Work and Digital Technologies. A Proposal for Analysis

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Abstract

This article aims to review the digitalization of work by adopting a multidimensional analytical perspective on the quality of working life that examines the different aspects of working conditions. It is divided into three sections: (1) contextualization of digitalization as part of certain changes already underway, (2) determination of the specific nature of digitalization, (3) presentation of the features of the analytical framework to study quality of working life and feasible ways to study the impact of digitalization. It is not within the scope of this paper to provide an overview of literature on the effects of digitalization. Instead, it offers a conceptual-methodological basis for the interpretation of digitalization, focusing on field analysis.

Keywords: digitalization, quality of work, quality of working life.

1. The context of digitalization

The digitalization of work has become a well-established process, albeit one which has thus far primarily affected certain sectors of production of goods and services. Digitalization can be contextualized against a backdrop of four main socio-economic processes that started in the second half of the twentieth century. The first of these regards changes in systems of value creation and organizational models. The production of economic value is no longer confined to production systems and now influences people's lives too. Now increasingly broad and extensive, value chains have adopted complex organizational models, often in network form; they are now factors in determining behaviour and enhancing lives (Armano et al., 2017). In a phase of history that has redefined the world of consumption, the consumer has been absorbed into the network (Codeluppi, 2005, 2022; Secondulfo, 2012). The second process involves the

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consolidation of the *society of "works"* (Accornero, 2000, 2002; La Rosa, 2006). This is the result of de-standardisation of work in relation to time, space, and content, as well as organizational forms and skills required by workers. The third process features the polarization of working conditions (OECD 2019, 2020). Concerned with the gradually widening gap between jobs with a high or low quality of working life, this phenomenon has yet to be studied in relation to digitalization (Inapp, 2022a). The final process involves the emergence of forms of hybrid work (Gosetti, 2022b), which are bound to become more common as a result of digitalization. They offer workers opportunities such as operating under different contractual forms at the same time and developing different content of work.

Broadly speaking, these trends have led to an increase in the heterogeneity of the social composition of work. Due to the diversification of conditions within the labour market or even the same organisation, individual workplaces need to be analysed carefully to avoid inappropriate generalisations. These changes are also intrinsically linked to a supporting ideology, which has become a structural component of the functioning of the economic system. This socio-cultural narrative, which supports and justifies the "spirit of capitalism", is based on the figure of *homo economicus*, an actor equipped with instrumental and competitive rationality. Norms and values have produced a narrative framework that is largely codified, also in legal terms. This has become a structural and structuring element of production processes (Boltanski, Chiapello, 2014). Its points of organizational reference are the network, financial globalization, and the rhetorical resources available to entrepreneurs in relation to themselves and the ability to survive widespread uncertainty. Digitalization has also developed its own core ideology in tandem with its growth. One frequently used term is *digital revolution*, a process described with labels such as *disruptive*, because it marks a clear and sometimes violent break with the past; *total*, because it has triggered overall change that affects every element of work and society, including human nature; *irresistible*, inasmuch as it is inevitable, relentless, and incontrovertible; *future-oriented*, as it is full of potential to be realized in the coming years; and *permanent*, as it constantly undermines the current state of affairs (Balbi, 2022). These ideological elements are an integral part of the context of digitalization and the justification thereof. As such, they should be examined thoroughly without making simplifications or generalisations. Above all, it is important to analyse in depth the heterogeneous nature of experiences of the digitalization of work.

2.   The digitalization of work

Before analysing the phenomenon of digitalization, it is important to identify some of its main constituent parts. These are the most frequently cited devices in studies (Cipriani et al., 2018; Inapp, 2017; Lombardi, 2017; Magone, Mazali, 2016): *the Internet of Things*, technological devices which collect data (for example using sensors) and communicate with each other via the Internet; *big data and analytics*, systems which collect, process, and distribute substantial quantities of data; *additive manufacturing*, production systems which combine materials (for example 3D printers) and facilitate co-designing; *augmented reality and voice interfaces*, devices which enhance information and simulate virtual reality; *autonomous and collaborative robots*, machines which cooperate and interact with operators, learning by solving problems; *autonomous and near-autonomous vehicles*, transport machines which require no direct human intervention; *cloud computing*, systems for sharing information between companies, production sites, network hubs, etc., characterized by their speed of reaction; *digital manufacturing*, systems that enable the simulation of production processes and combine digital components for management purposes; and *advanced self-service technologies*, systems that involve the consumer/customer in the production process. All these technologies can also be combined with each other.

One particularly interesting aspect to study is the transition from robots to *cobots*, a collaborative form of robotics (Inapp, 2019) where people and machines cooperate through physical interaction and reciprocal recognition. The aim of robotics is no longer to replace the human factor but to build a system of interpenetration between people and machines. This system raises questions about the new ways in which workers are subsumed into the labour process. The spread of *artificial intelligence* is another transition that requires careful examination. For the purposes of this article, it can be defined as a set of high-tech hardware and software components that can process and interconnect huge amounts of data, and also generate decisions, calculating the probability of success and learning from the functioning of organizational processes (Inapp, 2019). Such systems thus lend themselves to top-down analysis of the formulation of operating rules or bottom-up observation of learning processes from experience and data accumulation.

Eight key concepts can be identified concerning the potential impact of digitalization on the condition of workers. The first of these is *connectivity*, namely the ability to generate and support connections within and between production systems and to join together individual and collective agents. The second core element is *pervasiveness*, with the capacity to penetrate the spaces and times of life and work, thereby blurring their boundaries. Indeed, this technology is equally suitable for producing, consuming, and living; it evens out

the differences between practices and behaviours of work and life. The third concept is *integration*, with the ability to compress complex organizational systems (at a vertical and horizontal level), create a dialogue between different organizational units and people-objects, merge the figures of producer and consumer, and integrate organization into the relevant context. The fourth is *rapidity*, namely swiftness in reading and interpreting different situations, reacting, forecasting, developing comparisons, and decision-making. The fifth element is *flexibility*, or the adaptability of technological applications depending on the strategic organizational choices and objectives. The sixth is *learning*, referring to the ability to learn from behaviours, effects, and reference contexts, thereby developing forms of learning organization and keeping track of choices made. The seventh keyword is *sustainability*, or the ability to manage situations of uncertainty and optimize use of resources through constant intelligent monitoring of production processes. The final concept is *know-how*, namely the necessary expertise and skills for using and enhancing digital technologies. This is also developed by the digital technologies themselves. These keywords all denote factors which are creating new living and working environments (Rullani, 2018).

