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Workplace innovation: a converging or diverging research field?

Peter R.A. Oeij, Steven Dhondt and Adela J. McMurray

Introduction

This chapter provides the most extensive review of the workplace innovation literature to date. In the past years, three internationally edited books have seen the light of day (Dworschak et al., 2021; McMurray et al., 2021b; Oeij et al., 2017), the dedicated *European Journal of Workplace Innovation* was initiated, and five special issues of journals (Howaldt & Oeij, 2016; Oeij et al., 2019b; Rus et al., 2017, 2019; Totterdill & Exton, 2014a), and many articles, were published. This review searched for all publications that use the term ‘workplace innovation’.

We contend that workplace innovation (WPI) is connected to the ‘advancement’ of jobs, people in jobs, organisations, the performance of organisations, and support renewal and innovation. Either directly or indirectly, workplace innovation can be connected to ‘high road strategies’ and ‘good jobs strategies’. Both strategies combine ‘advancing’ the quality of work with better economic performance, more innovation and/or more inclusiveness, and a fairer distribution of a company’s revenues.

Based on the types of research and levels of analysis, we categorise the workplace innovation publications. This exercise clarifies the different levels (individual, organisational, and sectoral/societal) that workplace innovation concepts address, and whether or not their focus is on fundamental research, evaluation research, or policy and practice (Oeij et al., 2021a). Our purpose is to distinguish the research streams that inform the different approaches to workplace innovation and show their relationships. These streams are: sociology and organisation research; safety science and organisation research; economic strategy and human resources (HR) research; and psychology and behavioural research addressing people, work, and organisations. We

endeavour to understand where this research is leading to. The main question for this chapter is if, in all these developments, we can identify a converging or more of a diverging development in how the topic of (WPI) is dealt with. In our concluding discussion of these developments, we assess whether this divergence or convergence is positive or not. It is not our intention to compare approaches of WPI to assess which approach is better than others and why that is the case. Each approach has its own value in contributing to how work can be 'advanced'. We merely want to show what different scientific disciplines are choosing as their focus. From this line of argument, the question that naturally follows is if there are ways to align the different discussions. Chapter 14 will deduce from this exercise what kind of future work programme may be needed to further improve the status of the topic.

This chapter is an analysis of the workplace innovation literature, and, thus, we must first lay out our intentions in the consecutive steps we have taken to unravel the field and how this chapter is organised. First, we examine what WPI is mainly about when people study the meaning and goal of the concept. There are many differences and commonalities that are useful for gaining an understanding of the field. The essential element of WPI appears to be to advance work. In a second step, we present a categorisation of the published studies based on the type of research and the level of analysis. The third step is of a historical nature, which begins with a search for where the workplace innovation concepts come from and how they have developed. Building on that step, we examine the field of studies, streams, and strands to connect the concepts to streams of research in sociology, psychology, economics, and management science that have labour as their main target. In a final step, after having aggregated the literature from single studies to coherent research fields, we discuss whether we see more convergence than divergence and what this means for future endeavours in the field. We do this by connecting to the beginning of the book, where we stated that WPI does not happen in a vacuum, but amidst a volatile environment with several disrupting developments, such as the coronavirus crisis, climate threats and the need for new energy resources, and war in Europe.

The essential element of workplace innovation is to advance work

Workplace innovation knows many faces. Several approaches are present, and several definitions have been proposed. This section presents the main approaches in this book. The clearest distinction between these approaches is

the level of analysis they address: individual and group behaviour; the organisation or company; or an industrial sector or society. A logical consequence is that approaches at different levels have different purposes. Individual approaches, for example, target new behaviour, such as innovative behaviour. Organisational approaches are directed at better performance and productivity and attracting good staff. Societal approaches aim at better conditions for companies to thrive and for employees to participate in paid work. Another difference is their origin. Where the term 'workplace innovation' comes from and how it has evolved over time are explored. Before we do that, we describe what the present variants have in common, which is that workplace innovation contributes to 'advance', 'improve', or 'progress' either the behaviour of persons, the outcome of processes, or the future situation for people, organisations, and society (Costantini et al., 2017). 'Progress' or 'modernisation' refers to the proposition that advancements in technology, science, and social organisation have resulted, and by extension will continue to result, in an improved human condition (see for example Berting, 2006). The notion of 'advancement' can be related to streams in the management, behavioural, work, and organisation sciences in the past decades.

Perhaps the simplest distinction of types of 'advancement' is the improvement of either labour or capital. Should an advancement be beneficial to one or the other – i.e. well-being or welfare – if not both? Underneath this distinction is the question of the division of labour. Production processes and working processes can be split up into larger or fewer tasks that are allocated to either managing or executing functions, apart from supporting functions. From Adam Smith and Frederick Taylor, we learned that under specific circumstances a fine-grained division of labour could make a production process highly effective and efficient. However, one of the downsides of Taylorism and Fordism, known for their overreaching division of labour, is the risk of alienation and discrimination at work, when people carry out meaningless jobs without any autonomy and self-determination to fulfil their human needs. The 1950s, 1960s, and 1970s witnessed the emergence of the desire to 'advance' the quality of working life. That particular 'humanisation of work' was targeted at reducing the division of labour and enhancing employee participation, and enriching jobs instead of further simplification of work. Aspects of humanisation to contribute to such advancement were at least sixfold (Van Strien, 1983): (1) healthy workloads and working environments; (2) using and developing human talents; (3) a sense of personal safety and social security; (4) democratic dialogue, voice, and participation; (5) a fair pay and distribution of the profits; and (6) equality and justice. When one genuinely has an eye for human needs in the design of work, one essential basic ingredient that is almost always a feasible option to use is organisational, strategic choice. Such room

to manoeuvre implies that the dominance of technological determinism is an unjust proposition, and that the homo economicus is an incomplete concept. Real-life practice showed that social aspects were significant compared to the 'technological system' when it comes to productivity, and that rational economic profit maximisation was not fully in line with personal development and human needs, according to the evidence of several landmark studies, such as in the Hawthorne experiments of Mayo's Harvard group, the Theory X versus Y studies of McGregor, and Maslow's pyramid of human needs (see for example Greenberg & Baron, 2008). In other words, technological options are not rigid, and neither is the rationality of market pressure.

In overcoming the negative effects of the division of labour and limited participation, there were at least two options present in the theories and approaches of the 1950s and beyond. One was to redesign the production process, and the other to affect the motivation of employees. Redesigning the production process was taken up by variants of sociotechnical approaches, including business process re-engineering and lean management. Their core idea was to install autonomous teams that carried out substantial tasks independently and that were self-supporting. Limited division of labour created rich team jobs and decision latitude about the team's tasks. The other route to boost the motivation of employees comprised, for example, better working conditions, better pay, more voice for employees, and modifying the workload and stress risks. The first stream paid more attention to re-organising the work and processes, while the second stream stressed re-organising the behaviour, attitudes, and skills of persons. A third stream can be positioned as a combination of re-arranging the work and the behaviour of working people through measures in the context of HR management or 'HR-bundles', and leadership behaviour. One could fit the job better to the person, fit the person better to the job, or adjust the person–job fit from both directions. In all these three streams, there could be a different management approach, for example there could be either top-down-oriented initiatives or bottom-up-oriented initiatives (Oldham & Fried, 2016). Whether or not the aspects of humanisation were realised depended partly on the management approach. But it was not only those managerial philosophies that played a role. External factors, like market developments, competition, financial management, and technology pushes would determine the room to manoeuvre for people in organisations.

