CHAPTER 2.

SUSTAINABLE EMPLOYMENT IN THE AGE OF DIGITALISATION: UNPACKING THE ORGANISATIONAL LEVEL

Ine Smits, Marine Franssen, Laura Beuker, Karen Van Aerden, Miet Lamberts, Ezra Dessers

ABSTRACT:

The implementation of digital technologies changes tasks, jobs, organisations and even the composition of the labour market. Whereas it is often theorised how technology possibly affects working conditions, there is only a limited number of empirical studies available. Moreover, the latter shows that actually, the organisation is the determining mediating actor. To understand how organisational choices affect the relationship between digital technologies and the sustainability of jobs, this chapter organises 25 case studies in Belgian organisations using digital technology, varying in size and sector.

Regarding the organisational level, it is clear that the implementation of highly innovative technologies can have far-reaching effects on the organisational structure. It also challenges leadership and HR policies and implies changes in job content, working environment and employment conditions. To cope with new technologies, the literature describes the need to adapt job design to adequately incorporate new tasks and responsibilities for employees. In the case of Belgium, it is expected that job content will mainly shift to control and monitoring as opposed to performing tasks. Since the organisational context is crucial for the workability of these newly adapted jobs, this chapter more specifically looks at the role of the middle manager in the design process.

Keywords: *Digital technology, digitalisation, job design, organisational design, employment sustainability*

INTRODUCTION

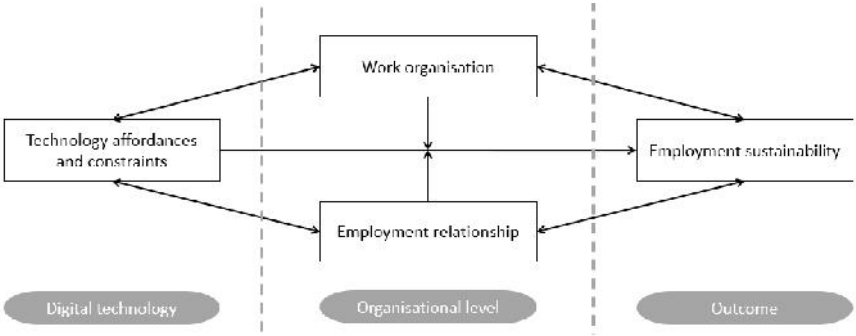
The increasing use of digital information and technologies, or digitalisation, influences our society on multiple levels. In addition to labour market effects, new digital technologies also challenge the current reality of work on the organisational and job level – affecting human-technology interaction, requiring new skills and imposing hierarchical changes (Veile et al., 2019). This chapter focuses on the organisational black box related to digitalisation, including organisational models and managerial practices that may promote

sustainable employment contextualised within technological innovation. We present a literature review discussing the state of affairs regarding the 'organisational level' as a defining intermediate factor between the implementation of digital technologies and job quality outcomes. The following paragraph (1) describes the conceptual framework for the literature review, defining four key concepts, and paragraph (2) presents the results of the literature review. Finally, we briefly elaborate on an action plan for upcoming research.

1. CONCEPTUAL FRAMEWORK

The interrelationships between the following four key concepts form the conceptual framework for the literature review. On the left-hand side, technology affordances and constraints represent the potential influence of digital technologies. Centrally, the organisational level is composed of work organisation and employment relationship, with distinction based on a conceptual model by Van Hootegem (2000). The first three concepts are defined in the next paragraphs. On the right-hand side, employment sustainability understood as the consequence of combining beneficial job features is mentioned as the outcome variable.

Figure 1. Conceptual framework



1.1 TECHNOLOGY AFFORDANCES AND CONSTRAINTS

The perspective of Technology Affordances and Constraints Theory refers to the potential of interactions between people and technology. The theory's essential premise is that the impact of a digital tool can only be understood when considering the synergy between its specific technicities, on the one hand, and its organisational adoption and human experience, on the other hand. This synergy leads to so-called technological affordances and constraints. Technology affordances represent the action potential of new

technologies: how meeting a particular goal can be facilitated by the use of technology. For example, the combination of the technological features of a certain digital file-sharing platform and the personal skills of a group of employees using this platform leads to the technology affordance of "information sharing". This is not inherent to the technological tool, nor is it characteristic of the group of individuals using the tool or the organisational context in which the tool is applied. "Information sharing" refers to what potentially can be reached when this platform is used and is thus a potential affordance resulting from the interaction between humans and the tool. This should, however, be distinguished from what is actually afforded by the technology. If, in the given example, employees use this platform for informal chatting rather than for sharing work-related content, "information sharing" is a technology affordance that is not afforded in reality.