Digital technology is not uniformly spread across Europe, and Italy has a lower level of digitalization than many countries. Whereas, generally speaking, the level of digitalization increases in tandem with the size of a company, Italy has a preponderance of small businesses (Leonardi, 2022). In the Rapporto Plus 2022 survey produced by INAPP (Inapp, 2022a), 20.6% of respondents stated that significant technological innovations had been introduced in their workplace between 2019 and 2021. In the field of public administration these innovations had more impact on the organizational process than on products and services, while in private companies both areas were equally affected. More than 70% of those who had experienced technological innovation noted significant change in their work duties (selecting the options "a lot" or "quite a lot" rather than "none" or "little"). This figure rose to 71.4% in public administration, which is probably related to digitalization during the pandemic crisis with the increase in remote working.

Platform working deserves separate consideration as an emerging field, albeit one which is still relatively limited. This system of intermediation is based on data use that becomes an *online place* of contact between service providers and purchasers. It can potentially generate work without interruption in time or space and involves payment for specific services, negotiated on a case-by-case basis or fixed in advance. In this way, the system leads to the taskification of work, which is ideal for simplifying payment (Arcidiacono et al., 2021; Armano et al., 2017; Constantinides et al., 2018; Eurofound, 2018; Inapp, 2017; Pais et al., 2021; Pirone, Rebeggiani, 2019). In order to gain a better understanding of

working conditions, though, the world of platforms should be divided into two types identified by the International Labour Organisation (ILO, 2021): *location-based* platforms (LBP), which include services rendered in local environments (home delivery, etc.), with payment mainly through the platform; and *web-based* platforms (WBP), which consist of micro-tasks performed online (translations, development of computer programs, etc.) and are usually paid for directly by the customer/buyer. Platforms provide a virtual space where a large number of services are organized, coordinated, and evaluated. These services are generally broken down into micro-tasks found in web space (Inapp, 2022b). In general, while the ILO states that 9.7% of working-age people in major European countries claim to have carried out work for a digital platform, the Inapp Plus survey (Inapp, 2022a) estimates that 5% of the Italian population aged 18-74 obtained income from platform working between 2020 and 2021 (renting premises, selling products, performing work activities, etc.).

Digital technologies have affected various environments. First of all, they can be used in the configuration and personalisation of a *product*, also through the involvement the consumer in the production process. They are also directly related to organizational processes by integrating vertical and horizontal levels. They influence the value chain, as well as the ability to connect different resources in production processes and increase efficiency in the use of components (production factors). Organizational digitalization combines well with the growing complexity of organizational models and the need to control organizational dynamics that bring together different nodes, functions, and paths. Digital technology facilitates interdependence between a number of factors (Lombardi, 2017): organizational components (modules of distributed processes), the core and periphery of an organizational profile, organization and diversified contexts, and local and global spaces. The impact of digitalization, which varies according to production sector, type of product, and value chain profile, assumes a social connotation. One is reminded of Naville's observations (1976) about automation becoming social automatism and influencing the transformation of relational systems and the social imaginary.

A consideration of the impact of digitalization should start by highlighting the non-linear nature of the processes of innovation (Ramella, 2013). Certain variables exert a significant influence on the impact of digitalization: the level of specialisation of work activities, strategic processing skills, and the degree of adaptivity of technical-scientific and economic-productive know-how (Lombardi, 2017). In order to grasp the impact of digitalization, processes of innovation should be read in relation to the specific nature of the institutional context in which they occur. Even artificial intelligence is part of a social process of development and planning since it performs tasks for which it has been programmed. For this reason, a sociological reading should focus on the social

dynamics at play around the development of digital technologies, both inside and outside the workplace. Such an interpretation moves away from the idea that technological change is inevitable and facilitates an understanding of the surrounding power dynamics, also bringing into play ethical and social issues regarding technological innovation. Indeed, the digital era coincides with the current state of development of capitalism, which now seems unthinkable without a digital support structure.

With specific regard to work, leaving aside the debate between pessimists and optimists, the impact of digitalization can be assessed in quantitative and qualitative terms. As regards the former, it is not the aim of this article to illustrate its repercussions on employment. Besides, recent studies have formulated a wide variety of different predictions when addressing the issue. The most likely development in this respect is the replacement of jobs involving predictable tasks, which can be absorbed by technological solutions that standardize procedures (Ford, 2015, 2021; Frey, Osborne, 2017). There is also growing support for the idea that digitalization will chiefly affect mid-level positions because certain low-level jobs are not easily absorbed by technology (cleaning, etc.). The less easily replaceable jobs will be those involving few repetitive tasks; with their emphasis on creative and innovative abilities, these positions require intellectual complexity and interpersonal, social, and emotional skills. According to some studies, the higher the qualifications needed for a job, the lower the risk of it becoming automated (Inapp, 2019).

With regard to the qualitative level, which mainly concerns the content of work, there is a variety of contrasting interpretations. Some refer to *upgrading*, which involves an increase in qualifications as digital technologies require more intellectual involvement on the part of workers, along with significant engagement in understanding processes (Oesch, Piccitto, 2019; Oesch, Rodríguez Menéz, 2011; Zuboff, 1988). Others mention *polarization*, which boosts a process already underway, whereby digital technologies erode mid-skill positions and jobs move to a higher or lower level (Autor, Dorn, 2013).