Most workplace innovation approaches are directed at 'advancing' work in one way or another, based on arguments that can be traced back to a combination of humanistic values and economic goals. Over time, we contend, there are different research trajectories, eventually leading to the 'advancement' of work, which can also be indicated as a 'good jobs strategy' (Rodrik & Sabel, 2019).

Rodrik and Sabel see a good jobs strategy as a means to introduce a fairer distribution of wealth and profits between management and employees, and to enhance the inclusiveness of people in low-income jobs. Good jobs mean both fair pay and sustainable employability, which imply investments in business models and technology that contribute to a society's cohesion in the long run. Such an approach requires a management strategy that looks ahead beyond 'not good enough' incremental innovations – i.e. not just tweaking your IT software but undergoing a disruptive renewal of your IT architecture; cost-efficiency survival options; and limiting the focus to economic and productivity goals. This broader approach converges with the notion of the 'high road' perspective (Gittel & Bamber, 2010; Osterman, 2018; Totterdill, 2011).

The categorisations of workplace innovation

How can we categorise the main approaches to workplace innovation? A literature search was conducted using the keywords 'workplace', 'workplace innovation', and 'innovative workplace', working back from mid-2021 to 1989 in the databases of Scopus, PsycInfo, PubMed, OSH-ROM and Google Scholar, resulting in 426 scientific and non-scientific articles, reports, and books. There are 170 publications dealing with 'workplace innovation' and 10 with 'work design as an example of workplace innovation', listed in Appendixes 12.1 and 12.2, respectively. We first give an overview of how the term 'workplace innovation' is interpreted by researchers. This is not the same as comparing definitions of workplace innovation, which is not what we intend. We are interested in distinguishing between the intentions of users. For instance, some researchers want to understand the behaviour of individuals, while others want to highlight organisational characteristics or evaluate the reasons why companies apply workplace innovation. Our interest is in whether types of research and levels of analysis can be helpful to categorise the field rather than to determine the 'right' definition.

Subsequently, we present our categorisation and thereupon, we shall mention the main examples within each of those categories. After that, we will abstract from the separate studies to connect workplace innovation to relevant streams in the social scientific literature on work.

Interpretations and use of the term 'workplace innovation'

There is a substantial stream of research that uses the term 'workplace innovation' as a steppingstone to capture some form of renewal, mostly other than

technological renewal or technological innovation (Eeckelaert et al., 2012; Kesselring et al., 2014; Prus et al., 2017). Not all investigations, however, use a clear definition or a clear measuring construct.

- Some use the term ‘workplace innovation’ in their title but do not spend a word on it in the text (Findlay et al., 2017; Finegold & Wagner, 1998; Kuhn & Weibler, 2021; Marks et al., 1997; Searle, 2008; Verma & Fang, 2003). They often mean innovations in workplaces or in the organisation in general terms (Matthews, 2021).
- Authors apply the term incidentally but mean something different, such as practices that are, in themselves, the innovation of the workplace; or as human resource management (HRM) practices that can stimulate innovation (Jena and Memon, 2018, for example, by ‘workplace innovation’ actually mean ‘innovative work behaviour’), creative ideas (Lu et al., 2017), the introduction of new management concepts as a form of workplace innovation (e.g. Bartram et al. (2020) discuss the introduction of Lean Management in this way), changes in the workplace (e.g. related to the work of employees, as in Kuhlmann & Schumann, 2001), or any innovation or renewal that is new to the workplace and thus (called) a workplace innovation but not specified (e.g. Burke & Sheldon, 2010; Han et al., 2020; Hausberg et al., 2017; Hughes et al., 2019).
- Many use the term ‘workplace innovation’ as a renewal that is a new ‘work(place) practice’, often as an example of High-Performance Work Systems (HPWS), pointing to either separate practices or ‘bundles’ of practices. These studies do not intend to make a contribution to workplace innovation as a distinct field of research but consider their use of the term ‘workplace innovation’ as more or less synonymous with HPWS studies (Balkin et al., 2001; Bamber et al., 2017; Black & Lynch, 2004; Bresnahan et al., 1999; Cho, 2014; Dervojeda et al., 2013; Erickson & Jacoby, 2003; Findlay et al., 2015; Flood et al., 2008; Gkiontsi & Karanika-Murray, 2016; Kalmi & Kauhanen, 2008; Kochan et al., 2009; Kraemer-Mbula et al., 2019; Lantz-Friedrich et al., 2016; Long, 1989; Lowe, 2001; McCartney & Teague, 1997, 2004; Verma & Fang, 2003; Zoghi et al., 2010). Several of them are studying the situation in the US and Canada, where HPWS is an established field of research. The difference between WPI and HPWS is further explained elsewhere (Oeij et al., 2015; 2021a).
- Another group of authors regard workplace innovation in relation to development, like regional economic development and national innovation systems, that requires a form of collaboration among agents and institutions in the innovation system, which is consistent with the notion of workplace innovation (Claussen et al., 2009; Lantz & Totterdill, 2004;

Pomares, 2018, 2019; Pomares et al., 2016; Svare, 2016; Totterdill, 1999, 2020; Totterdill & Hague, 2004).

- Then, there is a cluster of authors that use ‘workplace innovation’ in terms of organisational renewal and design other than the HPWS stream, and distinct from most streams to be discussed below. These authors use the term ‘workplace innovation’ to study organisational innovation and innovations in the organisation, in relation to learning and other innovative work practices (Lorenz, 2015; Raul & Andrei, 2018), responsible management (Ennals, 2014), professionals in human factor design and ergonomics (Badham & Ehn, 2000), non-technological innovation (Carranza et al., 2020; Watanabe et al., 2021), New Ways of Working (Medik & Stettina, 2014), occupational health risks and safety (Jilcha, 2020a, 2020b; Jilcha et al., 2016), autonomous teamwork in production cells (Isa & Tsuru, 2002), the effect of unionisation (Reshef et al., 1993), employee motivation (Palin & Kaartemo, 2016), employee involvement (Hebdon & Hyatt, 1996), democratic dialogue (Garmann Johnsen et al., 2021), human-centred design of digitised industrial work (Hirsch-Kreinsen & Ittermann, 2021), the development of social capital (Hughes et al., 2019), and job satisfaction and well-being (Casini et al., 2018). An exceptional application is the use of WPI by ‘capitalists to adopt new forms of work organization and new production techniques designed to increase profitability less by augmenting the technical efficiency of production than by facilitating greater control over workers’ (Weisskopf, 1987: 134).
- Finally, some researchers apply ‘workplace innovation’ as an example to explain how a method can be applied to achieve workplace innovation (e.g. Durugbo (2020) shows how a problem structuring method can help to identify opportunities for workplace innovation), how technology can facilitate workplace innovation (Tan et al., 2015), how design thinking can contribute to workplace innovation (Matthews, 2021), how innovation leadership can be linked to workplace innovation concepts (Oeij et al., 2021b; Totterdill & Wilkie, 2021), how workplace innovation can be linked to frugal innovation (Etse et al., 2021), how workplace innovation can be connected to the development of ecosystems (Dessers & Mohr, 2021), as a way to involve employees in an innovation process (Lohse et al., 2020), and to understand the relationship between good jobs and the participation in democratic processes (Dhondt et al., 2021).

