PILLAR 3

STATE OF THE ART

SEAD
Sustainable Employment in the Age of Digitalisation

Christophe Vanroelen

Nick Deschacht

Ezra Dessers

François Pichault

Esteban Martinez Garcia

Digitalisation, technology, employment, labour market, occupations, platform economy

[Introduction]

From existing research it has become evident that digitalisation can have a profound and even disruptive impact on most domains of life. The "Sustainable Employment in the Age of Digitalisation" (SEAD) project focuses on one domain in particular: the world of work. This project has two main aims: (1) to assess the nature and impact of technology-related change in existing and developing labour market segments in Belgium and (2) to identify the potential for sustainable employment and for limiting the vulnerability of workers in the context of digitalisation.

Four thematic issues related to the impact of digitalisation on contemporary labour markets and employment situations are studied in separate work packages:

- Macro-economic insights about how digitalisation is affecting labour market dynamics, the occupational structure and job quality in Belgium (WP1).
- The role of organisational characteristics in shaping the impact of technology on the work experience, with specific attention for organisational models and managerial practices that promote sustainable employment in a context of technological innovation (WP2).
- How the skills composition and job quality of occupations in the Belgian labour market are changing as a consequence of the introduction of new technologies (WP3).
- The platform economy as an emerging employment phenomenon: job quality, perspectives for collective action and the socio-demographic profile and employment trajectories of those workers engaging in digital platform work (WP4).

[State of the art] *4-5 pages*

Digitalisation and labour market dynamics, occupational structure, and job quality (WP1)

In theory, the effect of new technologies on labour demand is ambiguous: it may reduce the demand for workers in an occupation through substitution, but it may also increase the demand for workers. Focusing on substitution potentials is misleading because this ignores the *complementarities* that increase productivity and the countervailing economic forces that can compensate for the displacement of workers through automation (Autor, 2014; Vivarelli, 2015; Acemoglu & Restropo, 2018; Gregory et al. 2019). Even if the substitution effect of a new technology dominates so that *the first-order effect* is automation and a replacement of human labour in an occupation, the final demand for labour in that occupation could increase because the overall effect also depends on how the demand for products by consumers responds to falling prices. After all, as productivity increases with technological progress, the cost of production falls and prices are likely to fall (this assumes that product markets are competitive, which need not be the case). If consumers respond to falling prices by consuming a lot more (elastic demand), then more workers are needed and this increased demand may compensate or even exceed the employment loss that resulted from the first-order substitution effect. We refer to the effect of technological change in an industry on labour demand in that industry resulting from changes in prices and the scale of production in that industry, as *the second-order effect* or the scale effect.

Technological change in one occupation or in one market may also affect the demand for other occupations or the demand for products in other markets (Autor & Salomons, 2018; Caselli & Manning, 2019). These indirect effects in the economy as a whole can be referred to as the *third-order effect* of technological change, to distinguish it from the substitution and scale effects in the market where the technological change took place. The main reason why the demand in other sectors may increase, is that technological change lowers product prices so that consumers have more income to spend in other sectors.

Technology does not just affect the demand for occupations as a whole – it also changes the task composition within occupations (Autor et al. 2003; Autor, 2014; Arntz et al. 2016). Any occupation is essentially a bundle of tasks, where a task is a unit of work activity that produces output such as moving an object, communicating a piece of information or organising the work of others. Occupations are generally composed of a variety of tasks and new technologies usually allow for the automation of only some tasks of an occupation. The literature that followed Autor et al. (2003) assumes

that routine tasks are relatively easy to automate, so that digitalisation leads to a decline in labour demand for routine tasks and to an increased demand for non-routine tasks. This is the *routine-biased technical change hypothesis*. The empirical evidence largely confirms the shift over time towards non-routine labour and the increasing skill requirements in occupations. Research also shows that the task composition within occupations not only varies across time, but also across jobs at the same moment in time (Autor and Handel, 2013): workers within a similar occupation often carry out very different tasks. Considering that workers adjust to new technologies by altering the tasks they do on the job, strongly nuances the alarming predictions on job loss due to automation.