Technology constraints, on the other hand, determine "ways in which an individual or organization can be held back from accomplishing a particular goal when using a technology or system" (Majchrzak & Markus, 2012: 1). A technology constraint of the file-sharing platform could, for example, be "decreasing direct communication", as it limits personal conversations regarding file-sharing among employees.

1.2 WORK ORGANISATION & EMPLOYMENT RELATIONSHIP

According to Van Hootegem (2000) and Huys et al. (2013), each organisation can be understood as the result of combined organisational choices in the field of its labour division and the employment relationship. In this model, organisational choices with regard to labour division include the production organisation (structure of the primary value-adding process), production technology (machinery and technology to produce outputs) and work organisation (grouping tasks into work packages to design workplaces). The combination of production organisation, production technology and work organisation results in a certain organisational structure within which specific jobs are defined (Huys et al., 2013; Van Hootegem, 2000). In our conceptual framework, we have enlarged and renamed this concept to 'work organisation' to reframe the focus on how organisations deal with jobs and roles within an organisational structure. In this literature review, the concept of work organisation thus includes choices regarding production organisation and technology, as well as the creation of jobs, roles and an organisational structure. The connections between these elements and technology are described in the following paragraphs.

The employment relationship concept refers to aspects of the way humans fit into these jobs, discussing allocation, disciplining and industrial relations (Huys et al., 2013; Van Hootegem, 2000). This also relates to the role of leadership, human resource management (HRM) and other managerial practices – elements that are also being formed by the

organisation's corporate culture. The following paragraphs present a literature review on the connection between digital technologies and the employment relationship.

Evidently, choices concerning the concept of work organisation affect the possibilities regarding employment relationships, and vice versa, as together these aspects comprise the organisation as a living organism. A conceptual framework, however, requires conceptual categories and definitions to allow for a fruitful analysis. Going forward we'll search for the optimal combination of elements in the work organisation and employment relationships to guarantee employment sustainability in the context of digital technologies.

1.3 EMPLOYMENT SUSTAINABILITY

Drawing on the concept paper by Eurofound (2015), two main components are distinguished within the broad concept of sustainable employment. The first component, "job quality", refers to the nature and quality of objective job characteristics and the work environment. However, to be able to meet the needs of the worker in the present without compromising his/her ability in future work requires more than the mere presence of high-quality working conditions in a current job (Eiffe, 2021). Therefore, a second component is distinguished – i.e., the "quality of working life". This term refers to a broader (and, to a degree, also more subjective) set of individual work outcomes such as social protection, job satisfaction, willingness and motivation to stay in (current) employment, opportunities for personal growth, health, well-being and the compatibility of work with other life spheres (Eiffe, 2021; van Dam et al., 2016). In other words: the "job quality" component is mainly related to the characteristics of one's current job, whereas the "quality of working life" component is broader and relates to the fit between job characteristics and individual characteristics/circumstances now and in the future (Eurofound, 2015). The distinction between both components also relates to the distinction between objective and subjective dimensions of work.

2. LITERATURE REVIEW

2.1 WORK ORGANISATION

Organisational structures are often understood in two categories: organic and mechanistic designs. Whereas the first is more flexible and characterised by decentralisation, empowerment, few rules and formalities, horizontal communication and collaborative teamwork, the latter is more rigid and known for stricter vertical and hierarchical regulations (Wilkesmann & Wilkesmann, 2018a). Regarding the fit between digital technologies and organisational structure, Shamim et al. (2016) argue that since the

digital transformation creates an unstable environment, the innovation and change management that is required fits best with an organic organisational design. Here, decision-making processes are faster, and both managers and employees are able to react more flexibly to the shifting challenges (Veile et al., 2019). In addition, a complex digital transformation affects all organisational processes, and rigid organisational structures are less likely to implement such profound changes (Fettig et al., 2018).