From a helicopter view, one can say that some users point to workplace innovation as a structural innovation, as an innovation in behaviour and culture, or as a corporate (HR) or supra-corporate (innovation) policy. While some users apply workplace innovation as a process in order to achieve something else – such as better jobs, and better productivity, others consider workplace

innovation as an outcome, and then there are also proponents who combine both angles. This seems acceptable if it is clear which are the dependent and independent variables. Although this diversity of approaches and uses is understandable, it is unhelpful for arriving at a well-demarcated research field.

A categorisation of workplace innovation approaches

In this section, we categorise the most prominent approaches, that is, we choose the most instructive examples that combine a certain type of research and a certain level of analysis. These telling examples are the ones that have a link to theory or a clear distinction as a concept. Examples of conceptualisations that lack such prominent features are the ones that are assessing innovative behaviour of persons – like creativity or contributing to the innovation of the organisation – and/or innovation of workplaces through new behaviour and new measures – such as leadership styles and HR measures. Such approaches are either too general or part of another specific stream, like the HPWS literature or topics like team innovation, innovation climate, and job crafting. Of course, these conceptualisations are connected to workplace innovation but do not make a substantial contribution to the field of workplace innovation as a distinct field. Another prominent feature is policy approaches that promote workplace innovation. These do not particularly contribute to workplace innovation as a distinct scientific field but are intended to contribute to the ‘advancement’ of work and society. Finally, we can include approaches that intend to evaluate workplace innovation policies and those that gauge workplace innovation by selecting variables and building new constructs from existing databases.

We developed a grid of workplace innovation approaches using these levels and types of workplace innovation in Table 12.1. Approaches of workplace innovation appear to be applied at the level of persons and groups/teams, at the organisational level, and at the level of policy-making by industrial branches, and local, regional, national, and international agents. They differ in type. We distinguish, first, fundamental research, which can be theoretical and/or empirical, and aims to test models and develop evidence-based knowledge. The second type is evaluation research, which studies the presence and dissemination of workplace innovation practices and the effect of policy programmes. The third type of approach, practice and policy, looks at programmes and interventions that are developed to support the practical application of workplace innovation. We discuss these approaches elsewhere in more detail (Oeij et al., 2021a). In that publication, we tried to clarify some of the main constructs and concepts of workplace innovation, and bring order to the approaches, given the theoretical ambiguity associated with the concept

until now (Weerakoon & McMurray, 2021). The main purpose of this chapter is to look for the links between the four different streams of social scientific research into the ‘advancement’ of work. The ambition is not to provide a full overview of WPI but a selective view. This, nonetheless, requires categorising the studies we have found.

Observations and interpretations

The categorisation grid is helpful in providing insights into and understanding of the literature. The selected approaches in Table 12.1 are described in Oeij et al. (2021a). Here we summarise our main observations and interpretations. For seven of the nine cells, we could find research that is making a substantial contribution to the field of workplace innovation as a distinct field – two of the nine cells remained empty.

Among the type of fundamental research, that is, testing models and developing evidence-based knowledge, there is one main example at the individual level, which is the Workplace Innovation Scale (WIS). Much research with this psychological measurement instrument has been carried out in Australia and Asia. The other cell of fundamental research is dominated by European research at the organisational level. Here four measuring instruments are positioned that are surveys to investigate the presence of organisational elements of workplace innovation characteristics, namely WPI TNO-WEA (a WPI construct in an employer’s survey), MWIP (Measuring Workplace Innovation Practices), ERIM Monitor (Erasmus Research Institute of Management competition and innovation monitor) and ISHIP index (WPI construct in the Intrapreneurship Index). We observe that there is almost no interaction between the psychological approach and organisational approaches. Recently, both strands do refer to each other but use different definitions of workplace innovation. Perhaps this indicates the need for multi-level research designs that investigate individual and organisational levels in relation to each other. At the regional/national/international level, no fundamental research into workplace innovation is present.

Table 12.1 Workplace innovation approaches broken down by level and type

Level	Type		
	Fundamental research: Testing models and developing evidence-based knowledge	Evaluation research: Developing knowledge of policy and practice	Practice and policy: Programmes and interventions
Persons and groups Individual and team behaviour	1 WIS [McMurray] (Baxter, 2004; Choudhary et al., 2021; Dang, 2018; McMurray & Dorai, 2003; McMurray et al., 2013, 2021a, 2021b; McMurray & Simmers, 2019; Muenjohn & McMurray, 2016, 2017a, 2017b; Muenjohn et al., 2020; Newnham, 2021; Simmers & McMurray, 2019; Von Treuer & McMurray, 2012; Wipulanusat et al., 2017, 2018, 2020)	2	3 SMART [Parker] (Hay et al., 2020a, 2020b; Parker & Jorritsma, 2020; Parker & Grote, 2020)

Level	Type		
Organisations Production systems and HR-systems	4 WPI TNO-WEA [Oeij] (De Kok et al., 2014; Oeij et al., 2011, 2012, 2014; Oeij & Vaas, 2016; Pot, 2011; Mockallo, 2016; 2021) MWIP [Kibowski] (Totterdill, 2015; Kibowski et al., 2019) ERIM Monitor [Volberda] (De Jong et al., 2020; Volberda et al., 2011, 2013; Volberda & Van Den Bosch, 2004) ISHIP index [Stam] (Stam, 2018)	5 EU 2014 [Kesselring] (Kesselring et al., 2014) Eurofound 2015 [Oeij] (Dhondt, forthcoming 2022; Dhondt et al., 2014; Howaldt et al., 2016; Oeij et al., 2015, 2016a, 2016b, 2017a, 2017b, 2021a; Oeij & Dhondt, 2017; Carranza et al., 2021; Carranza & Sanchez, 2021) WPI-index [Dhondt] (Dhondt et al., 2014; Totterdill, 2015) Eurofound 2020 [Van Houten] (Eurofound & Cedefop, 2020)	6 TWIN [Van Amelsvoort/Van Hootegem] (Van Amelsvoort & Van Hootegem, 2017) EUWIN Guide [Totterdill] (Totterdill, 2015; Totterdill et al., 2016) 5th Element Model [Totterdill] (Totterdill, 2015, 2020; Totterdill & Exton, 2014b, 2017; Totterdill & Wilkie, 2021; Kibowski et al., 2019)