It is particularly interesting to study the process of further polarization of work triggered by digital technologies. Indeed, the idea of polarization – sparked or strengthened by digitalization – seems a more convincing angle than upgrading. This idea highlights the gradually widening gap between jobs (whether old or new) classed as high quality (in terms of salary, professional qualifications, protection, etc.) and those classed as low quality, with a reduction in intermediate positions (Goos et al., 2014; Wright, Dwyer, 2013). By generating *routine-based technological change* (Lombardi, 2017), robotization and artificial intelligence might heighten this polarization process, expressing a kind of latest-generation digital Taylorism. In the banking sector, for example, even with the introduction of digital technology there is greater distance between

strategic management (centre) and the network of branches (periphery). The latter has become the new home of business and consultancy services, which require transversal skills to manage customer areas (including the skills needed to use digital technologies) rather than specialized functions (loans, mortgages, etc.). The frequent result is increased standardization of work activities and loss of personal relations with clients (Gosetti, 2022a; Inapp, 2022c). More generally, it has been claimed that robotization tends to replace mid-skill jobs rather than positions requiring a high or low level of qualifications (Leonardi, 2022).

If this trend continues, it may well intensify the polarization process and consolidate social stratification in the labour market as a whole and within organisations. It is therefore necessary to transcend the dispute between pessimists and optimists; digitalization should be observed from an analytical perspective focusing on different aspects of working conditions influenced by digitalization. This involves studying the social composition generated in the current phase of digitalization using a model that analyses quality of working life (Gosetti, 2022b).

3. Digitalization and quality of working life

The term quality of working life refers to the combination of (a) personal needs, meanings attributed to work, and ambitions and (b) models, organizational processes, and aspects of the social organisation of work. This concerns the relationship between what is sought in a job and what the job can effectively guarantee. While the model is presented in more detail elsewhere (Gosetti, 2022b), it is essentially a non-hierarchical multidimensional analytical tool that examines different elements of the conditions of working life without ranking them a priori in order of importance. It is an open and dynamic analytical model (whose analytically independent aspects are frequently revised), which should be contextualized in accordance with the workplace where it is applied. It includes assessment criteria that are both subjective (satisfaction and self-assessment of work performance) and objective (behaviours and expected organizational conditions). The following pages will highlight some analytical methods regarding the impact of digitalization on each aspect.

3.1 The economic aspect

This dimension concerns the livelihood guaranteed by work and the income of a job. It seems that digitalization has a direct impact on working hours as a measure to determine remuneration. One trend already underway

and further influenced by digitalization is the tendency to remunerate certain jobs in terms of tasks performed and services provided rather than at an hourly rate. From another point of view, earnings must also be considered in relation to digital skills, in the sense that those who possess them will benefit in terms of financial reward. This all furthers the de-standardisation of remuneration of labour, even between co-workers. Furthermore, the pay gap related to digital skills might increasingly marginalize those who lack such abilities. It is therefore important to establish how much these changes influence the processes of impoverishment of work already underway for several years (Benassi, Morlicchio, 2021; Morlicchio, Pirone, 2015) and the formation of a social class potentially marginalized as a result of new technologies.

The pay gap related to digitalization, which can reinforce financial polarization, requires dynamic analysis as a process of impoverishment. Rather than analysing conditions, ongoing changes such as the opportunity to access digital skills need to be carefully examined. Furthermore, poverty should be seen as the result of a combination of personal, family, and contextual factors related to lack of technological skills. One final aspect to consider, with the expansion of digital technologies, is the relationship created between (a) the economic value of a work activity (with new forms of piece work) and (b) the creation of economic value through processes that include the lives of workers and consumers.

3.2 The ergonomic aspect

This dimension regards the psycho-physical effort required of a worker. It is an aspect strongly influenced by digital technology through the redefinition of the space and time of work activities. The impact can be seen in reduced working hours, which is an established trend in the labour market, albeit one which is not universal, differing according to production sector and company size (Eurofound, 2016). Digitalization also affects the ability to generate a job without precisely defined space or time, thereby reshaping the landscape of work with moving boundaries. This therefore concerns the emergence of new organizational configurations that combine space and time, such as *remote working*. The flexibility of new technologies (De Masi, 2020; De Pisapia, Vignoli, 2021) can also help to reshape an expanded work landscape by interweaving different workplaces and creating *co-working* spaces. The result is a network of jobs distributed across a territory, thereby combining different ergonomic conditions. One implicit effect of this is the opportunity to devise territorial regeneration projects with the digitalization of organizational processes.

Digital technologies have a direct impact on work schedules. For example, platform working can cause stress through the use of algorithms that rank and rate workers. Piece work, on the other hand, requires workers to comply with pre-established terms also connected to work continuity (being able to obtain assignments) and payment. One aspect to examine is therefore the potential intensification of work as a result of digital technologies (Carreri et al., 2020; Casilli, 2017, 2020; Gosetti, 2022a). It would also be interesting to analyse alterations in the ergonomic dimension when the relationship between people and machines changes. In some situations, there is a form of symbiosis between the two elements, with the machine becoming a functional extension of human potential, an indispensable constituent part of work procedures.

Another interesting aspect to consider is cognitive ergonomics, a field that analyses cognitive pressure and the emotional toll on workers caused by the pervasive nature of digital technologies. If the ability to be permanently online and permanently connected is not controlled, it can become a weakness rather than a strength. Furthermore, also at a cognitive level, it is necessary to examine the influence of digital technology on a worker's need to identify the precise purpose of their work.

3.3 The social environment aspect

This dimension concerns labour relations and the social climate of the work environment. As digital technologies have a direct impact on connectivity, they also affect interpersonal relations, in addition to work sharing processes, co-operation, and group dynamics. As well as being directly related to individual and collective management and control systems, they enter the realm of relational constructs by conditioning communication codes and languages. They are constituent technologies of labour, interpersonal, and social relations. During the pandemic, it was possible to maintain work relations remotely with the support of digital technology, which also helped to establish contact between people for the first time. This effect is paradoxical in some respects, as physical distancing was associated with a social coming together. The reshaping of organizational processes, expanded and distributed through digital technologies, has challenged the traditional concept of a work community. This has led to questions about the new forms of community with different work affiliations and identities (Albano et al., 2019).

This dimension also includes digitized methods of human resource management, which directly affect the relational system and the social environment (Inapp, 2022c). For example, digitalization is becoming part of procedures for: recruitment (automated systems to analyse candidates, etc.),

introducing new employees to work processes, measuring performance, planning career paths, and training and self-training.

The social environment aspect is also concerned with the social climate. One interesting factor to study is therefore the influence of digital technologies on socialization at work, as well as on relations that might become abusive. It is precisely the pervasive nature of digital technology that enables it to influence relational dynamics at different levels.

