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Work practice view to digitalization – A literature review

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Abstract

Initially felt at the knowledge work, novel technologies are making headway beyond that, impacting employees from offices to factory floors. We review previous Information Systems research with the focus on introducing novel digital technologies in work practice. We provide an overview on the drivers for introducing the change, how the drivers transition into actual change at work practice, involved actors and role of workers in the change initiative, as well as outcomes and success factors for the initiatives. We highlight the need for the affected persons to participate in the planning and design of the technological changes as a critical component in digital transformations.

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1. Introduction

Over the past 200 years the world has undergone a series of changes that are substantial enough to be called Industrial Revolutions. All have significantly altered the work practices – the first one through mechanization of labor using steam, the second one through serialization in form of assembly line factory work, and the third one from the

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rise of information technology and computers [1]. The 3rd industrial revolution heralded the phenomenon of digital transformation, a “process where digital technologies create disruptions triggering strategic responses from organizations” [2]. The shape of the transformation has changed as technologies have matured and expanded, from digitizing the content, to digitalization of the work, and finally to digital transformation of the business itself [3]. However, it can be argued that the focus has been in the storage, management, and exchange of information, and hence the transformation affected mostly those who can be considered knowledge workers.

We are now ongoing the 4th industrial change, comparable to the earlier three [4], arising from the emergence and self-reinforcing interplay of new technologies that span the digital, physical, and biological worlds, supported by the fast information exchange enabled by the data-centricity and telecommunications from previous change [1]. Apart from changing the knowledge work, like having AI and robo-advisors do the analysis work in financial services [5], this ability to span digital and physical means that this time the digital transformation, through initiatives such as Industry 4.0 [6], will impact also traditional labor that has so far been untouched by digital technology, e.g. factory work, farming and transportation. Consequently, there have been predictions that such work is easy to automate, and the result will be a disappearance of a significant number of jobs [7]. On the other hand, counterarguments have also been made suggesting that work may change, but jobs remain [8-10].

The impact of technology change on organizations has been one of the main threads in Information Systems (IS) research since the beginning. Digital transformation in IS literature largely takes an organizational viewpoint (see e.g. [2,11]) and digital transformation is often portrayed quite straightforwardly as organizations’ means to use digital technologies to renew and readjust themselves either using it as an advantage, or responding to a singular driver, e.g. market pressure [12]. Other views also exist, though, suggesting that digital transformation should be seen as a complex and dynamic process, portraying digital transformation and its material arrangements as tightly dependent and related on the context where it happens and the practices in that context [13].

IS scholars have become interested in work only relatively recently [14]. Originally, interest in work practices developed in the fringes of IS research in 1970s and 1980s, examples of which are Participatory Design (PD) and Computer-Supported Cooperative Work (CSCW) communities. The original Scandinavian PD was interested in utilizing tacit knowledge of workers – who are arguably the experts of the work they do – when the work practices are being changed and, hence, to empower the workers [15]. CSCW research took anthropological perspective into IT research; notable early examples are Lucy Suchman and her Work, Practice, and Technology group at Xerox PARC [16] and Lancaster CSCW group [17]. During the last two decades interest in work practices in IS research has been increasing, based not only on the pioneering work in PD and CSCW, but also on the “practice turn” in social sciences [18]. Wanda Orlikowski has had an important role in this process [19,20], and we are here following the direction she has shown.

In this paper, we take a particular interest in how the change takes form in relation to work practice and what is the current understanding in the IS field about this topic, to be able to propose new avenues for IS research and practice. We thus carried out a literature survey focused on systematic understanding of the recent state of the art in the IS field on how a change, due to introduction of new digital technologies into workplace, takes form in relation to work practice, asking as our research questions: RQ1 What drivers for introducing the change in the work practice have been reported? RQ2 How the change drivers have been transitioned into change at practice? RQ3 Who are the actors involved in the reported change initiatives and how have the workers been involved? RQ4 What kind of outcomes have been reported? RQ5 What seems to affect the success of the change at the level of work practice?

In the next section, we describe our literature review methodology. Then, we present the findings of our narrative literature review. After that, we discuss our findings and their implications to IS, as well as limitations to the study and paths for future research.

2. Research methodology

We chose to do a narrative literature review as the topic is new and there is a need for a lot of iteration and interpretation both in the literature search as well as in analyzing the literature [21]. We followed an adapted version of the PRISMA guidelines [22] (identification of the papers, screening them, checking eligibility of the papers, and based on that, including the papers in the analysis). In the **identification phase**, the first step was to conduct a wide background study on the topic to understand the phenomenon and to be able to choose suitable keywords. After that, we used AIS Electronic Library and Senior Scholar Basket of Eight journals as our data sources in January 2022. These databases were selected because they have long been at the forefront in publishing high quality IS research.