Level	Type		
Regional, national, and international institutions High level/institutional strategies and policy/interventions	7	8 National programmes in EU (Pot, 2011; Alasoini et al., 2010; Totterdill, 2009) European Social Fund – ESF (Bureau Bartels, 2011; Xavier & Pot, 2012) My Enterprise 2.0 [Oeij] (Oeij et al., 2014) National programmes outside EU, like Korea (Bae & Kwon, 2008; Bae & Lee, 2017; Cho, 2014; Kim & Bae, 2005)	9 Policy model [Alasoini] (Alasoini, 2009a, 2009b; 2018a; 2018b, 2019; Alasoini et al., 2010, 2011; Garmann Johnsen et al, 2021; Pot et al., 2016, 2017, 2021) EUWIN Policy [EU] (EUWIN, 2022) National agencies (Xavier & Pot, 2012; www.workitects.be; Totterdill & Exton, 2021)

The type of evaluation research aimed at developing knowledge for policy and practice is only found at organisational and higher levels (e.g. at industry, regional, and national levels). The organisation-level research is comprised of European studies by the European Commission and Eurofound, trying to empirically capture the workplace innovation characteristics of companies and comparing these across Europe, or making inventories of variables that measure characteristics of workplace innovation (in diverse European datasets). Higher-level research into workplace innovation is found in national programmes within Europe and in Korea, evaluation research into EU subsidy programmes, and evaluation of regional workplace innovation programmes. The purpose of this type of evaluation research is either to understand empirical practices better or to get a grip on what should be done from a policy perspective to support workplace innovation. Definitions of workplace innovation are often rather broad.

The practice and policy research types are dominated by tools and models for practice. At the level of persons and groups is positioned the SMART model, which supports the practice of job design and work design. At the organisational level, there are organisational design tools (TWIN) and consultancy methods or guides (EUWIN Guide, Fifth Element Model). At the regional, national, and international levels, we observed policy models to support work-

place innovation and analysed and classified approaches in various countries, specific policy-supporting bodies in Europe (EUWIN), and in certain countries (Netherlands, Belgium, Scotland). These examples also apply rather broad definitions of workplace innovation. It can be stated that policy approaches sometimes use workplace innovation as a term to cover many different topics. It is no surprise that 'opportunistic' proponents of specific change may use present fashion fads as a carrier for their interests. Likewise, workplace innovation propagandists take every opportunity to frame related policy and practices as an example of welcomed WPI policy directions.

A historical approach to understanding the concepts and connecting them to streams

We now turn to an overview of streams and concepts of research into work and how that connects to workplace innovation. We will be looking at how concepts of the workplace have developed, and where they come from, and will connect those concepts to research in the sociological, psychological, economical, and management fields of work. Do we see divergence or convergence in the field of workplace innovation and those streams? Anticipating the answer to this question, we observe at least some convergence of research towards the general topic of 'good jobs'. Our approach is not a chronological overview but an attempt to understand whether this research has certain commonalities and how that might have developed over time.

Development of workplace innovation concepts

Workplace innovation is a concept or construct that is used either to explain characteristics of work, jobs, organisations, and behaviour or as a desirable situation in companies and organisations that demand policy support and facilitation from various agents. Having previously looked at workplace innovation from different levels, we now turn to the question of where the concept comes from. We contend that all workplace innovation approaches strive to explain or support the 'advancement' of the work situation for persons (employees, managers) or for the work organisation. Indirectly or directly, workplace innovation contributes to more well-being and more welfare for persons, organisations, and society. And although it may not be deliberately stated by its representatives, workplace innovation practices can be easily linked to a 'good jobs strategy' in general terms. As such, it follows the initial purpose of the quality of working life movement.

In Europe, the term ‘workplace innovation’ is related to the values of the European Social Model (ESM). The ESM is a defining feature of the EU and its Member States and is meant to capture the European alternative to rampant (neo-liberal) free-market economies (in the US) by providing a model of sensible economic policy-making in which economic, welfare, and employment policies form a central part (Rogowski, 2008). The core of the EU policy is to advance economic growth, social inclusion, and employment and to stimulate innovation and knowledge development. In this context and as a response to economic setbacks and crises, many projects in Europe, largely commissioned by the European Commission, have dealt with these topics, not only under the flag of workplace innovation, but often using different names for concepts with great similarities, such as ‘new ways of working’, ‘innovative workplaces’, and ‘sustainable work systems’. Concrete topics under research were, for example, fighting unemployment, reducing the deskilling of labour, developing new ways of working and organising, new types of work and work organisations, social security programmes and measures, and innovation policies and (re-)skilling the labour force (see Pot et al., 2016, 2017, 2020). The ESM focussed on the quality of working life, in contrast to global trends towards Lean Production and Japanisation, with their narrow structural emphasis on productivity and a tendency towards job enlargement rather than job enrichment (Totterdill, 1997). The ESM tries to balance four values: ‘the humanisation of work through advanced job design and social relations; the widespread scope for innovation throughout the organisation; the design and deployment of technology in ways which maximise workforce potential and environmental protection; and increasing employment to reduce the waste of human resources in the labour market’ (Totterdill, 1997: 203).

When exactly the term ‘workplace innovation’ was coined (in Europe) is hard to tell. References to ‘workplace innovation(s)’ can be found in literature from the 1990s, generally referring to the introduction of any new forms of work organisation and any new forms of direct employee participation as innovation strategies connected to the notion of embedment in high road infrastructures (Totterdill, 1997, 1999). One of the first attempts to operationalise the concept of workplace innovation was the Hi-Res report (Totterdill et al., 2002), which stands for ‘High Road concept as a resource to support the creation of new forms of intervention’, aiming at a better understanding of the ‘high road’ and how to get there, which is through a rather messy interplay between several factors. Hi-Res summarised workplace innovation’s defining characteristic in terms of the creation of jobs and practices that empower workers at every level of an organisation to use and develop their full range of knowledge, skills, experience, and creativity in their day-to-day work, leading to high performance simultaneously with high quality of working life. It built

on diverse traditions including both Socio-technical Systems Design (Mohr & Van Amelsvoort, 2016) and Scandinavian Democratic Dialogue (Gustavsen, 1992), and stressed both content and process factors.

From a historical perspective, we can distinguish streams in research that are related to variants of workplace innovation concepts, and that can be connected to a tendency to realise 'good jobs'. These streams are in the field of *sociology* & organisation research, in *safety science* & organisation research, in *economics* & strategy and HR research, and in *psychology* & behavioural research. Moreover, these streams go beyond Europe, implying we can distinguish more geographical approaches to workplace innovation. Although there is overlap between the streams, we tried to demarcate them as accurately as possible in Figure 12.1, which we shall describe.