Nevertheless, Wilkesmann & Wilkesmann (2018) describe the different use of new digital technologies in organic as well as mechanistic organisation structures. Technologies in mechanistic organisational structures tend to reinforce the reproduction of routines and have employees filling the gaps, whereas technologies in organic structures mainly contribute to innovations. It is likely that path-dependency following the existing organisational structure steers the selection, implementation and use of new technologies (Lall, Seim, Torvatn & Knutstad, 2016). Reversely, new technologies necessitate a change in the way work is organised, leading to the emergence of and search for new forms of work and organisation (Van Hootegem, 2016). For example, a technology that allows direct and immediate communication could create the technology affordance of "communicating across hierarchical levels", impacting the traditional organisational hierarchy. Expert interviews with managers in technology-adopting companies stress the importance of simultaneously adapting the organisational structure to the use of digital technologies (Veile et al., 2019). In this regard, Cagliano et al. (2019) showed that enterprises tend to transition from a vertical organisation with a centralised decision-making structure to a flat, decentralised organisation when technical complexity increases.

Changes in the organisational structure imply changes on the job level regarding the combination of different tasks as well as the internal functional hierarchy. Veile et al. (2019) recommend that adaptations should be made in terms of job design to encompass new tasks and responsibilities as a result of working with new technologies. This includes the adjustment of relevant job characteristics to combat new job quality risks. Examples could include changes in compensation following task complexity or flexible working hours, updated training opportunities, efforts to instil teamwork, more flexible workplaces and attention towards social support from colleagues and managers to prevent isolation. Lacking to adapt job design can increase stress and affect well-being (Kadir & Broberg, 2020).

Naturally, the introduction of new technologies also affects the nature of tasks. Veile et al. (2019) observe that with increased automation, machines undertake routine tasks and leave employees with more intellectual demands such as decision-making. Moreover, Cagliano et al. (2019) explain that workers' tasks differ with the level of technological complexity that is introduced. When organisations apply automations of limited technological complexity, the remaining tasks are characterised by specialised manual activities. When organisations fully implement and integrate a large set of technologies, tasks shift to multitasking activities mainly related to the production, reparation or control

of the given technology, with a higher proportion of cognitive tasks (Cagliano et al., 2019). A technology that replaces manual activities could, for example, lead to the technological constraint of "diminishing low-educated work".

These changes fuel both discussion and predictions about job losses. Certain job or task characteristics, however, seem to shield jobs and tasks from being replaced or profoundly changed by digital technology. For now, the disruptive impact of digital technologies is limited in jobs that demand complex and flexible decision-making or require a personal relationship, such as personal care or assistance (Brolis et al., 2018). Nevertheless, changes in task composition undeniably have direct and significant effects on skills requirements and the job quality of employees (see infra.).

2.2 EMPLOYMENT RELATIONSHIP

Similar to the previous paragraphs, technology affordances and constraints are expected to affect how employment relationships are formed, and vice versa. The literature on this topic is limited and mainly focuses on the managerial preconditions for introducing new technologies, rather than on how employment relationships change as a result.

When implementing new digital technologies, companies step out of their comfort zone. Together with changing the general architecture of an organisation's structure, Veile et al. (2019) emphasise the need for systematic cultural change when addressing a new organisational reality. This cultural change should be initiated by management (top-down approach) and conducted incrementally. The culture that enterprises should aim for is described in terms of willingness to learn, openness to new things, the promotion of creativity, idea generation and an entrepreneurial mindset (El Sawy et al., 2016). Kiel et al. (2017: 16) mention an "adaptable corporate culture convinced of the need to pursue the novel industrial paradigm". This corporate culture is reflected in the disciplining and leadership style of managers, HRM practices with regard to allocation and training, and the context of employee involvement and industrial relations.

Considering leadership style, the most commonly discussed type of leadership in the context of digitalisation is the transformational leadership style (Shamim et al., 2016). Even though transformational leadership is mainly considered relevant during specific changes, in practice it might become a vested means of coordination due to the continuous change processes that confront organisations (Schoemaker et al., 2018; Imran et al., 2020). In the context of Industry 4.0, knowledge-oriented leadership is also put forward. This new construct focuses on the development, conservation and sharing of knowledge in the company by combining the ad-hoc flexibility of transformational leadership with the more stable fundaments of transactional leadership (Shamim et al., 2016).