3.4 The recognition aspect

This dimension is concerned with the symbolic aspects of work, which are generally related to a worker's values and identity. It is an aspect that satisfies the need to be recognized as a person. Indeed, feeling recognition is a requirement often perceived as essential to escape organizational obscurity. It is also a way to avoid being considered a number in the production chain of goods and services. This dimension therefore examines the way in which digital work enhances the visibility of a worker. If, as Todorov claims, "all coexistence is recognition" (Todorov, 1998) and recognition is the "intersubjective premise" of the ability to achieve existential goals with a high level of autonomy (Honneth, 2010, 2019), questions need to be asked about the potential of digital technologies as relational mediators within the dynamics of recognition. Since there is a relational basis to recognition, the technology involved in relations becomes an integral part of the recognition process as a means and a language.

Digital technologies themselves produce an identity, a digital identity profile. Indeed, having digital skills is a distinguishing trait in some workplaces. If identity also includes the ability to recognize the effects of one's actions distinctly from those of others (Melucci, 1996), digital skills become an identity factor inasmuch as they identify a distinctive feature of one's contribution to the production process. When, instead, this distinction is removed and individual contributions are levelled out, lost within an indistinct whole, it becomes a factor working against the individual and collective need for recognition.

The space-time boundaries affected by digitalization, which were discussed with regard to the ergonomic aspect, also relate to recognition processes. Indeed, working space and time can be personalized, creating a reference area for self-identification and recognition by others. Furthermore, digital technology affects memory too. By storing data from work processes, fragments of work experiences are also preserved. Recognition is fuelled by memory and the chance to recount a working life, talking about oneself through work. Equally, it offers the opportunity to make an employment history social

proof by bringing it into the public domain (Jedlowski, 2009). Digital technology can therefore be a resource for recognition if it enables a work identity to grow and does not standardize a person's work or role, highlighting their contribution to the creation of a good or service.

3.5 The complexity aspect

This dimension regards variety in content of work and the opportunity to do a job that engages a worker intellectually and is not fragmented or purely executive. This therefore involves mental engagement and the intellectual valorisation referred to by Friedmann (1971) in conjunction with moral and social valorisation. Digital technology is problematized first and foremost by analysing the discretionary powers available to a worker (Gallie et al., 2004). Specific daily work practices need to be observed to understand the extent to which work content is predefined. In this way, for example, it could be seen whether algorithm-based organization assigns workers compulsory (or optional) working modalities. One factor to explore within this dimension is therefore the neo-Taylorisation of work (fragmentation, proceduralization, etc.), processes which have been identified by many sources and also affect some digitized activities (Brown et al., 2011; Crowley et al., 2010; Eurofound, 2016; Haakestad, Friberg, 2020; Isfol, 2013; Taska, 2017). While some work environments have witnessed digital segmentation and the spread of task-based work as a result of digitalization (Gosetti, 2022a), some authors claim that fragmentation goes beyond the workplace by assuming a social character. It is the pervasiveness of digitalization that enables a Taylorist logic based on the fragmentation of work to be extended to society as a whole (Magatti, 2017).

The complexity aspect is related to the above-mentioned process of polarization. Indeed, there are already some technological innovations that do not necessarily enrich the content of work, or at least not always. The complexity of work is closely connected to the opportunity to learn new things and acquire new skills directly through work, training, and self-directed learning. Acquiring skills means moving beyond the multi-functionality and versatility required by some organizational models for reasons of flexibility in work processes. It involves harnessing the potential of digital technology to obtain information and implement it effectively in operational processes. It is also used for knowing how to learn, a dimension which is associated with knowing how to do and knowing how to be.

The processes surveyed thus far also need to be studied in reference to the relationship between the homogeneity/heterogeneity of the content of work and the classification of the worker. Indeed, in some working environments

digital technologies standardize the work content of jobs previously characterized by greater distinctive features. For example, factory and office workers now both carry out information processing tasks in some workplaces. The processes of growth in the homogeneity/heterogeneity of the content of work also require analysis to understand the differences between sectors of production of goods and services.

3.6 The autonomy aspect

This dimension regards the operative freedom of a worker in organizational and technical terms when making independent work-based decisions, drawing on pre-planned strategies and personal enterprise. Workers are involved to a greater degree in the new organizational models, which are now frequently adopted following the spread of the Japanese model of *lean production* (Ohno, 2004). In contrast to Taylor's claims, workers are asked to take initiative in dealing with their (place of) work and, above all, the technology employed. This means grasping the potential of digital technology in order to work independently and knowing how to use it to tackle and solve organizational and technical problems. Digital technology is an organizational variable which can develop considerable control over work and all its constituent parts. This control can be exercised over the results but also over the process of goal achievement and the people involved. In some cases, it is the technology itself which makes decisions independently in place of the worker.

Autonomy is closely connected to the specific nature of the relevant position, but digital technology favours the delegation of organizational and technical responsibilities to the worker. It thus becomes an enabling technology, applicable in different ways, which can create conditions of operative autonomy. It can be connected to the aspect of "knowing how to act" which workers need in models that require active involvement in autonomous "organization building", also using the contribution of digital technologies. There are also, however, situations in which the level of autonomy is reduced by employing digital technologies in performance logic systems. In these cases, the worker is asked locally – in the "periphery" of the network – to carry out tasks that are defined centrally; the process of centre-periphery relations is managed through the support of digital technologies (Carreri et al., 2023).

Autonomy therefore means moving beyond discretionary powers – choosing between predefined, unmodifiable scenarios – to harness the ability to interpret planned pathways, which are selected and applied through organizational and technical operational translation. It is thus a question of

independently adapting the pathways to follow and, if necessary, combining them with other scenarios, using technologies that make it possible to collect data, simulate decision-making processes, check the progress of processes underway, and so on.