Fields of research that are connected to workplace innovation

The row 'Sociology & organisation research' (Watson, 2017) in Figure 12.1 depicts the development in a timeline of the above-mentioned European variant of workplace innovation. As stated, it goes back to Socio-technical Systems Design, which stresses the joint optimisation of the social and technical system for success, in conjunction with the presence of (semi-autonomous) team-based work. From there, arrows go over to (later phases of) Human Relations, Humanisierung der Arbeit (Humanisation of work), Strategic Choice, and from there to Democratic Dialogue and Modern Sociotechnics. Alongside these approaches, industrial democracy and reducing alienation of work were driving forces. Subsequently, arrows are going to the High Road perspective, eventually feeding into the EU variant of workplace innovation. What these approaches have in common, at least in Europe (Totterdill et al., 2002), is the weight put on a skilled workforce with decent jobs as a driver for innovation and performance. There is an option to choose High Road perspectives, for which it is important that top management is supportive and that power relations are not too asymmetrical (as is suggested by the Labour Process approach). The EU variant of workplace innovation is a mixture of sub-variants, as there are definitions by policymakers, researchers, and consultants, who each stress different aspects. Their common ground is the European Social Model and its values. The variant of workplace innovation that is proposed by EUWIN, the European workplace innovation network, is the Fifth Element model (Totterdill & Exton, 2014b). Expanding the Hi-Res framework, the Fifth Element model identifies four bundles (or 'Elements') of working practices with a strong association between high performance and high quality of working life, namely: (1) Jobs, Teams, & Technology; (2) Employee-Driven Innovation & Improvement; (3) Organisational Structures,

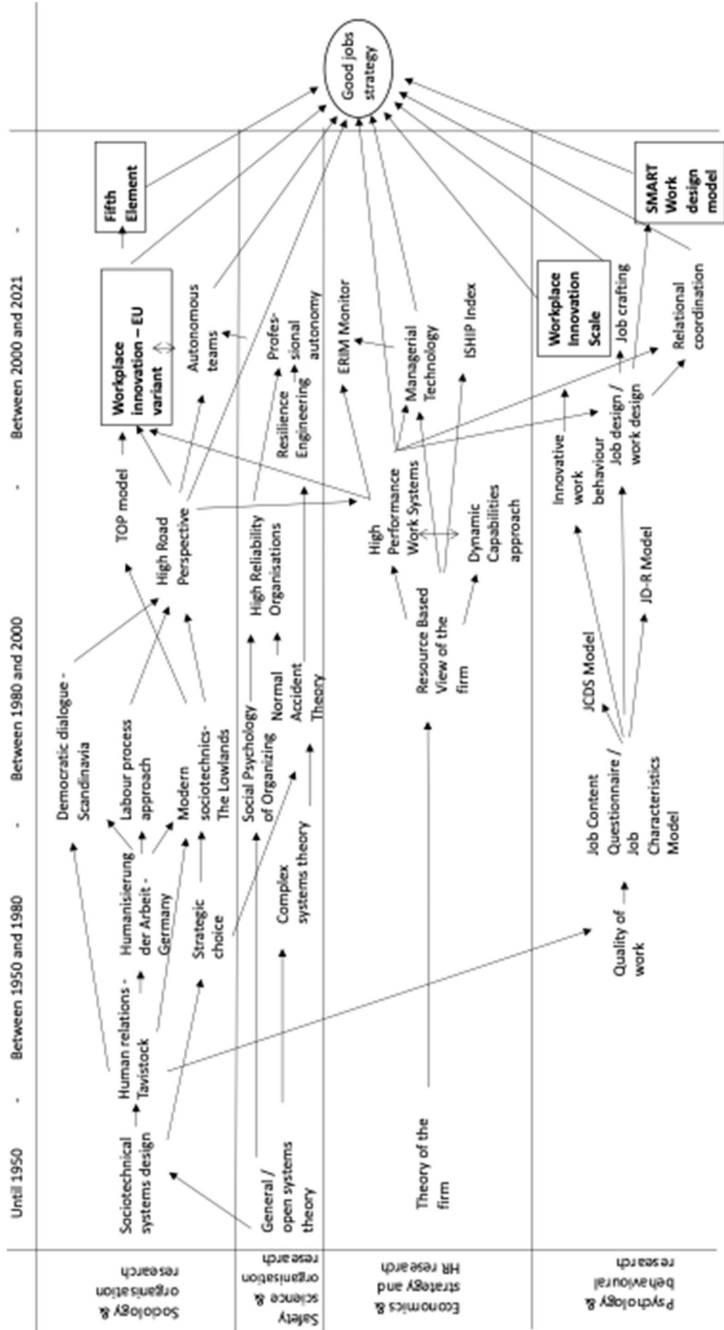


Figure 12.1 Research streams connected to workplace innovation and good jobs strategy

Management, & Procedures, and (4) Co-Created Leadership & Employee Voice. Alignment between these Elements creates a synergy in the form of the 'Fifth Element', a system of mutually interdependent parts that leads to a sustainable culture of innovation and empowerment embedded throughout the organisation. The purpose of the Fifth Element model is to achieve win-win outcomes for organisations and their employees. This then links with an arrow to the 'Good jobs strategy'.

The row 'Safety science & organisation research' in Figure 12.1 takes another route (Woods et al., 2010; Weick & Sutcliffe, 2015). As in the former row, this route starts with the Open Systems theory. This connects to the theory of Complex Systems, the Social Psychology of Organising, and the Normal Accident theory. From there, arrows go over to High Reliability Organising and Resilience Engineering. Both of these theories build on the need for professionals to deal with risks in a non-standard manner, because these professionals must find solutions for problems that are difficult to predict and, therefore, very hard to handle. They must be prepared for the unexpected, think outside the box, and suppress the psychological habit of simplifying complex issues. For this reason, professional autonomy is indispensable, and that requires a design of jobs and teams that can operate highly autonomously. Although the term 'workplace innovation' is not used in this context, the term 'learning organisation' is, and therefore this type of work must take into account human needs that enable professionals to operate flawlessly under tiring conditions. Paradoxically, their work is at times extremely stressful and risky, but at the same time extremely rewarding when operations are successfully ended. Moreover, it is striking that the organisation of work is highly flexible and adaptable during operations, while it is rather bureaucratic and formalistic – namely hierarchic, with formal briefings and debriefings, and intensive training – when there is no disaster to combat. To attract highly qualified staff, it makes sense to follow a good jobs strategy. In nuclear plants and power plants, this is often the case, but not always in the case of professions of first responders in, for example, health care institutions. High-reliability organisations consider safety as very important, perhaps the most salient outcome of their processes – but this may come at the expense of a well-elaborated good jobs strategy. One approach not included here but with affiliations to safety science is systems ergonomics or systems human factors, which proposes an integral view on the interaction of systems/organisations, equipment/interfaces, and people/behaviour (Wilson, 2014).