Different work tasks require different skills and as technology alters the task content of occupations, skill requirements in occupations and in the economy at large change accordingly. Theoretically, the effect of technological change on the demand for skills, and higher levels of education, is not straightforward. New technologies could lead to *deskilling*, i.e. the substitution of skilled labour by machines that are operated by unskilled labour (Braverman, 1974; Katz & Margo, 2013; Kunst, 2019). On the other hand, new technologies could lead to *upskilling* if machines substitute unskilled labour and require more skilled labour to operate them (Griliches, 1969; Autor et al., 1998). This latter theory is referred to as the skill-biased technological change hypothesis. Empirical evidence supports the hypothesis that new technologies complement, rather than substitute, more-skilled workers and that technological progress has raised the demand for educated workers. Educational levels have increased a lot over the past decades and over this period the wages of higher educated workers have not fallen (on the contrary), which implies that the demand for higher educated workers must have increased over time with technological change (Autor et al., 1998). Although upskilling appears to be the main result of technological change, there is evidence of deskilling among some groups of workers (Autor, 2019; Kunst, 2019). Overall, evidence shows a process of *job polarisation* that has occurred in the past decades, i.e. the simultaneous growth of high-education and low-education jobs and the fall in employment in the middle of the skill distribution (Autor et al., 2006; Goos & Manning, 2007; Goos et al., 2014).

The most important consequence of automation and the changing occupational structure is that the associated productivity increase tends to increase incomes and consumer welfare. As occupations shift and economies grow, so does total income. Both economic theory and empirical evidence also demonstrate a strong relation between productivity and the wages earned by workers (Stansbury & Summers, 2017; Caselli & Manning, 2019). Income inequality, which has risen strongly in rich countries since 1980 (Nolan et al., 2019), is often considered to be another consequence of technological change. Even when average incomes grow, income inequality may widen and the incomes of some occupations or groups – such as low-skilled workers – might fall. Skill-biased technological change is considered to be the main driver of the increase in income inequality in many countries – next to other factors such as declining union power and import competition (Autor et al., 1998).

The quality of a job is not just determined by the wage but by the entire package of job features that includes various dimensions of non-wage attributes (Munoz-Bustillo et al., 2009; Vandenbrande et al., 2012): job content (the intensity of work, task variety, repetitive work, autonomy in how to organise the work, ...), working conditions (risk of injuries, hard physical work, ...), employment conditions (job security, working times, promotion chances, on-the-job learning, ...) and social relationships at work (e.g. participation in decision making). The process of digitalisation and occupational change pose both opportunities and threats for the quality of jobs (Peña-Casas et al., 2018).

Only a few fragmentary studies have analysed Belgian data to investigate automation, occupational change and their consequences for labour market outcomes. More research is required to describe the changing occupational structure of the Belgian labour market, the changing taks composition in Belgium and the effects of digitalisation on individual labour market outcomes. Research is also needed on the role of the organisational level in mediating between technology and sustainable work and on the micro-level of specific occupations in both the traditional sectors of the economy and the emerging sectors of the digital economy.

Organisational characteristics and the impact of technology on work experiences (WP2)

While it is often (implicitly) assumed that changing employment patterns and job characteristics are inevitable consequences of technological innovation, caution towards such a technological deterministic view is warranted. It is in fact at the level of organisations that the impact of technology on the characteristics of jobs takes shape. Fleming (2019) advances the concept of "bounded automation" to describe how effects of digitalisation are dependent on organisational forces rather than being determined by technology alone. The emergence of new technologies tends to unlock complex relations between (pre-existing) organisational designs and new possibilities and requirements (Lall et al., 2016). In other words: organisational choices regarding the selection, the implementation and the specific use of technological features will for a large part determine the impact of digitalisation on workers' jobs (Fabbri, 2018). Therefore, contextual factors such as supporting HR- practices, organisational culture, managerial climate and leadership styles are crucial (Chivaka, 2018). They determine how organisational design is translated into specific job features, affecting job quality and thus influencing employee well-being and performance (Aryee et al., 2012; Van de Voorde, Veld, & van Veldhoven, 2016).