They were also identified to contain most of the IS related research about the topic. Our final search string was as follows: (“digital transformation” OR “digitalization” OR “digitization”) AND (“work” OR “workplace” OR “worker” OR “job” OR “occupation” OR “labor” OR “task”) AND “change”.

The search string was adapted for the different databases and variations of the terms were used. In addition, we consulted experts. Articles from 2013 or older were excluded already in this phase, as it appeared that the works of Frey and Osborne [7], Brynjolfsson and McAfee [23] and Forman, et al. [24] kicked off the interest in how digital transformation changes work, evident from the fact that the number of relevant articles increased clearly from 2014 onwards. This resulted in 486 papers. After removing duplicates in the **screening phase**, the total was 223 papers. In the **eligibility phase**, the first set of inclusion/exclusion criteria we applied was that the study had to meet both two criteria: 1) As our specific interest is in how new intelligent digital technologies coming to the workplace change work practices, we required the papers to somehow discuss such technologies. 2) The paper needed to include discussion at the level of work practices. However, only 6 papers were found that fulfilled this, therefore we widened our criteria from ‘intelligent technologies’ to ‘any digital technology’, to include any of the 223 papers that matched both of the following criteria: 1) The paper discusses introduction or use of any digital technology, and 2) it discusses that at the level of work practice. This resulted in the final sample of 29 papers to be analyzed in this literature review.

In the paper **analysis phase**, two of the authors coded the papers in a table by: year of publication; country of origin and other demographic factors; research methodology; drivers and goals for digital transformation; how the paper discusses work practice; and what it tells about the digital transformation process itself (actors, activities, outcomes). In many cases, a lot of interpretation was needed as many of the papers did not go very deep in work practice level. These interpretations were based on our understanding of the context and nature of the industry or its general situation when facing global digital transformation, and were discussed among the authors to reach an agreement.

3. Findings

26 of the analyzed papers used a **qualitative research approach**. Of the three exceptions one was a short TREO opinion paper highlighting the importance of taking employees into account [25]. Meske [26] used a quantitative method and Kang et al. [27] had a quantitative survey as part of their research, in addition to qualitative interviews. 19 of the studies had been conducted in Europe. Other **geographical areas** mentioned include Canada, China, India, Indonesia, Mexico, USA, and “global”, or “international”. The studied cases in the papers covered following **industries** or type of organizations that best describe the actual work settings: 7 of the studies focused on Manufacturing, whereas other industries were quite evenly spread between Administrative, Banking, Communication, Governmental (Social Work and Law Enforcement), Healthcare, Hospitality, Software, Transportation, and Wholesale. Two studies focused on specific technologies and had respondents from various industries. The papers were **published** in: AMCIS (3), AMCIS TREO (2), BLED (2), ECIS (5), HICSS (3), ICIS (3), IJIM (1), ISJ (3), JAIS (2), JSIS (1), MISQ (1), PAJAIS (1), UK Academy for Information Systems (1). Paper by Lestari & Djastuti [28] was included based on an expert opinion. It was published in Review of Management and Entrepreneurship. The number of papers by the **publication year** were: 2014 (1), 2015 (1), 2016 (0), 2017 (3), 2018 (3), 2019 (5), 2020 (11), 2021 (4), 2022 (1).

3.1. RQ1 Drivers for introducing the change to the work practice

Though the driving forces behind the need or desire to introduce technological change into practice, such as market disruptions, were not explicitly explored in the papers, it can be implicitly identified that they were often shaped by external actors and forces beyond the organization. Such agents acted on their own volition and from these activities a driver manifested that then started to affect the organization in question. A **mandatory, regulation-driven change** was discussed in [29] and mentioned in [30,31], where a legislative agency created regulations that mandated changes at the workplace. **Radical, technology-driven disruption** through platformization was the case in [32]. In these cases, the driver effectively dictated what the change is and how it has to be deployed and the organization had to adapt in order to survive. In some cases, the drivers were a **pressure**, but less directed and allowed the organization to find their own ways to apply the change. Such drivers ranged from desire to improve cost and work efficiency [5,28,30,33–40], or a need to respond to or prepare for market pressure and competition, including the changes to work driven by digitalization [5,30,31,39,41–44]. There were also **opportunity**-driven changes, such as looking to grow business by applying advanced technology enablers [27,33,45]. In some cases, the impetus came from customer or

other external interface, again not as a pressure, but as an opportunity to enhance the work efficiency, serve customers better or adapting to evolving customer practices [33,37,46–49]. An opportunistic driver could also be unrelated to the organization itself, such as in two cases where the change arose from workers being exposed to and familiar with new consumer technologies and wanting to improve their own work with similar solutions [50,51].