The third row that we present in Figure 12.1, 'Economics & strategy and HR research', focuses on the effects of HR bundles and the intangibles of organisational performance. The resource-based view of the firm (RBV), stemming

itself from the theory of the firm, studies the strategic resources a firm can exploit to achieve sustainable competitive advantage (Barney, 1991). The RBV proposes that firms are heterogeneous because they possess heterogeneous resources. This means that firms can have different strategies because they have different resource mixes. The RBV focuses managerial attention on the firm's internal resources to identify those assets, capabilities, and competencies with the potential to deliver superior competitive advantages. In a similar vein, the theory of dynamic capabilities is about the capability of an organisation to adapt an organisation's resource base purposefully. The resource-based view of the firm emphasises sustainable competitive advantage; the dynamic capabilities view, on the other hand, focuses more on the issue of competitive survival in response to rapidly changing contemporary business conditions (Teece et al., 1997). Both theories have inspired developers of the High-Performance Work Systems theory that studies which elements of 'HR-systems, bundles and measures' contribute to a firm's competitive advantage. Eileen Appelbaum and her colleagues (2000) compared traditional production systems with flexible high-performance production systems involving teams, training, and incentive pay systems in three industries. The plants utilising high-involvement practices showed superior performance. Besides, workers in the high-involvement plants showed more positive attitudes, including trust, organisational commitment, and intrinsic enjoyment of the work. Various studies have demonstrated links with productivity. It is often linked to the notion of employee voice and empowerment (Boxall et al., 2019; Boxall & Winterton, 2018). On the one hand, the elements of high involvement and high commitment of employees, which are part of the HPWS concept, fed into the workplace innovation concepts applied by EU researchers (see the first row, 'Sociology & organisation research'). On the other hand, HPWS nourished economic and strategic research that was interested in investigating the effect of intangibles on business performance, such as studies into managerial technology by Bloom and Van Reenen (2010). The managerial technology theory states that some aspects of management are considered as technology or "best practice", and that adopting organisational best practices would improve productivity in a typical firm. Bloom & Van Reenen identify several basic management practices which, for example, point to human resources management measures, company governance measures, and performance monitoring measures.

The RBV and HPWS stream influenced the construction of the ERIM Monitor and, to a lesser extent, the ISHIP index (see Table 12.1). The ERIM Monitor is yearly research into the competition and innovation capabilities of Dutch firms. The monitor measures 'social innovation' and strongly overlaps with the EU workplace innovation concepts. The monitor shows over the years that business performance depends more on social innovation than on technolog-

ical innovation, which is an indication for firms of the relevance of investing more in social innovation than they have done thus far (Volberda & Van Den Bosch, 2004; Volberda et al., 2013). ISHIP stands for Intrapreneurship Index, and its goal is to create insight into the conditions (organisational and individual) for entrepreneurship within established organisations (Stam, 2018). The ISHIP index includes a construct of workplace innovation which is measured by assessing to what extent operating employees or workfloor employees are involved with innovation or renewal. In this stream of economic and strategy-related studies, there is less attention to a good jobs strategy. It is absent in the ERIM Monitor and ISHIP index, which both will be discussed further in the next section, and only partially related to the managerial technology studies.

The fourth and final row, 'Psychology & behavioural research', focuses on individual and group or team behaviour. The basis is the experiences of the Human Relations school and the quality of work movement. The driving force was the question of how work can satisfy fundamental human needs (Parker et al., 2017a). Job characteristics theory is a work design theory, and it provides core characteristics for enriching jobs in organisational settings, namely skill variety, task identity, task significance, autonomy, and feedback. These characteristics affect five work-related outcomes (i.e. motivation, satisfaction, performance, absenteeism, and turnover) through three psychological states (i.e. experienced meaningfulness, experienced responsibility, and knowledge of results) (Hackman & Oldham, 1975). In 1980, Hackman and Oldham modified the job characteristics theory. The main changes included the addition of two more moderators (knowledge and skill. and context satisfaction), removal of the work outcomes of absenteeism and turnover, and increased focus on internal work motivation. Several of the outcome variables were removed or renamed as well. In addition to the theory, Oldham and Hackman also created two instruments, the Job Diagnostic Survey (JDS) and the Job Rating Form (JRF), for assessing constructs of the theory (Hackman & Oldham, 1980).

The Job Content Questionnaire (JCQ) has its roots in the functioning of stress theory and is a questionnaire-based instrument designed to measure the content of a respondent's work tasks in a general manner (Karasek et al., 1998). The JCQ originated from the Job-Control/Job-Demand--Control(-Support) model (Karasek, 1979; Karasek & Theorell, 1990). The three central scales are Decision Latitude (a combined scale of Skill Discretion and Decision Authority), Psychological Demands, and Social Support (a combined scale of Supervisor and Coworker Support). These are used to measure the high-demand/low-control/low-support model of job strain development. The demand/control model predicts, first, stress-related risk and, second, active-

passive behavioural correlates of jobs. The JCQ has been elaborated over the years and is still expanding.

Another branch that is connected to the job characteristics model and the Job Content Questionnaire is the Job Demands–Resources model (JD–R) (Bakker & Demerouti, 2014, 2017). The JD–R is used to predict employee burnout and engagement, and, consequently, organisational performance. The JD–R model assumes that employee well-being is explained by job demands and job resources. Research has provided evidence for the existence of two simultaneous processes: the health process and the motivational process. High job demands exhaust employees' mental and physical resources and therefore lead to the depletion of energy, and health problems (i.e. the health process). In contrast, job resources foster employee engagement and extra-role performance (i.e. the motivational process). Several studies have shown that job resources may buffer the impact of job demands on stress reactions. In addition, research has confirmed that job resources have motivational potential, particularly when job demands are high. However, it is less clear what demands are most significant, and what features of the work meet these demands (Oldham & Fried, 2016). While the JD–R model and the Job–Demand–Control(–Support) model of Karasek (1979, 2020; Karasek & Theorell, 1990) are both concerned with individual well-being, the latter plays a larger role in the design of jobs and organisations (mainly at the team level, as in modern sociotechnology or sociotechnics), whereas the first plays a larger role in the management of burnout, stress, and engagement (mainly at the individual level). The JD–R model includes more subjective or personal job resources than Karasek's model, whose focus is on objective job characteristics as job resources.