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). Wilkesmann & Wilkesmann (2018) describe the different use of new digital technologies in organic and in mechanistic organisation structures. Technologies in mechanistic organisational structures tend to reinforce the reproduction of routines and have employees filling the gaps; whereas in organic structures, technologies 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 et al., 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). 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 the technical complexity increases.

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 a systematic cultural change addressing the new organisational reality. This cultural change should be initiated by the 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, and the promotion of creativity, idea generation and an entrepreneurial mindset (El Sawy et al., 2016). Kiel et al. (2017, p. 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, the 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 way of coordination because of continuous change processes that confront organisations (Schoemaker et al., 2018; Imran et al., 2020). In the specific context of the 4th Industrial Revolution, also knowledge-oriented leadership is 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 the Self-Determination Theory (SDT) (Rigby & Ryan, 2018; Van den Broeck et al., 2016) in particular an 'autonomy-supportive context' will promote the autonomous motivation of employees and make jobs more resourceful, allow workers to have more control and learn them to apply new skills; crucial elements to successfully implement a digital transformation (Tuckey, Bakker, & Dollard, 2012; van de Voorde et

al., 2016). Research shows clear relations between an autonomy-supportive context and employee engagement and well-being, with employment relations to guarantee crucial preconditions (Gagné & Bhave, 2010). Various new technological applications have a 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). The organisational context thus serves as a moderator in the relation between technology affordance or constraint and employment sustainability.

From the employee-side, employee involvement is frequently underlined as a precondition for a successful implementation of new technologies for several reasons. Employees are the ones who will apply and operate the 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). Involvement of the employees also affects perceived well-being and operational performance (Kadir & Broberg, 2020; Tortorella & Fettermann, 2018).

Most 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 to install an autonomy-supportive context to increase employee engagement and well-being. For this context, elements of work organisation as well as employment relation are crucial. Research shows that rather than the technology itself, different forms of organisational design impact the result and workers' perceptions of working with digital technologies (Wilkesmann & Wilkesmann, 2018b). Nevertheless, literature – and especially empirical evidence – on this topic is limited. Future research should therefore focus on data collection in order to specify the precise requirements for shaping different elements in the work organisation and the employment relationship and how to align these.

Digitalisation and changing occupations in established industries (WP3)

A vast amount of literature dealing with the effects of technological changes on occupations has already been produced over the years. Within this literature, a consensus emerged on the fact that digitalisation tends, among other effects, to automate certain tasks rather than whole occupations, so that the job content of occupations changes (Acemoglu & Restrepo, 2019; Autor, 2015). Over time, several different models investigating the changing content of jobs have been constructed (Valenduc & Vendramin, 2019). However, in-depth qualitative case-studies of technology-related change in specific occupations are still rare. Based on an exploration of the literature, five transversal occupations were selected to act as cases in the SEAD project: assembly line workers, customer advisors, middle managers, recruiters, and R&D managers.

In the five analysed occupations, the process of digitalisation generates more complex tasks to be handled by workers while 'simple tasks' or 'physical' ones seem to be increasingly assigned to technological tools. Job scopes are no longer oriented on routine-decision-making but tend much more towards the development of new and innovative processes (Demirel & Türetken, 2020). Digitalisation also leads to the diversification of tasks to be handled by workers. In some cases, this complexity and increasing number of tasks to be handled can lead to a new task division between workers. Coordination mechanisms can also be modified through technology. Standardisation of processes therefore becomes increasingly important (Loyarte-López et al., 2020). Decision support system tools help to reduce uncertainties, complexities and bias while generating profit, according to Wei et al. (2016). However, algorithms themselves can be flawed.

In some cases, technological tools have increased workers' workload and work pace. The co-occurrence of the tasks could induce workers' exhaustion, especially when combined with an increased control by management. Close monitoring of work performance using technology generally provoked feelings of distrust and loss of control among the workers (Perez & Martín, 2018). Technological workplace surveillance increased formal control and thereby reduced the employees' feelings of autonomy (Abdullateef et al., 2014). Regarding material and physical conditions of work, some technologies can help to reduce risky tasks and/or physically demanding ones and thus improve ergonomics at the workplace.

