bos-Nehles et al. (2017) establishes the positive influence of autonomy, training and developmental feed-back practices. Empirical evidences for practices such as rewards, job insecurity, time pressure and task complexity are mixed, implying that they have to be implemented with caution for managing the participation constraint to innovation.

As it takes a stance of enabling bureaucracy rather than contextual ambidexterity, the accounting and management control literature is somewhat less pessimistic on the relationship between control and creativity (Adler and Chen 2011). It acknowledges that control structures include a variety of different mechanisms and control practices, some of

which may help new product development and enhance innovation (Davila 2000; Davila et al. 2009). However, these studies have predominantly focused on organisational level variables. Another strand in this literature addresses individual level motivational and coordination challenges. A first example is given by Gilson et al. (2005) who find that standardization moderates the relationship between creativity and both team performance and customer satisfaction. They show that creative team environment is positively associated with team performance whereas standardized work practices are positively associated with customer satisfaction. Grabner and Speckbacher (2016) give a second example showing that a pay for performance incentive scheme and subjective evaluation are complementary control devices in a creativity-dependent setting, where the primary source of value creation is the creativity of core employees. However, research is just beginning to analyse the various configurations of controls that are likely to favour the right balance with creativity. Adler and Chen (2011) consider activities where individuals face a dual challenge of demonstrating creativity and embracing the formal controls that coordinate their creative activities with others. They argue that the implementation of the appropriate control systems and enabling forms of bureaucracy can be combined to support those large scale collaborative and creative activities. Indeed, creativity is needed when tasks are uncertain and formal controls when tasks are complex and interdependent. Instead of creating informal and cultural controls to balance job autonomy like in contextual ambidexterity, these approaches accept standards as useful control mechanisms and argue that a supportive context can substitute for autonomy (Parker 2014).

If no definite conclusion can be drawn, the literature on learning organisations (Greenan and Lorenz 2010) suggests different innovative capabilities for ambidextrous organisations and enabling bureaucracies. When successfully implemented, the former is close to adhocratic organisational forms where dynamic learning is associated with radical innovation. The latter resembles the Japanese model of organisation or the lean form of work organisation that would favour cumulative learning and incremental innovation.

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