Disciplining in the context of a digital transformation should tolerate mistakes and focus on creativity to rapidly learn from failures (Veile et al., 2019). According to Self-Determination Theory (SDT) (Rigby & Ryan, 2018; Van den Broeck et al., 2016), an 'autonomy-supportive context' in particular will promote the autonomous motivation of employees and make jobs more resourceful, allow workers to have more control and teach them to apply new skills; these are crucial elements to successfully implementing a digital transformation (Tuckey, Bakker & Dollard, 2012; van de Voorde et al., 2016). Research shows a clear connection between an autonomy-supportive context and employee engagement and well-being, with employment relations as a guarantee for crucial preconditions (Gagné & Bhave, 2010). Various new technological applications have strong potential to create this 'autonomy-supportive context', while some digital tools challenge traditional autonomy-supportive HR and leadership practices (Hertel, Stone, Johnson & Passmore, 2017). For example, an application to change work schedules anytime and anywhere allows the technology affordance "flexible scheduling". Whether this affordance leads to better or worse job quality outcomes for employees (e.g., regarding work-life balance) depends on how the organisation approaches this technology. The organisational context thus serves as a moderator in the relationship between a technology affordance or constraint and employment sustainability.

Looking at allocation, leading members of the firms interrogated by Horváth and Szabó (2019) stated that the absence of a leader with appropriate skills and experience to pilot Industry 4.0 projects was mainly an issue in smaller businesses. This is in line with studies on HRM in small and medium enterprises which show that these businesses traditionally operate more in a flexible and informal manner, where both managers and employees are less likely to receive formal training and companies encounter difficulty attracting and retaining highly competent employees (Singh & Vohra, 2005). The appropriate digital skills to understand, handle and coordinate new technologies, however, are stated to be a necessary precondition for a digital transformation which can be met through training and education or attracting specialised employees (Brolis et al., 2018; Veile et al., 2019).

From the employee-side, employee involvement is frequently underlined as a precondition for the successful implementation of new technologies for several reasons. Employees are the ones who will apply and operate new technology (Veile et al., 2019), and since they are familiar with the current work processes and interactions, their involvement logically can help to improve them (Kadir & Broberg, 2020). Employee involvement also affects perceived well-being and operational performance (Kadir & Broberg, 2020; Tortorella & Fettermann, 2018).

On a macro-level, employee involvement is studied in the context of industrial relations and social dialogue. Recently, trade unions' attention towards the topic has also been sharpening. Eurofound (2016) affirms the key role of social partners in achieving win-win strategies for dealing with organisational change. In 2018, Voss and Riede (2018) stated that 65% of questioned trade union representatives and company-level workers mentioned

that digitalisation has risen as a topic of information and consultation. Recently, European cross-sectoral social partners have published a framework agreement to optimise the benefits and deal with the challenges of digitalisation in the world of work (Business Europe et al., 2020). In Belgium, digitalisation was also one of the topics of the 2017-2018 InterProfessional Agreement and was identified as an important societal challenge.

3. EFFECTS ON EMPLOYMENT SUSTAINABILITY

With regard to the effect of digital technologies on employment sustainability, an ambivalence can be found between enhancements due to the decline in physical tasks and work being upgraded in terms of intellectual tasks (Eurofound, 2019), on the one side, and scenarios of increased polarisation leading to worse work and employment conditions or unemployment among the low-skilled workforce (Ghobakhloo, 2020), on the other. Empirical analyses show how the use of specific technologies both positively and negatively affects sub-elements of the broad concept of employment sustainability. For example, increased physical health risks include visual fatigue caused by augmented screen time and more musculoskeletal problems due to sedentary tasks (EU-OSHA, 2017; Tran & Sokas, 2017). By contrast, robots that are used for alleviating the lifting of heavy weights lead to fewer injuries (Brolis et al., 2018). In addition, the technology affordance of 'working anytime anywhere' allows flexibility, which could lead to a better or worse work-life balance, depending on how organisations, managers and employees approach this. The same applies to scheduling tools that optimise the allocation and timing of tasks, as they lead to more efficiency but may also diminish rest periods and thus increase workload (Brolis et al., 2018). A direct communication tool can increase the level of autonomy but also the level of control, depending on its application. As regards up-to-date skills, Brolis et al. (2018) stipulate that even though some technologies do not seem complex (e.g., asking cleaners to use a smartphone for work schedules), all workers should receive training to acquire the necessary numerical or computer skills. Lastly, various research highlights how the use of technologies, especially in the platform economy, can lead to the isolation of workers (EU-OSHA, 2017).

