



An introduction to digitalizing work in the Nordics¹

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Digitalization as an everyday reality

Digital technologies have become an essential part of our everyday lives. While they were still a curious novelty in the 1960s and 1970s, they seem to permeate an ever-increasing part of today's societies (Levin & Mamlok 2021). By now, they are no longer confined to offices, where people need to physically sit in front of computers to use them. Instead, they are ubiquitous, with handheld devices being portable, and wearable technologies frequently even unobtrusive (Delabrida Silva et al. 2018). Augmented Realities blur the lines between technology and reality, while Virtual Realities even place a technological layer over our realities (Arena et al. 2022). Our technologically embedded lives create a myriad of data, which is used for various kinds of communication and as a currency. It is shared on social media for social interaction and to cultivate a personal image (Hall 2018). Moreover, it is routinely shared with companies for marketing and product development, sometimes in exchange for services (Cao et al. 2022). Thus, the datafication of our lives pulls us into a complex network of interactions.

With the digital shifts in our lives, social structures are also shifting. The question of social participation is no longer restricted to material factors: it also takes on digital dimensions. Where society becomes interwoven with technologies, these technologies turn into a gatekeeper. Mastering them becomes a necessity for fully participating in society. Those who lack technological mastery – or even consciously decide against using technologies – risk being excluded from society. They may have insufficient access to public services and leisure offers, see an erosion in their social networks, and even experience challenges in their working lives (Comi et al. 2024). New social inequalities emerge, shaped by the command over digital technologies. These new social inequalities run along and across generations (Van Dijk 2020). Generations differ in their use of digital technologies, which creates a digital divide within societies. The members of the younger generations often have well-developed digital skills, having been born into a digital society. This circumstance earned them the title of digital natives. In contrast, the individuals who are middle-aged and of working age today were for the most part not born into a digitalized society. They witnessed the digital turn, having been obliged to pick digital skills up at a later point of their lives. They are therefore sometimes referred to as digital immigrants (Elaoufy 2023; Prensky 2001). At the same time, digital skills differ within generations. Such differences align with, for example, differences in education, occupation, place of residence, and attitude toward technologies (Van Dijk 2020). Thus, how we fare in current societies is linked to our use of digital technologies.

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Our digitalizing world of work

As societies digitalize, work changes. A transformative digitalization takes place in the work domain, which changes its character. Digital technologies are increasingly being used in workplaces, for example, for communication, planning, administration, monitoring, and production. To use them, workers need to develop new skills or update the ones they have. Otherwise, they run the risk of being unable to successfully carry out their work tasks as time goes on (Komp-Leukkunen et al. 2022). The emerging digitally assisted tasks handle a higher information flow and access new knowledge at a faster pace. These changes alter the quality of work and the demands on the workers. The physical demands of work may decrease because digital solutions separate the information flows from material flow. They reduce the need to handle documents on paper, machines through physical presence, and meetings through attendance in person. At the same time, the psychological demands of work may increase because multitasking at a quick pace becomes the norm. The boundaries between work and private life blur, and the status of being truly disconnected from work becomes harder to achieve. As a result, stress and information overload can occur (Komp-Leukkunen 2023). How these shifts play out differs across sectors, occupations, and individuals, creating a stained-glass effect of shifts rather than a uniform development.

While some jobs change due to digitalization, others disappear altogether. Researchers already warned for years that repetitive tasks can be automated, making it possible to shift them from humans to machines. Depending on how high the share of repetitive tasks in an occupation is, an entire occupation or parts of it can be automated (Cassandro et al. 2021). Workers in these occupations may become redundant, streaming into unemployment or early retirement. However, the majority of these displaced workers can find new employment in a different occupation with similar skill requirements. Thus, technological displacement seems to lead to a flow between occupations, rather than a mass exodus from the labor market (Kurer & Gallego 2019). Recent technological advancements have provided a new twist to this situation. The emerging technologies using generative Artificial Intelligence can now also take over job tasks without routine character. For example, they can generate texts and produce pictures according to user specifications. This capability also affects occupations that deemed themselves largely immune to technological displacement, such as marketing, education, and human resource management (Ooi et al. 2023). However, since these technologies are still new, their effect on the different occupations is not yet known. On the one hand, they may simply lead to another shift in work tasks. On the other hand, they may have the more far-reaching consequence of creating further redundancies. A combination of both is also possible.