3.7 The control aspect

This dimension regards the ability of workers to control their working conditions and take part in decision-making processes to influence choices, which are often taken at higher hierarchical levels and have direct repercussions on their jobs. This involvement may be direct or indirect (without mediation or through representative bodies), formal or informal (with variously prescriptive procedures and conditions to comply with), and generalized or selective (regarding all aspects of the job or only certain issues). It is usually structured in three different levels: information, consultation, and co-decision. Worker control is reflected above all in the ability to influence the choice of organizational model and the planning of organizational processes. As Luciano Gallino pointed out (1983), tangible involvement is not a question of choosing between alternatives but of participating in the construction process of the decision matrix, which generates the options that are later chosen from. It means taking part in establishing the basic conditions of the organizational model, such as choosing the technologies to adopt and implementing them in organizational processes.

As an organizational and enabling variable, digital technology can be implemented in different ways; direct or indirect involvement in decision-making processes can allow workers to formulate its precise mode of use. Organizational planning thus becomes a crucial element in the digitalization phase as a chance to define the quality of working life. Digital technology is at the same time a means of participation (which may or may not favour involvement, for example through sharing information) and a means for organizing processes. Through participation in the planning of organizational processes, workers may take action, for example, regarding conditions of work-related complexity and autonomy. Moreover, the control aspect also concerns a worker's opportunity to have a *voice* (Hirschman, 2017).

These aspects all highlight the fundamental role played by the strategic choice of organizational governance, which can create conditions for controlling and fostering the development of the relevant skills required. Decision-making processes can become remarkably fast when digital technologies are used. In some cases, the technology itself opens and closes the decision-making process without involving the worker. Therefore, in order to

facilitate control, it is necessary to provide timeframes, instruments, and methods that enable effective participation (Carrieri et al., 2015); these should be structured according to the size of the organisation, the type of work carried out, and so on. After all, from another angle digital technology can favour strong control over workers, with direct repercussions also on complexity and autonomy. When an activity is platform-based and work is strongly influenced by an algorithm in its time and place of execution, the worker has a very limited scope of autonomy (Wood et al., 2018). In this case, it is an algorithm that organizes, controls, and evaluates the worker's actions, with control exercised at the planning stage of the algorithm when the criteria for carrying out and evaluating work are established.

3.8 The reconciliation aspect

The subject of reconciliation between work and life has been discussed widely over the last few years. The boundaries between these two areas of experience have become increasingly permeable, and spatio-temporal blurring has developed significantly, above all in certain jobs, partly as a result of the introduction of digital technologies. The current organizational technology offers an unprecedented transversal approach that brings together work and life. The same device can now be used to share information, analyse data, draft documents, maintain long-distance relations, and so on, in life and work alike. In practice, the digital tool is an increasingly influential factor in the commonality of language in different experiences.

Although digital technologies make work activities more transferable and portable, they have an invasive impact on areas outside work. The relationship between work and life has a situated character; the type of product or service offered is therefore significant, but it mainly depends on the organizational model adopted and processes of division and coordination of labour. The de-standardisation of time and space in the labour market over the last few decades has directly affected the work-life relationship, raising new issues of reconciliation. It is highly probable that this aspect will be an object of great interest in sociological studies in the coming years in the wake of the introduction of digital technologies. Indeed, the perspective of the *work-life balance*, which has characterized even the most recent organizational planning systems and methods for interpreting current trends (Bertolini, Poggio, 2022; Chung, van der Lippe, 2020; Hjálmsdóttir, Bjarnadóttir, 2021; Warren, 2021; Wood et al., 2020), requires a critical review because of the changes underway that have progressively blurred the boundaries between work and life. In this case too, the perspective is one of organizational planning, which includes

digital technology as a variable making work and life increasingly indistinguishable. The Taylor-Ford model featured sectorial boundaries and clear spatio-temporal distinctions in carrying out activities, which helped to make the distinction between work and life. This has been strongly undermined by the flexibilization and distribution of organizational processes.

The space of work is changing as well as the time. Value creation processes increasingly strive to include vital and territorial resources in production. Our lives and relationships are put to work, becoming part of cycles of production of goods and services that generate organizational value. This extension of scope is both visible and invisible: there is sometimes an explicit agreement with the consumer (such as with home banking), but in some cases the aspect of life is included without any express disclosure (for example, the appropriation of important personal behavioural data by production systems). Furthermore, production systems depend on skills acquired *on the job* through training, but also those developed *in life*. Digital skills are developed outside work, especially with regard to the younger generation, by imitation through individual and collective experimentation. Digital skills acquired *in life* are fundamental for being at work. In addition, as digital technologies have also reshaped the landscape of work, they have entered the work-life equation. As mentioned above with regard to the ergonomic aspect, they have enabled the construction of remote working models (flexible working, etc.), created co-working spaces, shaped cooperation networks, and influenced processes of territorial mobility. Territorial planning in the next few years will also have to consider the digitalization of work organizational processes.

3.9 The social protection aspect

This dimension regards the set of factors that allow workers to plan their working lives. What makes this aspect significant is above all the uncertainty of career paths and the heterogeneous nature of the social composition of labour, as well as the consolidation of the polarization of working conditions, also connected to digitalization. As Robert Castel highlighted, the protective nature of work has weakened over the years. *Disaffiliation* (Castel, 2004, 2015), a term used to refer to gradual loss of adhesion to collective regulations, has led to an increase in widespread uncertainty. Although work maintains its importance, it loses substance, creating a situation where risk and uncertainty form part of the ethos (Appadurai, Alexander, 2020), taking root in the *habitus* of those concerned. Work is increasingly characterized by a weakening of protective ties, combined with an idea of individual active participation and empowerment with

regard to job hunting, skills maintenance, and the construction of a working life.

Social protection therefore involves support (financial or otherwise) for those who lose their jobs as a result of technological innovations that eliminate jobs or reduce working hours, with a consequent drop in earnings, as well as for those who need to take time off work for training. This issue is connected to the current debate on wealth redistribution systems that are not job-based, during a phase in which some areas of work can function without human input and will do so to an even greater extent in the future. Social protection is thus directly concerned with the impoverishment of work (Benassi, Morlicchio, 2021; Filandri et al., 2021), and the low wages in some jobs in particular. It relates to the continuity of income from work (Morlicchio, 2020) and includes relational as well as financial aspects (Saraceno et al., 2020). In general, it is a question of establishing protection for discontinuity in career paths and developing active policies that sustain ongoing training and provide support during career transitions.