3.2. RQ2 Dimensions of activities, transitioning the change driver into a change at work practice

When looking at the activities involved in transformations, the following three levels could be inferred from the papers, starting from the practice and moving to higher echelons. Firstly, there is the activity of **deploying the change at the level of worker and practice**. At this level, old practices, where they existed, needed to be dismantled and (re)configuration of a new practice, that integrates the tasks, procedures, and the new technology that the change brought in, was needed, often adapting the technology during the process [27–30,33,34,37,39, 41–45,47–50]. The second level was found to be the activity of **implementing or tailoring the technology** chosen as the solution. This activity was typically carried out outside of the affected practice level, without or with worker involvement [5,26,30,35,37,40–44,46]. The third activity we identified was **designing the change** – in other words, deciding and directing where and how the change was to be enacted, including e.g. the choice of technology. This was clearly an organization level activity in the analyzed papers, and in most cases the technology within the organization was introduced top-down [5,26,30,31,34,39–42,45,48]. While there were also examples of emergent use of technology [46,49–51], where workers were the active force for driving new digital technologies into use, even in these cases the outcome required organization-level activity, support, and decision-making, e.g., to steer through conflicts of interest, such as was described in [50].

3.3. RQ3 Actors engaged in the change process

As the data set was collected with a focus on work practice, the papers naturally included **workers** as actors in the change process, although their involvement and degree of empowerment varied. In 12 papers the worker involvement described was more of an object or subject of the change, either only informed and educated, or at most in supportive roles: such as being consulted but not involved in design, as testers, supporting other employees who were coming to change later, or having to simply cope with the change [5,26,29,30,32,34,39,40,43–45,48]. Two papers described a situation where the workers did participate but lacked the necessary support and thus did not have the actual capability to steer the change direction [37,46].

In 7 papers the workers were empowered to directly influence the change itself, at varying degrees. In many cases the workers had the power to adapt and modify the tasks and technology even to a large extent at the level of practice, [30,41,42,47,50], sometimes acting without asking for permissions, or even going against them [48,49,51]. In some cases, the workers were also engaged, or being engaged in technology development beyond the practice level [41,42,50]. In several cases, workers were actively involved in the design and guidance of the change direction [30,31,35,49] at the organizational level, such as participation in the change office composed of managers and employees, that defined which processes and organizational structures were to be targeted for the change. Finally, in one paper the workers were the actual initiators and active thought leaders for the entire transformation [50]. In this case, the prompting driver was their experience with consumer technology that was convenient and easy to use.

While none of the papers identified a situation where workers or their views would be involved or represented in the shaping of the driver itself behind the change initiative (e.g. legislation), some papers [29,32,52] identified this dimension and implied the lack of capability to influence things as a negative issue.

At the organizational level, a key player group were **in-organization decision-makers** above the workers such as CEOs, CDOs, CIOs and lower-level management, administration, or business ownership [25,30,34,36,37,39,42–45,50] as well as **in-organization support units**, especially IT controlling the technology choices [30,50]. There were also **temporary action teams** working on the transformation [30,31,37].

In the technology development dimension, there were technology providers or **IT organizations** implementing or tailoring the technology solution [5,30,35,42,50], but also technology companies utilizing disruptive technologies to change the market ecosystem, such as platforms [27,32,52], or consumer technology providers without connection to the organization or market in question but changing the overall technology landscape [50].

Market-related actors in the sector where the organization operated included **customers** [30,45,49,50] and **competitors** [30,32,42,52], or external **non-commercial agencies** targeting the organization and promoting adoption

of technology and change in practices [46]. External actors further out of the organization's operating sphere included government or **governmental agencies**, especially policy and regulation makers [29,31,40].

3.4. RQ4 Outcomes of the change process at the level of practice/worker

Digitalization has been predicted to cause a radical reduction and disappearance of jobs. A counterargument has been that while some tasks may be automated, the job itself more likely changes than disappears. From the papers studied the following observations can be made:

There were cases where the workers expressed a fear of losing a job [35,42] and some papers identified a situation where the integrated technology indeed **replaced the worker in a task or role** [5,41,42], but in none of these cases the people affected lost their jobs. Instead, **the job profile and role changed** – for instance in [42] the outcome was a change in role from execution (manual data analysis) to development (acting as a tester/gatekeeper to AI doing the data analysis), which can be seen as a step up in authority. Role and job changes were described also in [29,30,38,40,47,48,50]. In addition, adoption of new technology resulted in **creation of entirely new jobs**, roles, and responsibilities [30,32,45,52], or even provided a possibility to conveniently have a second job without adding more work hours [27].