On a more positive note, the digitalization of work also creates jobs. The Information and Communication Technology sector has been expanding over the last decades, providing work opportunities to a growing number of people. Of course, the workers in this sector need to have the required skills, which means that individuals need to go through training or retraining before they can enter this sector. A simple transfer of unemployed individuals into this sector is not possible. Moreover, workers in the Information and Communication Technology sector need to stay informed on technological progress, making life-long learning particularly relevant for them (Marshall 2011). Additionally, digitalization creates new jobs across all other sectors. With new job tasks emerging,

new occupational profiles are also appearing. For example, the occupations of data analyst and data scientists only established themselves after Big Data became widely available (Baumeister et al. 2020). In another example, the occupation of a prompt engineer only emerged after generative Artificial Intelligence made it possible to give natural language commands to software (Mesko 2023). More new professions will probably emerge as digital technologies keep evolving.

Nordic perspectives on digitalizing work

When we trace the effects of digital technologies on working lives, our attention will invariably be drawn to the Nordic countries. Nordic societies are advanced in their process of digital transformation. The Organization for Economic Co-operation and Development (2019) reported that when it comes to digital skills, the Nordics are in the most advanced group. For example, more than 90% of the Danish, Finnish, Icelandic, Norwegian, and Swedish populations use the internet, with more than 80% of them using it on a daily basis. The citizens of these countries already have high digital skill levels, and their countries installed life-long learning schemes that will keep them abreast of future technological developments. The European Commission (2022) reached a similar conclusion in their Digital Economy and Society Index. This index considers digital skills and infrastructures as well as the digitalization of businesses and of public services. It shows that Denmark, Finland, Norway, and Sweden already progressed particularly far in their digitalization of public services, while being above average in all other dimensions. Denmark stands out among the Nordics because of high internet connectivity, whereas Finland stands out because of its well-developed human capital.

The far progressed digitalization of Nordic societies makes them particularly interesting and instructive case studies on digitalizing workplaces. In these countries, we can already today see the impact of digital developments that will only come about in other countries in the future. While other countries still have a stronger need to plan and conceive how digital technologies can be integrated into work, the Nordics can already learn from their experiences. These country differences are smaller when it comes to already established digital technologies, such as computer use in general. However, they are better pronounced when it comes to more advanced technologies, such as Artificial Intelligence (Organization for Economic Co-operation and Development 2023). Therefore, this special issue serves two purposes. First, it portrays the challenges and benefits that Nordic countries currently experience in their digitalizing workplaces. Second, it provides a glimpse into new developments in digitalizing workplaces. Even though it is just a glimpse, it may serve as a weak signal, already indicating what further developments we can expect in the future.

The first article in this special issue explores how the COVID-19 pandemic altered the use of technology at work. This pandemic brought about a sudden leap in the digitalization of working lives because physically visiting workplaces was often impossible. Digital solutions made up for this limitation. The pressure to accept this increase in digitalization was high, because it was often the only way to carry out working tasks and run businesses. In their article, Arianna Poli, Annika Heuer, and Andreas Motel-Klingebiel explore how older Swedish workers experienced this situation. Older workers were at a disadvantage during the COVID-19 pandemic because of their less developed digital



skills and lower involvement in training activities. Poli, Heuer, and Motel-Klingebiel document the diversity in individual experience of technology-related changes at work. They show that low-educated workers in particular had difficulties using digital technologies and were dissatisfied with technological changes at work. Thereby, this article underlines the crucial distinction between the use of digital technologies at work and the satisfaction with digitalized work. The one does not need to coincide with the other.