When considering working time arrangements, the boundaries between professional and private life become more and more blurred, in both ways. The constant connectivity that comes along with ICT tools enables flexibility in choosing working hours. At the same time, it enables working during times of non-paid work time, regardless of location and working hours, which ultimately leads to work intensification and work-life imbalances for some occupations (Farrell & Morris, 2013; McWhite Seymour, 2016). Dragano and Lunau (2020) refer to '*techno-overload'*, as the fact that work with digital technologies becomes demanding due to high pace, multitasking and expectations with regard to response times.

The increased use of temporary workforce is aimed at enhancing the company's ability to answer quickly to fluctuations in markets demands, such as the introduction of digitalisation and more flexible assembly processes (Rosini, 2018). The use of temporary workers can contribute to enhance the employment stability for the core workers, that is the permanently employed ones. The latter can also be involved in teaching, mentoring and coaching junior and temporary workers (Rosini, 2018). As far as the outsourcing issue is concerned, it seems that this decision does not depend entirely on the digitalisation process, the latter acting as a 'facilitator' of the outsourcing decision directly dependent on considerations linked, for example, to human capital, availability of skills and firm size (Giacomarra et al., 2019; Teirlinck & Spithoven, 2013).

Empirical investigations have shown that the active participation of employees in implementing technological infrastructure has positive consequences for business performance as well as for the employees themselves (e.g. reducing workload, role ambiguity and enhancing organisational learning) (Garrido-Moreno, Lockett, & García- Morales, 2014 ; Kaasinen et al. 2020). The importance of investments in training related to the implemented digital technologies has also been considered. Employees can feel that they are not given the adequate resources and necessary time to learn about the new, often complex technologies (Jantti and Hyvarinen, 2018; Vuori, Helander & Okkonen, 2019). These two sets of actions (i.e. promotion of an active participation and training) can thus be considered as capacitation tools for actors.

Finally, the concept of sustainable employment is scarcely investigated in relation to the five selected occupations and, when studied, the notion of sustainability often comes after other considerations such as economics or efficiency. Some of its critical elements (especially regarding skills, work-life balance or autonomy) are approached, but studying the employment sustainability in itself is rarely mentioned as an objective in the explored literature. This calls for comprehensive empirical studies regarding the impact of digital technologies on the work experiences and the sustainability of work of the five occupations.

<u>The platform economy as an emerging employment phenomenon (WP4)</u>

Beyond transforming work and employment in existing industries, digitalisation has also contributed to the emergence of several types of new business models that cut transaction costs by installing digital intermediaries between clients, producers, service providers, etc., a phenomenon which has notably been described as the platform economy. While definitions of the platform economy greatly diverge, the platform economy may be broadly defined as organisational configurations that extend through *ecosystems* of multiple subcontracting relationships and (inter)dependences "*where labour becomes organised and mediated through internet-based platforms*" (Ellmer et al., 2019). The platform economy as a whole is likely to leave a durable imprint on society (Piret, 2019). It contributes to the institutionalisation of more precarious/fragmented forms of employment and the accumulation of data, setting new challenges for social security and generating new modalities or opportunities of work. An in-depth analysis of the platform economy should therefore provide insights into the transformations taking place in the wider working worlds, exemplifying what is sometimes described as "uberisation", an economic model characterised prominently, but not exclusively, by digital intermediation (Abdelnour, 2017, p. 154).

While it is generally recognised that investigation into the phenomenon is necessary (Vallas & Schor, 2020), defining the platform economy remains difficult (Kenney & Zysman, 2019). It is therefore crucial to identify platforms by a series of characteristics that set the platform economy apart, such as the relying on digital infrastructures, the use of algorithmic matching to coordinate economic transactions, acting as an intermediary between different actors and the fact that value is extracted from the transactions (Srnicek, 2017; Casilli, 2019; Kovaleinen et al., 2019).