Another offspring of the quality of work movement is the stream of job design and work design (Knight & Parker, 2021; Oldham & Fried, 2016; Parker et al., 1997, 2017a, 2017b, 2020). Job design refers to the actual structure of jobs that employees perform; thus, job design focuses on the work itself, that is, the tasks and activities that employees complete for their organisation daily (Oldham & Fried, 2016). Work design is broader, and also encompasses the organisation of work and the crafting of work and includes the team level (Parker et al., 2017b). Job design dates to the days of Taylor and scientific management, when job simplification and standardisation were keys to improving operations and profit. Counter-productive behaviours such as tardiness, productivity restrictions, and soldiering behaviour, however, made people aware that jobs should be enriched instead of simplified to improve productivity. This inspired the quality of work movement, for example, in the Motivation–Hygiene theory of Herzberg (see Greenberg & Baron, 2008). To enhance employee performance and job satisfaction, work should include 'motivators' to foster

employee responsibility, achievement, competence, recognition, and advancement (Oldham & Fried, 2016). Job/work design is a core element of the Job Characteristics model and its successors, the Job Demand–Control model and the Job Demand–Resources model, and its more recent variant of Job Crafting (Wrzesniewski & Dutton, 2001). Small wonder that job/work design overlaps with these theories, and with Sociotechnical Systems Design and autonomous team approaches. In the early years, job design stressed characteristics, like task variety, autonomy, task identity, and feedback, that could enrich jobs by countering simplification and standardisation and thus motivate employees. When, by the end of the century, a global shift had taken place from a manufacturing economy to a knowledge and service economy, other job characteristics grew stronger. These were social dimensions of work, for example, interactions, feedback, and social support (Oldham & Fried, 2016). Regarding the effects of job design, job satisfaction and better performance were of central interest in the beginning. But in later years, there came more appreciation for a broader impact on individuals and their organisations, such as health, well-being, safety, innovation, and profitability. Since the 1980s, there has been a growing consideration for the design of work performed by teams, with major topics like autonomy, self-determination and self-directed teams, and team–task interdependency. New fields were opened up that were connected to teams, such as group dynamics, team effectiveness, and team leadership (Parker et al., 2017a). Job/work design partly evolved into the practice of job crafting in the 2000s (Tims et al., 2013a; Wrzesniewski & Dutton, 2001) and into team crafting and collective job crafting in the 2010s (Tims et al., 2013b). The essential question here is how individuals and teams can ‘craft’ their jobs, modify their tasks within certain limits, namely their job discretion, and make their work more meaningful. In reverse, job/work design can create room to manoeuvre for employees such that it affects their roles. Think, for example, of role breadth, extra-role behaviour / organisational citizenship behaviour, and proactive work behaviour. These can be linked to the concept of role orientation, which captures how individuals (and teams) construct their roles in different ways, and can be related to the world of work to promote better job performance (Parker et al., 1997, 2017). This role orientation approach was further developed into the SMART work design model, one of the latest branches of the job/work design stream. The SMART work design model consists of a selection of the existing job characteristics studied in the past 50 years, namely Stimulation (based on skill and task variety), Mastery (based on role clarity and task identity), Agency (based on autonomy), Relations (based on social support and feedback), and Tolerable demands (tolerable workload and stress risks) (Hay et al., 2020a, 2020b).

A final branch to mention is Relational Coordination (RC) (Gittell, 2016), which is a mutually reinforcing process of communicating and relating for the purpose of task integration. RC proposes that highly interdependent work is most effectively coordinated through relationships that are characterised by shared goals, shared knowledge, and mutual respect and that are supported by frequent, timely, accurate, and problem-solving communication. Research shows an association between RC and a wide range of positive performance outcomes for organisations and employees. The design of work systems can support or undermine RC. RC is, first of all, communicating and relating for the purpose of task integration – a powerful driver of performance when work is interdependent, uncertain, and time-constrained. RC's key concept is 'team-work' (Gittell, 2016). RC can therefore be seen as a special type of job/team design and element of High-Performance Work Systems.

A relevant observation about the job/work design stream is that one part of this community studies the psychological antecedents, moderators, mediators, outputs, and outcomes in terms of behaviours, attitudes, and states, and where the main relation under investigation is the one between person and job. The other part of the community seems driven to assess the conditions of 'good' jobs and work in how the production process and operational process is organised and designed, irrespective of the persons that hold these jobs. That part pays more attention to how technology and innovations are applied, and what is the range of options for alternatives to the design of jobs, workplaces, and organisations. The first part of the community is dominated by researchers and professionals with a psychological background, while the second part is dominated by researchers and professionals with a sociological background or a background in business administration or engineering/operations management. Eventually, all approaches support the achievement of 'good jobs' in one way or another. We, however, contend that psychologists underuse their potential for change because they are overlooking production and operation management issues due to a lack of expertise (Karanika-Murray & Oeij, 2017a, 2017b).

A final sub-stream of the quality of work movement to mention here is Innovative Work Behaviour (IWB) (Janssen, 2000; Scott & Bruce, 1994; 1998; West & Farr, 1990). Despite the many empirical studies using this concept, the literature lacks a detailed definition and conceptualisation of IWB, which leaves De Spiegelaere et al. (2018) to conclude that innovative work behaviour deals with employee behaviour aimed at bringing about innovations. These innovations can be products, processes, procedures, or ideas that are new and intended to benefit the relevant unit of adoption. Innovative work behaviour, as with the parent concept of innovation, is a broad concept and has a strong

overlap with other concepts such as creativity in the workplace (Amabile, 1996), intrapreneurship (Bosma et al., 2010), organisational citizenship behaviour (Organ et al., 2006), personal initiative / taking charge (Frese & Fay, 2001), and employee-driven innovation (Høyrup, 2012). The workplace innovation scale (WIS) of McMurray and colleagues (Table 12.1) originated from this stream of psychological behaviour (McMurray & Dorai, 2003). It was designed to identify and measure the behavioural aspects of innovation practices by individuals in their workplace, that is, the innovative behaviour of individuals (see Chapter 9 of this book).

Diverging or converging concepts?

Conclusion

The theoretical and empirical developments in the field of workplace innovation are scattered. We see overlap across the four streams and cross-fertilisation of ideas (Figure 12.1). Several social scientists from different disciplines want to know what explains good or bad jobs. Often, they use different lenses for methods and constructs. Convergence requires active discussion and exchange of viewpoints between users, and a search for common research, political, and practical goals. On the other hand, the present applications of workplace innovation serve different goals, or goals that only broadly cover similar topics, making it impractical and less desirable to strive for scientific convergence. That does not necessarily put 'the advancement of work' at risk. Concerning practical convergence, however, it would be recommendable to stress the good jobs strategy as a common goal for all of the concepts.

On the basis of the categorisation grid (Table 12.1), we stated that there is hardly any interaction between psychological and organisation approaches (sociology, economics, operational/business/management research) in the type of fundamental research. This is also observable when comparing the sociological and psychological streams in Figure 12.1. The link between both is, on the one hand, the Human Relations approach, connecting systems research and job quality research, and on the other, the economic-strategy research on High-Performance Work Systems, which attracts sociological and psychological investigators. The evaluation research in the categorisation grid seems to be more empirical and descriptive than theoretical. It wants to find out what works, who is using certain approaches and why, and on what issues samples of companies, industries, and countries may differ, or not. Since the focus is on companies, industries, regions, and countries in most evaluation research, the

psychological stream of research is almost absent. In the practice and policy type of research, there is a dominance of tools, models, and programmes. Driven by policy objectives, there often are approaches built on (theoretical) assumptions and evidence gathered elsewhere that have resulted in (practical) interventions at the group, company, industry, and geographical level, which are expected to be instrumental to the improvement of work and business. All four research streams contribute to such policy objectives. One could therefore contend that there is most common ground between the sociological, economic, psychological, and safety research streams when it comes to supporting good jobs and good businesses via policy, practice and concrete experiments. The Fifth Element model and the SMART work design model, for example, bundle several evidence-based insights from the four streams into a tool for practice. Perhaps the convergence is strongest in practical and policy-oriented work. The more fundamental research benefits from the fact that the separate scientific disciplines produce a lot of specialised knowledge. There is a clear reason for the existence of distinguished scientific disciplines. We should, therefore, not speak in terms of divergence as ‘undesirable’, because the power of bringing the knowledge together is in developing general policy and practice approaches. After all, responding to disruptive events requires deep knowledge made practical in an integral, systemic manner.