The second article takes a closer look at how workers feel about digital technologies. It suggests that questions of well-being at work are connected with digital technology use, with some individuals thriving on such technologies while others suffer. Tuuli Turja, Jari Hakanen, Oxana Krutova, and Pertti Koistinen analyze Finnish survey data to gain a better impression of the diversity of experiences. They find that in most cases, digitalization not only increased the workload but also made work more satisfactory. In some cases, the increased workload was perceived as unsatisfactory and stressful. In other cases, digitalization reduced the workload, which also created a feeling of satisfaction. Hardly anybody reported that digitalization reduced the workload, which made work boring and unsatisfactory. These findings cast a spotlight on varying reactions to the same phenomenon. Not only the way in which digital technologies change our working lives can vary, but also how individuals react to these changes. Future research should consider both kinds of diversity.

The third article zooms in on a particular group of older workers, namely on older self-employed individuals. These individuals can approach digitalization as they like – being their own bosses and making their own rules. Consequently, they can decide on their use of digital technologies based on features of the technologies as well as their own preferences. If they fundamentally disagree with the use of digital technologies, they can even go as far as to avoid using them altogether. Visa Rantanen and Kathrin Komp-Leukkunen illustrate this point through three case studies of older Finnish self-employed individuals. These individuals take very different approaches to handling digital technologies at work, ranging from hesitancy to embracing it. Nevertheless, none of the individuals studied decided to avoid it altogether. This circumstance highlights the fact that the digitalization of society is already so far progressed that a working life without digital technologies is by this point hard to realize.

The fourth article turns to the most drastic possible reaction to digitalization, namely the one that requires exiting the workforce. This option is more widely available to older workers, who may already have accumulated enough pension rights to qualify for early or full retirement. Per Erik Solem, Linda Hauge, Tale Hellevik, and Katharina Herlofson study the retirement preferences among older Norwegian workers. They find that difficulties with digital technologies can leave older workers yearning for early retirement. Their workplaces can facilitate such difficulties just as much as they can steer retirement decisions. This insight demonstrates that workplaces play a pivotal role in how the digitalization of working lives affects employees.

The fifth and final article revisits the well-known discussions on the effects of computer use on retirement age. These classical discussions emerged in the early years of the digitalization of working lives. Kathrin Komp-Leukkunen explores whether the effects of computer use in Denmark and Finland have changed since then. She shows that computer use and computer training are commonplace occurrences for older workers by now. In contrast to the beginning of the digital turn in workplaces, they no longer constitute an exceptional occurrence or a major obstacle to older workers. Quite the

contrary: by now, using a computer at work allows individuals to work until a later age. It increases their employability, and it gives them access to jobs that are less physically demanding. Both of these changes help to realize extended working lives, which are ranking high on political agendas across Europe. This article thus reminds us that the effects of digitalizing working lives are not set in stone. They are in flux, and we regularly have to question what we know in order to keep detecting the shifts.