Another clear outcome was the **change in worker empowerment** as they gained or stood to gain [5,31,38,41,42,50] or lost [5] authority or access to resources. The technology also provided an **enhanced ability to carry out the work**, or it **reduced the workload** in some way [27,29,33,36,38–41,46,47,49,51]. In some cases, however, the result was **additional workload** e.g. [29,46] or even **hindrance** to worker's ability to carry out a task they felt to be essential in the job and role they had [34,40].

Finally, in some cases, the change in tasks, roles and responsibilities required workers to **acquire new skills** [30,32,41,46,52], or to **adjust to new working conditions** as the introduction of the technology affected how the work was physically done either on a macro level e.g. altering the workplace or its layout and how people interacted in that space [34,45,47,48,51], or on a micro level, such as switching the technology interaction mode from mouse-based to more keyboard-based [44].

3.5. RQ5 What seems to affect the success of the change at the level of work practice

Several factors were identified either as supporting or hindering a successful integration of a new technology into a durable practice. **Success factors** included: 1) Active management engagement in taking into account the worker(s) wishes and concerns and, in general, actively taking care of a positive worker experience during the digital transformation [25,42,50]. 2) Inclusion or enhanced collaboration with other parts of the organization or beyond the organization during the change process [45,46,50]. 3) Workers provided with the goals of the change, instead of the design, and themselves guiding the design of the change, able to reject designs that they do not consider appropriate [30]. 3) Workers having the autonomy and ability to craft the new practice to make it fit for purpose, or at least ability to influence it, such as ability to modify tasks and procedures [40,47]. 4) The potential in the technology to be altered [30,41] or developed further e.g. [41,42] to have a better fit to the practice, or having entirely new technology solutions created together with the workers to support the new practices e.g. [32,35,50,52]. 5) Workers having the autonomy and ability to craft the new practice to make it fit for purpose, or at least ability to influence it, such as ability to modify tasks and procedures 6) The change bringing in increased empowerment, such as more responsible or authoritative role e.g. [5,42,45] or improved access to resources [31]. 7) The new practice enhancing the workers' ability to carry out their work e.g. by adding new capabilities, reducing the effort or resources needed, or making the work otherwise more effective [27,30,33,40,41,42,46,50].

In some reports, the **failure to take important factors into account** resulted in a failed or struggling transformation. These factors were: 1) Need for the change to 'make sense' at the worker level [43,44]. 2) Need to do integration beyond the task, including also worker professional identity influenced by aspects such as local culture [34], workplace [48], or work profile [5,40]. 3) Need to maintain the meaningfulness and feeling of satisfaction regarding the work, e.g. in [30] one-third of the employees left the company and those remaining expressed a feeling of dissatisfaction as the role change was felt to make the work simpler, repetitive and boring compared to the challenge and satisfaction it provided earlier. 4) Importance of physical arrangements in the deployment of the new technology so that it does not interfere with important tasks related to the practice [34,47], or compete with valuable resource such as free time during the breaks [43,44].

Finally, a set of **directly negative factors** were identified. 1) Opposing workplace culture e.g. command and control leadership, or organization/actor such as IT, resisting the change design or direction desired by the workers [35,39,49–51]. 2) Lacking a clear plan on how to integrate the new technology to the practice [47]. 3) Lack of support from management or lateral/organizational support such as being short of resources to establish or carry out the new practice [29,37,46]. 4) Missing personal capabilities to cope with the change, such as lack of skills [30,32,52]. 5) Impediments in crafting the new practice, such as unsuitable or inconvenient technology [27,30,37,43,44,46,47] and lack of support from the underlying process [27]. 6) Uncertainty of actual management values and priorities especially when it comes to the use of time and effort for engaging in the change activities [37,43,44], even if the management was driving the change.

4. Concluding discussion

This study focused on systematic understanding of the recent state of the art in the IS field on how a change, due to introduction of new digital technologies into workplace, takes form in relation to work practice. Our literature review revealed that very little has so far been written about such digital transformations where advanced digital technologies ('intelligent technologies' such as e.g. AI) have been applied to work practice. When we broadened the technology scope while maintaining the focus on practice - i.e. the level of work and worker – findings were more forthcoming and allowed to establish answers to our research questions.