The separate effects on sub-elements of employment sustainability are expected to be amplified because different types of tasks tend to systematically bundle together (Fernández-Macías et al., 2016). Intellectual and social tasks are often combined, while physical demands co-occur with routine tasks and the use of machines. This implies that certain jobs and sectors currently deal with an enormous impact from the increased use of technologies, whereas others are rather untouched. The fact that the impact of new technologies is unequal over jobs and sectors leads to an increased difference in job quality, and job polarisation may be close at hand (Peña-Cases et al., 2018).

More importantly, the large majority of research concludes that the impact of digital technologies on job quality depends on the context in which these innovations are applied and how they are used. The role of managers and HRM practises is thus crucial. For (middle) managers, the most prominent questions in the context of digitalisation relate to employee autonomy, control mechanisms and standardisation of processes (Cagliano et al., 2019). This refers to the difficulty in instilling an autonomy-supportive environment to increase employee engagement and well-being. For this to happen, elements of work organisation as well as employment relationships are crucial.

Cagliano et al. (2019) have observed a strict prescription of work procedures and limited autonomy in so-called "process-automated factories", i.e., organisations with a low number of digital technologies that are integrated mainly at the level of production phases. In "smart factories", on the other hand, a high number of digital technologies are fully integrated in operation processes, and workers experience autonomy in work procedures in terms of control, problem solving and working methods. Cirillo et al. (2019) find that the introduction of Industry 4.0 artefacts can cause diverse effects on employees' autonomy levels. Some practices increase employee discretion, while others facilitate strict managerial control mechanisms. An example of the latter is the use of software to check if employees are performing their tasks in a designated amount of time (Kadir & Broberg, 2020) or task allocation through a digital system including which operations workers have to perform, as well as when and in what order (Wilkesmann & Wilkesmann, 2018b). In personal care, for example, technology allows employees to optimise their work schedule. On the one hand, this allows them to better arrange their working hours, while, on the other hand, it might lead to more time pressure (Brolis et al., 2018).

The type and use of digital technologies, as well as the organisational structure in which they are installed, thus determine certain job characteristics and employees' job quality. Butollo et al. (2019) declare that the projects currently being implemented tend to increase standardisation and work control. This might be explained by the desire for control as a significant driving force for people in a leadership position (Horváth and Szabó, 2019). Research shows that, rather than the technology itself, different forms of organisational design impact results and workers' perceptions of working with digital technologies (Wilkesmann & Wilkesmann, 2018b). Nevertheless, the literature on this topic is limited.

CONCLUSION

This literature review has shown the overwhelming impact of digital technology on all aspects of an organisation. In the work organisation as well as in employment relationships, the recurrent advice is to align strategy, technology and organisation to create optimal outcomes, both financial and related to well-being. Nevertheless, the vast majority of research on digital technologies consists of theoretical papers, far outweighing

the empirical research on organisational contexts (Cagliano et al., 2019; Frank et al., 2019; Kadir & Broberg, 2020). Future research should therefore focus on data collection in order to specify the precise requirements for shaping different elements in work organisation and employment relationships, as well as how to align them.

In addition, the digitalisation of the manufacturing sector is especially being studied from a technical point of view. Implications of technological innovation in terms of labour and employment relations is still a relatively young field (Habraken & Bondarouk, 2017; Vacek, 2016). It would be beneficial for future research to include other sectors and to open up this perspective from a sole focus on technical features to the potential interaction between technology and people in the context of an organisation (as described in the TACT).