References

- Arena, F., Collotta, M., Pau, G., & Termine, G. (2022). An overview of Augmented Reality. *Computers*, 11(2), 28. <https://doi.org/10.3390/computers11020028>
- Baumeister, F., Werneck Barbosa, M., & Gomes, R.R. (2020). What is required to be a data scientist? Analyzing job descriptions with centering resonance analysis. *International Journal of Human Capital and Information Technology Professionals*, 11(4), 21–40. <http://doi.org/10.4018/IJHCITP.2020100102>
- Cao, G., Tian, N., & Blankson, C. (2022). Big Data, marketing analytics, and firm marketing capabilities. *Journal of Computer Information Systems*, 62(3), 442–451. <https://doi.org/10.1080/08874417.2020.1842270>
- Cassandro, N., Centra, M., Guarascio, D., & Esposito, P. (2021). What drives employment–unemployment transitions? Evidence from Italian task-based data. *Economia Politica*, 38, 1109–1147. <https://doi.org/10.1007/s40888-021-00237-5>
- Comi, M., Smith, S., Goettlich, W.A., Alexander, P., Davidson, D., & Staples, W.G. (2024). Digital home-lessness: Exploring the links between public Internet access, technological capital, and social inequality. *Current Sociology*, 72(1), 65–82. <https://doi.org/10.1177/00113921221111819>
- Delabrida Silva, S.E., Rabelo Oliveira, R.A., & Ferreira Loureiro, A.A. (2018). *Examining Developments and Applications of Wearable Devices in Modern Society*, Hershey: IGI Global. <https://doi.org/10.4018/978-1-5225-3290-3>
- Elaoufy, H. (2023). Bridging the gap between digital native students and digital immigrant professors: Reciprocal learning and current challenges. *American Journal of Education and Technology*, 2(2), 23–33. <https://doi.org/10.54536/ajet.v2i2.1522>
- European Commission (2022). *The Digital Economy and Society Index*. Retrieved March 14, 2024, from <https://digital-strategy.ec.europa.eu/en/policies/desi>.
- Hall, J.A. (2018). When is social media use social interaction? *New Media & Society*, 20(1), 162–179. <https://doi.org/10.1177/1461444816660782>
- Komp-Leukkunen, K. (2023). A life-course perspective on older workers in workplaces undergoing transformative digitalization. *The Gerontologist*, 63(9), 1413–1418. <https://doi.org/10.1093/geront/gnac181>
- Komp-Leukkunen, K., Poli, A., Hellevik, T., Herlofson, K., Heuer, A., Norum, R., Solem, P.E., Khan, J., Rantanen, V., & Motel-Klingebiel, A. (2022). Older workers in digitalizing workplaces: A systematic literature review. *Journal of Aging and Social Change*, 12(2), 37–59. <https://doi.org/10.18848/2576-5310/CGP/v12i02/37-59>
- Kurer, T., & Gallego, A. (2019). Distributional consequences of technological change: Worker-level evidence. *Research & Politics*, 6(1), 1–9. <https://doi.org/10.1177/2053168018822142>
- Levin, I., & Mamlok, D. (2021). Culture and society in the digital age. *Information*, 12(2), 68. <https://doi.org/10.3390/info12020068>
- Marshall, V.W. (2011). A life course perspective on information technology work. *Journal of Applied Gerontology*, 30(2), 185–198. <https://doi.org/10.1177/0733464810367791>



- Mesko, B. (2023). Prompt engineering as an important emerging skill for medical professionals: Tutorial. *Journal of Medical Internet Research*, 25, e50638. <https://doi.org/10.2196/50638>
- Ooi, K.-B., Wei-Han, G., Al-Emran, M., Al-Sharafi, M.A., Capatina, A., Cahkraborty, A., Dwivedi, Y.K., Huang, T.-L., Kar, A.K., Lee, V.-H., Loh, X.-M., Micu, A., Mikalef, P., Mogaji, E., Pandey, N., Raman, R., Rana, N.P., Sarker, P., Sharma, A., Teng, C.-I., Wamba, S.F., & Wong, L.-W. (2023). The potential of generative artificial intelligence across disciplines: Perspectives and future directions. *Journal of Computer Information Systems*. [Epub ahead of print]. <https://doi.org/10.1080/08874417.2023.2261010>
- Organization for Economic Co-operation and Development (2019). *OECD Skills Outlook 2019: Thriving in a Digital World*, Paris: OECD Publishing. <https://doi.org/10.1787/e11c1c2d-en>
- Organization for Economic Co-operation and Development (2023). *OECD Skills Outlook 2023: Skills for a Resilient Green and Digital Transition*, Paris: OECD Publishing. <https://doi.org/10.1787/27452f29-en>
- Prensky, M. (2001). Digital natives, digital immigrants. *On the Horizon*, 9(5), 1–6.
- Van Dijk, J. (2020). *The Digital Divide*, Cambridge: Polity Press.