This study contributes to the literature in the following ways: First, we provide a systematic overview of the research on this area, with 29 empirical studies on the topic. Future of work is an emerging area of research in the IS field [53] and particularly work practice perspective has not traditionally been strong in IS, thus the relatively small number of studies is not unexpected. 72,4% of papers were published 2019 or after, which also signals the novel nature of the topic. Second, based on our thorough analysis of empirical findings in the data set we provide an overview on 1) the drivers for introducing the change in the work practice and how they transition into change at practice, 2) involved actors in the change initiative and role of workers in the change, 3) outcomes and success factors for change initiatives that have an effect on work practice. The decision to focus on the most recent studies in IS forums only is a limitation, but we wanted to specifically understand what the current state of the art is in the IS research to be able to see what kind of future directions could benefit IS field. We also needed to make a lot of interpretations as the papers varied in their focus on work practice, our central interest in the study. There was a limited number of studies per country and per industry and therefore no conclusion could be made regarding those. Research on how novel digital technologies change the work practice would benefit from comparative studies over industries. Additional forums, use of other keywords, and different inclusion/exclusion criteria might yield useful findings as well.

We want to specifically highlight the following aspects from our findings: When looking into our findings related to RQ1 and RQ2, the flow that transitions the driver into the practice-level change, four broad stages could be identified: The first stage is where the driver itself is born and shaped. This is often considered to be largely an external activity [2] [54], by agents and forces beyond the organization, who act according to their own interests and drivers. However, their impact can be quite significant. For instance, the European Union regulatory bodies have become quite active in the area of digital technologies. All in all, we see this stage to be a complex and highly networked process, especially the more global the world becomes.

Second stage is at the organizational decision-making level, where the change activities are planned and directed, and e.g. technology choices are made. This has long been in IS focus and a significant amount of research has been published of this level. The third stage is where the chosen technology is implemented or tailored by someone other than workers – often an actor external to the company – and potentially without any particular collaboration with the company if the technology is adopted as-is. Again, this is something that has been under study for long. Finally comes the stage where the change is deployed through integrating the technology at the level of practice. The small number of papers we found that focused on the new wave of technologies (6 papers), indicates a need for further studies on the effect of novel technologies in the work practice.

Very little worker involvement was reported in stages beyond the practice-level, with few cases identifying engagement in technology development and two cases where workers were clearly involved in the change design and direction. Workers are of course always involved in the practice-level change but even here the degree of involvement varied – in some cases they were empowered with high degree of autonomy or taking liberties of their own, in other cases they were mere subjects to change, expected to adopt or support it. Furthermore, when this stage is reached, many things have already been decided and fixed that can be limiting, hindering, or even damaging when it comes to

the ability to integrate the new technology and craft a new, durable practice. We claim that these issues arise largely from the lack of understanding, generalizations, or misconceptions when it comes to the actual work and its realities.

To conclude, for the purpose of future research and practice, we propose IS researchers and practitioners pay attention to the following: First, the four stages identified from the literature form an interesting framework for examining future of work – they give structure to the larger picture of change, providing a way to identify where to look for forces that affect the change in work; they help checking if all factors have been covered in a study; and they make it possible to consciously focus on certain aspects and/or a certain stages in the change process and communicate this clearly in the reports.

The stages also form an interesting basis when discussing about worker involvement, as decisions that affect the outcome at the level of practice are made on each stage. The question for the future research that can be posed here is, who are the ones making the decisions, in what stage, and how? What are the motives considered at each stage? Whose voice is being heard and where? Potentially useful theoretical frameworks to examine this include e.g. discourse studies, which can make power differences visible; or value co-creation [55] or stakeholder theory [56], which both draw attention to the different actors, including workers, and how they benefit in the process. The role of regulation as a high-level factor for the change in work opens also interesting avenues for IS research, particularly with the emerging IS interest in regulation of IT (see e.g. [13]): how to get the worker viewpoint and insight heard already at the level where the drivers for the change are being shaped.

The third clear takeaway from the review is that taking a new technology into use is not simple and straightforward, but often quite iterative process, where the system is over time made to fit with the work, and vice versa. How this process actually takes place has, however, got only little attention and a rather superficial treatment in the reviewed papers. Given the importance of grassroots experience to the success of digitalization, this suggests a promising new area for further research in IS. Such new opening could benefit from the existing line of research on “appropriation” – processes where people adapt technologies into their working practices – in CSCW and end-user-design [57,58,59]; a good recent overview is in [60]. In addition, the recent IS research has brought up the view that digital transformation should be seen as a relational, dynamically changing process that bundles the material arrangements (such as technology) and practice together [13]. We propose further studies on taking the relational perspective at the work practice level.