Before providing pointers for future research (in Chapters 13 and 14), we want to point out what the present disruptions mean for a good jobs strategy and the application of workplace innovation as a concept.

Discussion points: digitalisation, COVID-19, and good jobs

This book on workplace innovation comes at a time when several environmental factors are drivers for disruptive changes, besides digitalisation and new technology (Oeij et al., 2019a). We mention only the COVID-crisis, the climate crisis, the energy transition/crisis, and the Russia–Ukraine war. All affect the future of work. Many propose that the future of societal well-being and welfare requires high-quality products and services, and achieving this cannot be done without highly qualified staff. Nonetheless, external factors, such as ongoing digitalisation and crises like the COVID-19 pandemic, might force entrepreneurs to make labour cheap, flexible, and replaceable by technological solutions. What does that mean for a good jobs strategy, and what is the role of workplace innovation?

Is the shortfall of good jobs to be viewed as a massive market failure, a gross economic malfunction, and not just a source of inequality and economic exclusion (Rodrik & Sabel, 2019)? This book is written in a time that is char-

acterised by ongoing digitisation and COVID-19. Digitisation is related to new technological applications like data science, AI, VR/AR, machine learning and algorithms, and nanotechnology, but also to ongoing automation and robotisation. As it affects IT hardware and IT software in almost any thinkable business, the influence is pervasive and at the same time, unpredictable in its effects on the quality and quantity of work. The effects can be either positive or negative, largely depending on the choices made by decision-makers who are surrounded by a volatile and fast-changing world (Parker & Grote, 2020). While long-term vision, the drive for sustainability, a greener economy, and empowering employees might favour the mindset towards a good jobs strategy, there is pressure to keep costs controllable and limited room to invest in long-term goals. That pressure comes from the economic threat related to COVID-19, and the competition that may force companies to replace employees with cheaper modes of production.

Against the background of digitisation, technological innovation, and new business models, the distribution of economic value issues must be taken into account, for which a workplace-innovative organisation could offer solutions. Much research indicates that employees receive less and less of the added value that is created in organisations (Elsby et al., 2013). Commitment to workplace-innovative ways of production requires at least a discussion about how the extra profit is distributed (Dhondt, 2021; Osterman, 2018; Rodrik & Sabel, 2019). The introduction and impact of new technology is largely a matter of strategic choice by decision-makers. In the sociotechnical approach of workplace innovation, for example, the organisation design sequence is that the work processes must first be organised and only then automated. In practice, a lot of technology comes off the shelf, and there is not much to organise. Bloom et al. (2014) indicate that information technology and communication technology have a different impact on how organisations function. Information technology ensures that employees themselves have access to all the information they need to process. This technology encourages a broadening of tasks. Communication technology, on the other hand, ensures that management has a better view of the work and will be more inclined to manage processes centrally. The specialisation of the work is a logical choice. In a similar vein, Autor and Salomons (2018) point to the automation choice between augmenting employees or replacing them.

We know from decades-long research that the way new technologies are being implemented results in changes in jobs or tasks. Some jobs improve in content; some become worse. Much discussion in industries is on the possibilities for reskilling and upskilling of work. The general trend seems to be that technology is skill biased (Acemoglu, 2002). More digital technologies require that

companies do more training and develop ‘T-shaped’ job profiles (EMPIRICA et al., 2020). ‘T-shaped skills’ refers to both specialist and generalist knowledge. Many industries in advanced economies indicate they are confronted with personnel shortages and have great difficulties in attracting relevant staff. A major concern is to support the implementation of more high-quality jobs and prevent the continuation of or increase in bad jobs.

At the same time, digital technologies are a threat to good jobs. Digital technology has the potential to shape organisations, if decision-makers let that happen. An example is the rise of platform work and click-work (Dhondt et al., 2021). Organisations driven by these technologies tend to centralise all decision-making and reduce work to top-down assignments. The contribution of the workers (note, they are not ‘employees’) to what they do and how they do it is very limited. Not only does the worker not get much out of work financially, but they also learn very little from their work situation. Long working days and bad work situations do not stimulate socially innovative behaviour (Warhurst & Dhondt 2020). Another threat is that digital technologies ensure a strong centralisation of decisions and standardisation of work in companies. Software developments such as Enterprise Application Integration (EAI) allowed companies to start integrating all company management domains. Technical integration was seen as a precondition for managerial and cultural integration in very large firms. The EAI technologies allowed companies to eliminate differences in practices between parts of companies and all employees’ work practices. Quality of work, use of skills, and ownership of employees are affected negatively: instead of good jobs (or ‘active work’, as Karasek calls it; Karasek & Theorell, 1990), there was more passive and stressful work, and sometimes pointless work.

Moreover, an increase in the impact of digital technology is expected. Although the number of robots remains low in the industry (Müller et al., 2019), the application of artificial intelligence (AI) in worker management systems can have unforeseen consequences for employees’ autonomy (Das et al., 2020; Zuboff, 2019). Employees are unaware of what is driving them and thus lose the opportunity to learn from work. The learning of the machine is part of the algorithm and the unlearning of humans (Dhondt et al., 2021).

In practice, there is a broad set of technologies and employees, and managers will have to be aware of how they shape their composition of technology, for which a design theory can be a useful tool. In this respect, it is important to consider how employees can be involved in decisions to shape technology and organisation (Dhondt, 2021). To create human-centred workplaces, the

'old' sociotechnical notion of a 'joint optimisation' of work, organisation, and technology is still valid (Hirsch-Kreinsen & Ittermann, 2021).

Coda

The study of work and the striving for 'advancement of work' go beyond the divergence in the research streams. Managerial choices can lead to good jobs, but can they also lead to good jobs in bad economic times? Perhaps cheap, 'not good enough' automation and crises like COVID-19 make such managerial choices hard. Managers, investors, and decision-makers always have some room for manoeuvre to combine healthy economic performance with technology implementation that ensures good jobs. Divergence in science is welcomed if it leads to more creativity and better knowledge. But going beyond 'A fair day's-wage for a fair day's-work' (T. Carlyle) towards a 'fair working life's employability for a fair working life's technology adoption' demands a fair say in our common future. At a certain point, we need to converge or bring together the insights of the four different research streams and perhaps create synergetic and integral views on the 'advancement of work'. A broad approach in dealing with workplace innovation can be such a choice.

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Appendix 12.2: Work design references as an example of WPI

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