ACKNOWLEDGEMENTS

This working paper was created in the context of the SEAD project, funded by Belspo-BRAIN. It is part of the induction paper of the project, which can be found on the project website: www.sead.be.

REFERENCES

Brolis, O., Paul, S., Stouffs, A. & Wattecamps, C. (2018*). L'impact de la révolution numérique sur le secteur des services à la personne*, 57.

Business Europe, SME UNITED, CEEP & ETUC. (2020). European social partners framework agreement on digitalisation.

Butollo, F., Jürgens, U. & Krzywdzinski, M. (2019). From lean production to industrie 4.0: More autonomy for employees? In *Digitalization in Industry: Between Domination and Emancipation,* 61–80. Palgrave Macmillan. https://doi.org/10.1007/978-3-030-28258-5_3

Cagliano, R., Canterino, F., Longoni, A. & Bartezzaghi, E. (2019). The interplay between smart manufacturing technologies and work organization: The role of technological complexity. *International Journal of Operations and Production Management*, 39(6), 913–934. https://doi.org/10.1108/IJOPM-01-2019-0093

Cirillo, V., Rinaldini, M., Staccioli, J. & Virgillito, M. E. (2019). Workers' intervention authority in Italian 4 .0 factories: autonomy and discretion.

Eiffe, F.F. (2021). Eurofound's Reference Framework: Sustainable work over the life course in the EU. *European Journal of Workplace Innovation*, 6(1–2), 67–83.

El Sawy, O., Kræmmergaard, P., Henrik Amsinck & Anders Lerbech Vinther. (2016). How LEGO Built the Foundations and Enterprise Capabilities for Digital Leadership. *MIS Quarterly Executive*, 15(2), 141–166.

EU-OSHA. (2017). Protecting Workers in the Online Platform Economy: An overview of regulatory and policy developments in the EU. *Publications Office of the European Union*. https://osha.europa.eu/en/tools-and-publications/publications/regulating-occupational-safety-and-health-impact-online-platform/view

Eurofound. (2016). Win-win arrangements: Innovative measures through social dialogue at company level. *Publications Office of the European Union*, Luxembourg.

Eurofound. (2019). The future of manufacturing in Europe. *Publications Office of the European Union*, Luxembourg.

Fernández-Macías, E., Hurley, J. & Bisello, M. (2016). What do Europeans do at work? A task-based analysis: European Jobs Monitor 2016. *Eurofound*. https://www.eurofound.europa.eu/nl/publications/report/2016/labour-market/what-do-europeans-do-at-work-a-task-based-analysis-european-jobs-monitor-2016

Fettig, K., Gačić, T., Köskal, A., Kühn, A. & Stuber, F. (2018). Impact of Industry 4.0 on Organizational Structures. *2018 IEEE International Conference on Engineering, Technology and Innovation (ICE/ITMC)*, 1–8. https://doi.org/10.1109/ICE.2018.8436284

Frank, A. G., Dalenogare, L. S. & Ayala, N. F. (2019). Industry 4.0 technologies: Implementation patterns in manufacturing companies. *International Journal of Production Economics*, 210, 15–26. https://doi.org/10.1016/j.ijpe.2019.01.004

Gagné, M. & Bhave, D. (2010). Autonomy in the Workplace: An Essential Ingredient to Employee Engagement and Well-Being in Every Culture. *Human Autonomy in Cross-Cultural Context*, 1, 163–187. Springer Netherlands.

Ghobakhloo, M. (2020). Industry 4.0, digitization, and opportunities for sustainability. *Journal of Cleaner Production*, 252. https://doi.org/10.1016/j.jclepro.2019.119869

Habraken, M. & Bondarouk, T. (2017). Smart Industry Research in the Field of HRM: Resetting Job Design as an Example of Upcoming Challenges. *Electronic HRM in the Smart Era*. https://doi.org/10.1108/978-1-78714-315-920161009

Horváth, D. & Szabó, R. Z. (2019). Driving forces and barriers of Industry 4.0: Do multinational and small and medium-sized companies have equal opportunities? *Technological Forecasting and Social Change*, 146, 119–132. https://doi.org/10.1016/j.techfore.2019.05.021