Finally, we feel that significantly more research is needed on the adoption of the new wave of technologies e.g. AI, at the level of practice. Such technologies are capable of autonomous action and can be more akin to a co-worker rather than mere tools. Hence, the change has potential to be far more radical departure from previous waves of technology introductions to workplace. More so, because the latest wave of industrial change now extends the digitalization into work domains that have so far being highly manual and execution oriented.

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References

Papers found through the literature review have been marked with an asterisk in front of the first author (*)

- [1] Philbeck, T. and N. Davis (2018) “The fourth industrial revolution.” *Journal of International Affairs* 72 (1): 17-22.
- [2] Vial, G. (2019) “Understanding digital transformation: A review and a research agenda.” *The Journal of Strategic Information Systems* 28 (2).
- [3] Bloomberg, J. (2018) “Digitization, digitalization, and digital transformation: confuse them at your peril.” <https://www.forbes.com/sites/jasonbloomberg/2018/04/29/digitization-digitalization-and-digital-transformation-confuse-them-at-your-peril/> Accessed March, 28, 2022.
- [4] Schwab, K. (2017) *The fourth industrial revolution*. Crown Business, New York.
- [5] *Strich, F., A-S. Mayer, and M. Fiedler (2021) “What Do I Do in a World of Artificial Intelligence? Investigating the Impact of Substitutive Decision-Making AI Systems on Employees’ Professional Role Identity.” *Journal of the Association for Information Systems* 22 (2): 304-324.
- [6] Lasi, H., P. Fetteke, H-G. Kemper, T. Feld and M. Hoffmann (2014) “Industry 4.0.” *Business & Information Systems Engineering* 6: 239-242.
- [7] Frey, C. B., and M.A. Osborne (2013) *The Future of Employment: How susceptible are jobs to computerisation?* Oxford Martin Programme on Technology and Employment.
- [8] Arntz, M., T. Gregory, and U. Zierahn (2017) “Revisiting the risk of automation.” *Economics Letters* 159: 157-160.