Indeed, the transition from one job to another, or from work to training, becomes a structural condition to consider when planning a working life. The social protection aspect therefore regards a set of factors to be read dynamically in relation to changes during people's lives (Arthur, Rousseau, 1996; Barabaschi et al., 2020; Bertolini, 2018; Bertolini et al., 2014; Blossfeld, Hofäcker, 2014; Magatti, Fullin, 2002; Spanò, 2018). Indeed, needs, meanings attributed to work, and ambitions change over time as a result of experience, an increase or decrease in skills, and the ability to manage a working life as a whole. In a context characterized by major technological innovation, connected to the flexibilization of organizational models and changes to contractual forms, one aspect to analyse is the continuity of a working life, which is increasingly made up of a combination of single experiences, sometimes of short duration, and training and professional events (Murgia, 2010).

Digitalization has helped to highlight the importance of social protection and the necessity for policies that reconcile work and life. It has also underlined the need to rethink ways of representing workers in a context where the labour market and organizations are polarized and stratified, and where heterogeneity in the social composition of work is increasing.

3.10 The political aspect

This dimension is concerned with the ability to generate a positive impact on the relevant community and society through work, triggering processes of change in accordance with the core values of workers. It studies how workers

are impacted by the social utility of work, a benefit that can be measured at micro, meso, and macro levels. The change prompted by digitalization, which affects products and services, as well as the organizational forms and content of work, also has a direct impact on the political aspect of work. This dimension is an aspect of quality of working life that meets the need for social commitment and involvement through work (Bertell et al., 2017). It offers an idea of work as an experience of social engagement; in the current climate of change in work and, more generally, in society, it necessarily involves a thorough examination of the impact of digital technologies on the dynamics of social participation.

While on one hand the process of digitalization is also generating a new image of work with a new social representation, on the other hand it enables the creation of policy sharing networks. In some respects, it enables an increase in the visibility of work, of the results of work processes, and indeed of working conditions. This dimension prompts an examination of the extent to which digitalization makes it possible to connect individual and collective actors to define and sustain a policy design through work and determine a new role for work (and a new policy space for workers) in policies for socio-economic development and democratic decision-making processes at a societal level. It is an area which is closely linked to the above-mentioned aspect of control. Indeed, there is a line of continuity between democratization within workplaces and within society as a whole. Digital technology helps to reshape the participatory systems at the heart of work and life, also by virtue of its inherent transversal nature and its ability to homogenize communication processes between these two dimensions.

4. Concluding remarks

The process of the digitalization of work is no longer a new phenomenon. It has affected products and services as well as the processes and content of work. One aspect yet to be fully explored, which should be analysed over the next few years, is the way in which working conditions are influenced by digital technologies. The analytical perspective offered in this article features a multidimensional approach that examines the different elements of working conditions, which increasingly involve the assimilation of work and life in certain sectors of production of goods and services, resulting in partially blurred boundaries. For this reason, too, the analysis needs to be extended even further from quality of work to quality of working life, with a thorough evaluation of the objective and subjective elements.

References

Accornero, A. (2000). La società dei lavori. *Sociologia del lavoro*, n. 80.

Accornero, A. (2002). *Il mondo della produzione. Sociologia del lavoro e dell'industria.* Bologna: il Mulino.

Albano, R., Parisi, T., & Tirabeni, L. (2019). Gli smart workers tra solitudine e collaborazione. *Cambio*, vol. 9, n. 17, pp. 61-73.

Appadurai, A., & Alexander, N. (2020). *Fallimento.* Cortina: Milano.

Arcidiacono, D., Pais, I., & Piccito, G. (2021). La qualità del lavoro nella platform econony: da diritto a servizio. *Politiche Sociali*, n. 1, pp. 75-98.

Armano, E., Murgia, M., & Teli, M., a cura di (2017), *Platform capitalism e confini del lavoro negli spazi digitali.* Sesto San Giovanni: (MI)Mimesis.

Arthur, M.B., & Rousseau, D.M., Eds. (1996). *The boundaryless career: A new employment principle for a new organizational era.* New York Oxford: University Press.

Autor, D.H., & Dorn, D. (2013). The Growth of Low Skill Service Jobs and the Polarization of the U.S. Labor Market. *American Economic Review*, vol. 103, n. 5, pp. 1553-1597.

Balbi, G. (2022). *L'ultima ideologia. Breve storia della rivoluzione digitale.* Bari-Roma: Laterza.

Barabaschi, B., Forti, A., & Spagnuolo, G., a cura di (2020). *Politiche, pratiche formative e competenze per l'occupabilità degli adulti nell'era digitale.* Sezione monografica *Sociologia del Lavoro*, 156, pp. 47-169.

Benassi, D., & Morlicchio, E. (2021). Bassi salari e bisogni familiari: l'*in-work-poverty* in Europa.*Sociologia del lavoro*, n. 161, pp. 34-53.

Bertell, L., de Cordova, F., De Vita, A., & Gosetti, G. (2017). *Senso del lavoro nelle economie diverse. Uno studio interdisciplinare.* Milano: FrancoAngeli.

Bertolini, S. (2018). *Giovani senza futuro? Insicurezza lavorativa e autonomia giovanile oggi in Italia.* Roma: Carocci.

Bertolini, S., Hofäcker, D., & Torrioni, P. (2014). L'uscita dalla famiglia di origine in diversi sistemi di Welfare State: l'impatto della flessibilizzazione del mercato del lavoro e della crisi occupazionale in Italia, Francia e Germania. *Sociologia del lavoro*, n. 136.

Bertolini, S., & Poggio, B. (Eds.) (2022). *Research Handbook on Work-Life Balance. Emerging Issues and Methodological Challenges.* Cheltenham: Edward Elgar Publishing.

Blossfeld, H.-P., & Hofäcker, D. (2014). Globalization, Rising Uncertainty and Life Courses in Modern Societies: A Summary of Research Findings and Open Research Questions. *Sociologia del lavoro*, n. 136.

Boltanski, L., & Chiapello, E. (2014). *Il nuovo spirito del capitalismo*, Milano-Udine: Mimesis.