The empirical evidence with regard to the socio-demographic profile of platform workers is still scarce (Piasna & Drahokoupil, 2019). Overall, platform workers are often described in studies as being young, male and highly educated (De Groen et al., 2018), but looking further into detail offers a more nuanced picture related to the type of platform activity. Studies also argue that platform labour relies heavily on migrant labour (Tassinari & Maccarrone, 2020; van Doorn et al., 2020). In the case of on-location platform work, this is explained by the lack of entry barriers (de Groen et al., 2018). For online platform work, workers who might face discrimination in the traditional labour market may be 'protected' on platforms due to more anonymity and less potential for discrimination and harassment (De Stefano, 2016). However, the latter is contradicted by observations of structural inequality and discrimination on platforms.

Regarding work and employment conditions, the literature has highlighted questions related to autonomy, workloads, atypical working hours, (constraint) flexibility, precariousness, work intensification and subjective insecurity (Barraud de Lagarie & Sigalo Santos, 2019; Méda, 2019). In order to fully understand the impact of the platform economy on employment, more research is necessary into identifying the role platform work plays in workers' overall activity and income and in their careers/life courses. The high occurrence of platform work as an activity next to other activities and as a small supplement to their main income (Huws et al., 2016), also puts findings in perspective with regard to the income levels of platform workers. While the income levels of platform workers are generally highly variable (Popiel, 2017), low income levels are frequent (Ellmer et al., 2019). In terms of work frequency, their work is often scarce, or seasonal (Popiel, 2017). This has to be seen in relation to the level of dependence on the platform (Kuhn & Maleki, 2017; Schor et al., 2020). On the one hand, platform work can provide an additional income source next to other, more stable employment (Ellmer et al., 2019); but on the other hand, workers can be entirely dependent on platform income, e.g. for lack of (perceived) alternatives (Ellmer et al., 2019; Kuhn & Maleki, 2017). More attention thus needs to be paid to worker trajectories into and out of platform employment and to the way this type of work fits into their broader career perspectives.

The platform economy poses several challenges for collective action and questions existing structures of industrial relations. On a collective level, the fragmentation of work that characterises platform work hampers attempts at collective action and can affect workers' bargaining power (Bellini & Lucciarini, 2019; Bogliacino et al., 2019). The atomisation of workers, high turnover and concurrent short employment times, the inter-individual competition instigated by the platform structure, independent employment status and « total work engagement » are structural factors of platform work that make collective action more difficult and sometimes less likely (Abdelnour & Bernard, 2019). The (spatial) dispersal of workers also reduces chances to build working collectives, to "forge a sense of shared identity" (Tassinari & Maccarrone, 2020) and maintain trust (Salehi et al., 2015). Moreover, the organisational configurations of the platform economy also undermine the established frameworks for collective bargaining and solidarity (Vandaele, 2017; Willems, 2019). As the boundaries between the company and the market become blurred (Casilli 2019), digital platforms contribute to the decline of the corporation as an alternative to pure market logics (Coase, 1987; Winter & Williamson, 1991). In this respect, digital platforms supersede networked organisations, which tend to become widespread, described as hybrid solutions between "hierarchy" and "market" (Thorelli, 1986), as hierarchical relationships are being replaced by seemingly neutral algorithmic matching (Casilli 2019, 75).

At the same time, work and employment conditions in the platform economy offer a unique opportunity to look further into the conditions for so called « unlikely mobilisations » (Collovald & Mathieu, 2009). A common observation is that of a hybrid situation (Abdelnour & Bernard, 2018; Leterme et al., 2018), featuring the co-existence, complementarity and alliance of traditional mainstream trade unions, « union-like organisations defending platform workers' needs and interests » (Vandaele, 2018), or free, network based activist groups (Vandaele, 2020). Strategic intermediaries between traditional unionism and platform movements play a significant role in this. As is the case in network unionism (a way to account for multiple outsourcing in dispersed network-firm models), individual activists may carry significant responsibility in organising and consolidating movements (Lafuente Hernández et al., 2015).

While recent years have seen a multiplication of both scientific publications and institutional reports on the platform economy, the available empirical data remains scarce and information on Belgian workers is extremely limited. More research is therefore needed on its specific dynamics and effects in Belgium, especially since it has been established that the platform economy must be understood in interaction with local labour markets, legislation and regulation systems.