- [9] David, H. (2015). “Why are there still so many jobs? The history and future of workplace automation.” *Journal of economic perspectives* **29** (3).
- [10] Willcocks, L. (2020) “Robo-Apocalypse cancelled? Reframing the automation and future of work debate.” *Journal of Information Technology* **35** (4): 286-302.
- [11] Hanelt, A., R. Bohnsack, D. Marz, and C. Antunes Marante (2021) “A systematic review of the literature on digital transformation: Insights and implications for strategy and organizational change.” *Journal of Management Studies* **58** (5): 1159-1197.
- [12] Levkovskiy, B., B. Betzwieser, A. Löffler, A., and H. Wittges (2020) “Why do organizations change? A literature review on drivers and measures of success for digital transformation.” In: Proceedings of the Americas Conference on Information Systems (AMCIS 2020).
- [13] Lanamäki, A., K. Väyrynen, S. Laari-Salmela, and M. Kinnula (2020) “Examining relational digital transformation through the unfolding of local practices of the Finnish taxi industry.” *Journal of Strategic Information Systems* **29**: 1-21.
- [14] Barley, S. R. and G. Kunda (2001) “Bringing work back in.” *Organization Science* **12**: pp. 76-95.
- [15] Greenbaum, J. and M. Kyng, M. (Eds.) (1991) “*Design at work: Cooperative design of computer systems.*” Hillsdale, CRC Press.
- [16] Blomberg, J., L. Suchman and R.H. Trigg (1996) “Reflections on a Work-Oriented Design Project.” *Human-Computer Interaction* **11**: 237-265
- [17] Bentley, R., J.A. Hughes, D. Randall, D., T. Rodden, P. Sawyer, D. Shapiro, and I. Sommerville (1992) “Ethnographically-informed systems design for air traffic control”. In: Proceedings of the 1992 ACM conference on Computer-supported cooperative work, pp. 123–129.
- [18] Schatzki, T.R., K. Knorr-Cetina, and E. Savigny (Eds.) (2001) *The Practice Turn in Contemporary Theory*. London, Routledge.
- [19] Orlikowski, W.J. (2007) “Sociomaterial Practices: Exploring Technology at Work.” *Organization Studies* **28**: 1435-1448.
- [20] Orlikowski, W.J. and S.V. Scott (2008) “Sociomateriality: Challenging the Separation of Technology, Work and Organization.” *Academy of Management Annals* **2** (1): 433-474.
- [21] Boell, S.K. and D. Cecez-Kecmanovic (2015) “On being ‘systematic’ in literature reviews.” *Journal of Information Technology* **30** (2).
- [22] Moher, M., A. Liberati, J. Tetzlaff, D. Altman, and PRISMA Group (2009) “Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement.” *Annals of internal medicine* **151** (4): 264-269.
- [23] Brynjolfsson, E. and A. McAfee (2014) *The second machine age: Work, Progress, and Prosperity in a Time of Brilliant Technologies*. New York, W. W. Norton & Co.
- [24] Forman, C., J.L. King, and K. Lyytinen (2014) “Special Section Introduction—Information, Technology, and the Changing Nature of Work.” *Information Systems Research* **25** (4): 789-795.
- [25] *Abhari, K. and Z. Solomonn (2020) “Reciprocal Relationship between Employee Experience Management and Digital Transformation.” In: Proceedings of Americas Conference on Information Systems (AMCIS 2020).
- [26] *Meske, C. (2019) “Digital Workplace Transformation – on the Role of Self-determination in the Context of Transforming Work Environments.” In: Proceedings of the European Conference on Information Systems (ECIS 2019).
- [27] *Kang, L., Q. Jiang, C-H. Peng, S.L. Sia, and T-P. Liang (2020) “Managing Change with the Support of Smart Technology: A Field Investigation of Ride-Hailing Services.” *Journal of the Association for Information Systems* **21** (6): 1594-1620.
- [28] *Lestari, L. and I. Djastuti (2020) “Implementation of Smart Technology, Artificial Intelligence, Robotics, and Algorithms (STARA): A Threat or Opportunity for Workers’ Future.” *Review of Management and Entrepreneurship* **4** (2).
- [29] *Eneman, M., J. Ljungberg, B. Rolandsson, B. and D. Stenmark (2020) “Governmental Surveillance - The balance between security and privacy.” In: Proceedings of UK Academy for Information Systems Conference.
- [30] *Rezazade Mehrizi, M.H., B. van den Hooff, and C. Yang (2022) “Breaking or Keeping the Habits: Exploring the Role of Legacy Habits in the Process of Discontinuing Organisational Information Systems.” *Information Systems Journal* **32**: 192–221.
- [31] *Zimmer, M.P., A. Baiyere, and H. Salmela (2020) “Digital Workplace Transformation: The Importance of Deinstitutionalising the Taken for Granted.” In: Proceedings of the European Conference on Information Systems (ECIS 2020).
- [32] *Högberg, K. (2021) “Strategic Responses to Digital Disruption – an Exploratory Study of Digital Transformation in Hospitality.” In: Proceedings of Americas Conference on Information Systems (AMCIS 2021).
- [33] *Hansen, S.W., J.L. Gogan, R.J. Baxter, and M.J. Garfield (2019) “Informed Collaboration in Health Care: An Embedded-cases Study in Geriatric Telepsychiatry.” *Information Systems Journal* **29**: 514–547.
- [34] *Kumar, M., J.B. Singh, R. Chandwani, and A. Gupta (2020) ““Context” in Healthcare Information Technology Resistance: A Systematic Review of Extant Literature and Agenda for Future Research.” *International Journal of Information Management* **51**.
- [35] *Magallanes, Y., A. Hernández, and Y. Ruiz (2019) “Challenges in the Development of a Virtual Office for Services to Teachers and Administrative Employees in Mexico.” In: Proceedings of Americas Conference on Information Systems (AMCIS 2019).
- [36] *Meyer von Wolff, R., S. Hobert, K. Masuch, and M. Schumann (2020) “Chatbots at Digital Workplaces – A Grounded-Theory Approach for Surveying Application Areas and Objectives.” *Pacific Asia Journal of the Association for Information Systems* **12** (2): 64-102.
- [37] *Rantala, K. and H. Karjaluo (2017) “Combining Digitization with Healthcare Service Processes: Value Co-creation Opportunities through Standard Work.” In: Proceedings of Bled eConference.
- [38] *Richter, A., S. Vodanovich, M. Steinhüser, and L. Hannola (2017) “IT on the shop floor - challenges of the digitalization of manufacturing companies.” In: Proceedings of Bled eConference.
- [39] *Schmid, A. (2019) “Beyond Resistance: Toward a Multilevel Perspective on Socio-technical Inertia in Digital Transformation.” In: Proceedings of the European Conference on Information Systems (ECIS 2019).