Brown, P., Lauder, H., & Ashton, D. (2011). *The Global Auction: The Broken Promises of Education, Jobs, and Incomes.* Oxford: Oxford University Press.

Carreri, A., Gosetti, G., Poggio, B., & Zanoni, P. (2020). Lavoro e digitalizzazione: soggettività, controllo e qualità del lavoro nella quarta rivoluzione industriale. Sezione monografica di *Sociologia del lavoro*, n. 158, pp. 51-221.

Carreri, A., Gosetti, G., & Masiero, N. (2023). Digitalization of relational space in the service triangle: The case study of retail banking. *Frontiers in Sociology*, vol. 8.

Carrieri, M., Nerozzi, P., & Treu, T., a cura di (2015). *La partecipazione incisiva. Idee e proposte per rilanciare la democrazia nelle imprese*. Bologna: il Mulino.

Casilli, A.A. (2017). *Gli esseri umani sostituiranno i robot? Piattaforme di micro-lavoro e intelligenze artificiali*, in AA.VV, *10 idee per convivere con il lavoro che cambia*. Milano: Fondazione Giangiacomo Feltrinelli.

Casilli, A.A. (2020). *Schiavi del clic? Perché lavoriamo tutti per il nuovo capitalismo*. Milano: Feltrinelli.

Castel, R. (2004). *L'insicurezza sociale. Cosa vuol dire essere protetti*. Torino: Einaudi.

Castel, R. (2015). *Incertezze crescenti. Lavoro, cittadinanza, individuo*, Bologna: Editrice Socialmente.

Chung, H., & van der Lippe, T. (2020). Flexible Working, Work–Life Balance, and Gender Equality: Introduction. *Social Indicators Research*, n. 151, pp. 365-381.

Cipriani, A., Gramolati, A., & Mari, G., a cura di (2018). *Il lavoro 4.0. La Quarta Rivoluzione industriale e le trasformazioni delle attività lavorative*. Firenze: Firenze University Press.

Codeluppi, V. (2005). *Manuale di sociologia dei consumi*. Roma: Carocci.

Codeluppi, V. (2022). *Il mondo digitale*. Bari-Roma: Laterza.

Constantinides, P., Henfridsson, O., & Parker, G.G. (2018). Introduction – Platforms and Infrastructures in the Digital Age. *Information Systems Research*, vol. 29, n. 2, pp. 381-400.

Crowley, M., Tope, D., Chamberlain, L.J., & Hodson, R. (2010). Neo-Taylorism at Work: Occupational Change in the Post-Fordist Era. *Social Problems*, vol. 57, n. 3, pp. 421-447.

De Masi, D. (2020). *Smart working. La rivoluzione del lavoro intelligente*. Venezia: Marsilio.

De Pisapia, N., & Vignoli, M. (2021). *Smart working mind. Strategie e opportunità del lavoro agile*. Bologna: il Mulino.

Eurofound (2016). *Sixth European Working Conditions Survey – Overview report*. Luxembourg: Publications Office of the European Union.

Eurofound (2018). *Automation, digitisation and platforms: Implications for work and employment*. Luxembourg: Publications Office of the European Union.

Filandri, M., Morlicchio, E., & Struffolino, E. (2021). Povertà, lavoro e famiglia: una riflessione introduttiva. *Sociologia del lavoro*, n. 161, pp. 27-33.

Ford, M. (2015). *Rise of the Robots: Technology and the Threat of a Jobless Future*. New York: Basic Books.

Ford, M. (2021). *Rule of the Robots: How Artificial Intelligence Will Transform Everything*. New York: Basic Books.

Frey, C.B., & Osborne, M.A. (2017). The future of employment: how susceptible are jobs to computerisation? *Technological Forecasting and Social Change*, n. 114, pp. 254–280.

Friedmann, G.P. (1971). *Problemi umani del macchinismo industriale. Il progresso tecnico e l'uomo contemporaneo*. Torino: Einaudi.

Gallie, D., Felstead, A., & Green, F. (2004). Changing Patterns of Task Discretion in Britain. *Work, Employment & Society*, vol. 18, n. 2, pp. 243-266.

Gallino, L. (1983). *Informatica e qualità del lavoro*. Torino: Einaudi.

Goos, M., Manning, A., & Salomons, A. (2014). Explaining Job Polarization: Routine-Biased Technological Change and Offshoring. *American Economic Review*, vol. 104, n. 8, pp. 2509- 2526.

Gosetti, G., a cura di (2022a). *Lavoratori, sindacato e digitalizzazione. Profili organizzativi e relazionali in cambiamento*. Milano: FrancoAngeli.

Gosetti, G. (2022b). *La qualità della vita lavorativa. Lineamenti per uno studio sociologico*. Milano: FrancoAngeli.

Haakestad, H., & Friberg, J.H. (2020). Deskilling revisited: Labour migration, neo-Taylorism and the degradation of craft work in the Norwegian construction industry. *Economic and Industrial Democracy*, vol. 41, n. 3, pp. 630–651.

Hirschman, A. (2017). *Lealtà, defezione, protesta. Rimedi alla crisi delle imprese, dei partiti e dello stato*. Bologna, il Mulino.

Hjálmsdóttir, A., & Bjarnadóttir, V.S. (2021). "I have turned into a foreman here at home": Families and work–life balance in times of COVID-19 in a gender equality paradise. *Gender Work Organ.*, n. 28, pp. 268-283.

Honneth, A. (2010). *Capitalismo e riconoscimento*, Firenze, Firenze University Press.

Honneth, A. (2019). *Riconoscimento. Storia di un'idea europea*. Milano, Feltrinelli.

Ilo (2021). *World Employment and Social Outlook 2021. The role of digital labour platforms in transforming the world of work*. Geneva: Ilo.

Inapp (2017). *Digitalizzazione, automazione e futuro del lavoro*. A cura di D. Guarascio, S. Sacchi. Roma: Inapp.

Inapp (2019). *Quale future per il lavoro: analisi della letteratura sugli impatti della robotica*. A cura di S. Lovergine, A. Pellero. Roma: Inapp.

Inapp (2012). *Job polarization in Italy: structural change and routinization*. Working Paper, n. 75. A cura di V. Intralighi, C. Vittori, A Ricci. Roma: Inapp.