Huys, Ramioul, M. & Van Hootegem, G. (2013). High performance workplaces: Background paper for the Third European Company Survey. https://docplayer.net/3656415-High-performance-workplaces-background-paper-for-the-third-european-company-survey.html

Imran, F., Shahzad, K., Butt, A. & Kantola, J. (2020). Leadership Competencies for Digital Transformation: Evidence from Multiple Cases. *Advances in Intelligent Systems and Computing*, 1209 AISC, 81–87. https://doi.org/10.1007/978-3-030-50791-6_11

Kadir, B. A. & Broberg, O. (2020). Human well-being and system performance in the transition to industry 4.0. *International Journal of Industrial Ergonomics*, 76, 102936. https://doi.org/10.1016/j.ergon.2020.102936

Kiel, D., Müller, J. M., Arnold, C. & Voigt, K. I. (2017). Sustainable industrial value creation: Benefits and challenges of industry 4.0. *International Journal of Innovation Management*, 21(8), 1–34. https://doi.org/10.1142/S1363919617400151

Majchrzak, A. & Markus, M. (2012). Technology Affordances and Constraints in Management Information Systems (MIS).

Peña-Cases, R., Ghailani, D. & Coster, S. (2018). The impact of digitalisation on job quality in European public services. *European Social Observatory & European Public Service Union*. https://www.researchgate.net/publication/328027407_THE_IMPACT_OF_DIGITALISATION_ON_JOB_QUALITY_IN_EUROPEAN_PUBLIC_SERVICES_THE_CASE_OF_HOMECARE_AND_EMPLOYMENT_SERVICE_WORKERS

Schoemaker, P. J. H., Heaton, S. & Teece, D. (2018). Innovation, dynamic capabilities, and leadership. *California Management Review*, 61(1), 15–42. https://doi.org/10.1177/0008125618790246

Shamim, S., Cang, S., Yu, H. & Li, Y. (2016). Management approaches for Industry 4.0: A human resource management perspective. *2016 IEEE Congress on Evolutionary Computation*, 5309–5316. https://doi.org/10.1109/CEC.2016.7748365

Singh, M. & Vohra, N. (2005). Strategic Human Resource Management in Small Enterprises. *Journal of Entrepreneurship*, 14, 57–70. https://doi.org/10.1177/097135570401400104

Tortorella, G. L. & Fettermann, D. (2018). Implementation of industry 4.0 and lean production in brazilian manufacturing companies. *International Journal of Production Research*, 56(8), 2975–2987. https://doi.org/10.1080/00207543.2017.1391420

Tran, M. & Sokas, R. K. (2017). The gig economy and contingent work: An occupational health assessment. *Journal of Occupational and Environmental Medicine*, 59(4), e63.

Vacek, J. (2016). Socio-Economic aspects of Industry 4.0. Proceedings of the 4th International Conference Innovation Management, Entrepreneurship and Corporate Sustainability, 731-741.

van Dam, K., van Vuuren, T. & Kemps, S. (2016). Sustainable employment: the importance of intrinsically valuable work and an age-supportive climate. *The International Journal of Human Resource Management*, 28(17): 2449-2472.

Van den Broeck, A., Ferris, D. L., Chang, C.-H. & Rosen, C. C. (2016). A review of self-determination theory's basic psychological needs at work. *Journal of Management*, 42(5), 1195–1229.

Van Hootegem, G. (2000). *De draaglijke traagheid van het management: tendensen in het productie- en personeelsbeleid.* Acco.

Veile, J. W., Kiel, D., Müller, J. M. & Voigt, K. I. (2019). Lessons learned from Industry 4.0 implementation in the German manufacturing industry. *Journal of Manufacturing Technology Management*, September. https://doi.org/10.1108/JMTM-08-2018-0270

Voss, E. & Riede, H. (2018). Digitalisation and workers participation: What trade unions, company level workers and online platform workers in Europe think. *European Trade Union Confederation*.

Wilkesmann, M. & Wilkesmann, U. (2018). Industry 4.0 – organizing routines or innovations? *VINE Journal of Information and Knowledge Management Systems*, 48(2), 238-254. https://doi.org/10.1108/vjikms-04-2017-0019

ABOUT THE AUTHORS