- [40]*Vogl, T.M. (2020) “The Impact of Information Technology Evolution on the Forms of Knowledge in Public Sector Social Work: Examples from Canada and the UK.” In: Proceedings of Hawaii International Conference on System Sciences (HICSS 2020).
- [41]*Dias, M., S. Pan and Y. Tim (2019) “Knowledge Embodiment of Human and Machine Interactions: Robotic Process Automation at the Finland Government.” In: Proceedings of the European Conference on Information Systems (ECIS 2019).
- [42]*Grønsvund, T. and M. Aanestad (2020) “Augmenting the algorithm: Emerging Human-in-the-loop Work Configurations.” *Journal of Strategic Information Systems* 29.
- [43]*Nolte, F., N. Guhr, and M.H. Breitner (2019) “Organizational Challenges for Enterprise Social Media at the Shop Floor.” In: Proceedings of Americas Conference on Information Systems (AMCIS 2019).
- [44]*Nolte, F., N. Guhr, and A. Richter (2020) “The Journey towards Digital Work Empowerment - Conceptualizing IS-Induced Change on the Shop Floor.” In: Proceedings of International Conference on Information Systems (ICIS 2020).
- [45]*Timonen, H. and J. Vuori (2018) “Visibility of Work: How Digitalization Changes the Workplace.” In: Proceedings of Hawaii International Conference on System Sciences (HICSS 2018).
- [46]*Giddens, L., S. Petter and M.H. Fullilove (2021) “Information Technology as a Resource to Counter Domestic Sex Trafficking in the United States.” *Information Systems Journal*: 1–26.
- [47]*Sergeeva, A., M. Huysman, and S. Faraj (2015) “Transforming Work Practices of Operating Room Teams: The Case of the Da Vinci Robot.” In: Proceedings of the International Conference on Information Systems (ICIS 2015).
- [48]*Serrano, C. and M-C. Boudreau (2014) “When Technology Changes the Physical Workplace: The Creation of a New Workplace Identity.” In: Proceedings of the International Conference on Information Systems (ICIS 2014).
- [49]*Shahlaei, C.A., M. Rangraz, and D. Stenmark (2017) “Transformation of Competence – the Effects of Digitalization on Communicators’ Work.” Proceedings of the European Conference on Information Systems (ECIS 2017).
- [50]*Gregory, R.W., E. Kaganer, O. Henfridsson, and T.J. Ruch (2018) “IT Consumerization and the Transformation of IT Governance.” *MIS Quarterly* 42 (4): 1225-1253.
- [51]*Manseau, J. (2020) “AI in the Workplace: A Qualitative Analysis of Intelligent Employee Assistants.” In: Proceedings of Americas Conference on Information Systems (AMCIS 2020).
- [52]*Högberg, K. and S. Willermark (2020) “Among Followers and Rebels: Professional Identity and Digitalization of Work.” In: Proceedings of Hawaii International Conference on System Sciences (HICSS 2020).
- [53]Baptista, J., M-K. Stein, S. Klein, M.B. Watson-Manheim and J. Lee (2020) “Digital work and organisational transformation: Emergent Digital/Human work configurations in modern organisations.” *Journal of Strategic Information Systems* 29 (2).
- [54]Osmundsen, K., J. Iden, and B. Bygstad (2018) “Digital Transformation: Drivers, Success Factors, and Implications.” In: Proceedings of the Mediterranean Conference on Information Systems (MCIS 2018).
- [55]Vargo, S.L. and R.F. Lusch (2016) “Institutions and axioms: an extension and update of service-dominant logic.” *Journal of the Academy of Marketing Science* 44: 5–23.
- [56]Jones, T.M. and A.C. Wicks (1999). “Convergent stakeholder theory.” *Academy of management review* 24 (2): 206-221.
- [57]Balca, E. and I. Wagner (2006). “Making Things Work: Dimensions of Configurability as Appropriation Work.” Proceedings of CSCW 2006.
- [58]Dourish, P. (2003) “The appropriation of interactive technologies: Some lessons from placeless documents.” *Computer Supported Cooperative Work* 12 (4): 465-90.
- [59]Draxler, S., G. Stevens, M. Stein, A. Boden, and D. Randall (2012). “Supporting the Social Context of Technology Appropriation: On a Synthesis of Sharing Tools and Tool Knowledge.” Proceedings of CHI '12, 2835–2844.
- [60]Stevens, G. and V. Pipek (2018) “Making Use - Understanding, Studying, and Supporting Appropriation.” In V. Wulf, V. Pipek, D. Randall, M. Rohde, K. Schmidt, G. Stevens (eds): *Socio Informatics – A Practice-based Perspective on the Design and Use of IT Artefacts*, Oxford University Press, Oxford. 139-176.