Inapp (2022a). *Rapporto Plus 2022. Comprendere la complessità del lavoro*. A cura di F. Bergamente, E. Mondrone. Roma: Inapp.

Inapp (2022b). *Rapporto Inapp 2022. Lavoro e formazione: l'Italia di fronte alle sfide del futuro*. Roma: Inapp.

Inapp (2022c). *Digitalizzazione e invecchiamento della forza lavoro nel settore dei servizi. I risultati di uno studio sui settori sanitario e bancario/assicurativo durante la crisi pandemica*. A cura di P. Checcucci, L. D'Agostino, V. Iadevaia, *InappReport*, n. 25. Roma: Inapp.

Isfol (2013). *Le dimensioni della qualità del lavoro in Italia. I risultati della III indagine ISFOL sulla qualità del lavoro*. A cura di V. Gualtieri. Roma: Isfol.

Jedlowski, P. (2009). *Il racconto come dimora*. Heimat *e le momoria d'Europa*. Torino: Bollati Boringhieri.

La Rosa, M. (2006). *Il lavoro nella sociologia*. Roma: Carocci.

Leonardi, S. (2022). La partecipazione diretta al tempo della trasformazione digitale del lavoro. Il caso italiano. *Working Paper FDV*, n. 1.

Lombardi, M. (2017). *Fabbrica 4.0: i processi innovativi nel Multiverso fisico-digitale*. Firenze: Firenze University Press.

Magatti, M. (2017). *Cambio di paradigma. Uscire dalla crisi pensando al futuro*. Milano: Feltrinelli.

Magatti, M., & Fullin, G., a cura di (2002). *Percorsi di lavoro flessibile*. Roma: Carocci.

Melucci, A. (1996). *Il gioco dell'io. Il cambiamento di sé in una società globale*. Roma: Carocci.

Magone, A., & Mazali, T. (2016). *Industria 4.0. Uomini e macchine nella fabbrica digitale*. Milano: Guerini Associati.

Morlicchio, E. (2020). *Sociologia della povertà*. Bologna: il Mulino.

Morlicchio, E., & Pirone, F. (2015). I lavoratori sul piano inclinato della crisi. *il Mulino*, n. 3, pp. 462-467.

Murgia, A. (2010). *Dalla precarietà lavorativa alla precarietà sociale. Biografie in transito tra lavoro e non lavoro*. Bologna: I libri di Emil.

Naville, P. (1976). *Verso l'automatismo sociale? Problemi del lavoro e dell'automazione*. Milano: FrancoAngeli.

OECD (2019). *Job polarization and the middle class. New evidence on the changing relationship between skill levels and household income levels from 18 OECD countries*. Paris: OECD Publishing.

OECD (2020). *Employment Outlook 2020: Worker Security and the COVID-19 Crisis*. Paris: OECD Publishing.

Oesch, D., & Piccitto, G. (2019). The Polarization Myth: Occupational Upgrading in Germany, Spain, Sweden, and the UK, 1992–2015. *Work & Occupations*, vol. 46, n. 4, pp. 441-469.

Oesch, D., & Rodríguez Menéz, J. (2011). Upgrading or polarization? Occupational change in Britain, Germany, Spain and Switzerland, 1990–2008. *Socio-Economic Review*, vol. 9, n. 3, pp. 503-531.

Ohno, T. (2004). *Lo spirito Toyota. Il modello giapponese della qualità totale. E il suo prezzo*. Torino: Einaudi.

Pais, I., Borghi, P., & Murgia, A. (2021). High-skilled platform jobs in Europe: Trend, quality of work and emerging challenges. *Sociologia del lavoro*, n. 160, pp. 203-223.

Pirone, F., & Rebeggiani, E. (2019). I lavoratori del clic. Digitalizzazione, lavoro e intelligenza artificiale nel programma di ricerca Digital Platform Labor. *Sociologia del lavoro*, n. 155, pp. 223-234.

Ramella, F. (2013). *Sociologia dell'innovazione economica*. Bologna: il Mulino.

Rullani, E. (2018). Lavoro in transizione: prove di Quarta Rivoluzione industriale in Italia. In A. Cipriani, A. Gramolati, G. Mari, a cura di: *Il lavoro 4.0. La Quarta Rivoluzione industriale e le trasformazioni delle attività lavorative*. Firenze: Firenze University Press, pp. 423-443.

Saraceno, C., Benassi, D., & Morlicchio, M. (2020). *Poverty in Italy. Features and Drivers in a European Perspective*. Bristol: Policy Press.

Secondulfo, D. (2012). *Sociologia del consumo e della cultura materiale*. Milano: FrancoAngeli.

Spanò, A. (2018). *Studiare i giovani nel mondo che cambia. Concetti, temi e prospettive negli Youth Studies*. Milano: FrancoAngeli.

Taska, L. (2017). *Scientific Management*. In A. Wilkinson, S.J. Armstrong, M. Lounsbury, Eds., *The Oxford Handbook of Management*. Oxford: Oxford University Press.

Todorov, T. (1998). *La vita in comune. L'uomo è un essere sociale*. Milano: Nuova Pratiche Editrice.

Warren, T. (2021). Work–life balance and gig work: 'Where are we now' and 'where to next' with the work–life balance agenda? *Journal of Industrial Relations*, vol. 63, n. 4, pp. 522-545

Wood, A.J., Graham, M., Lehdonvirta, V., & Hjorth, I. (2018). Good gig, bad gig: autonomy and algorithmic control in the global gig economy. *Work, Employment and Society*, vol. 33, n.1, pp. 56-75.

Wood, J., Oh, J., Park, J., & Kim, W. (2020). The Relationship Between Work Engagement and Work–Life Balance in Organizations: A Review of the Empirical Research. In *Human Resource Development Review*, 2020, vol. 19, n. 3, pp. 240-262.

Wright, E.O., & Dwyer, R.E. (2013). The Patterns of Job Expansions in the United State: A Comparison of the 1960s and 1990s. *Socio-Economic Review*, n. 1, pp. 289-325.

Zuboff, S. (1988). *In the Age of the Smart Machine: The Future of Work and Power*. New York: Basic Books.