

WORKING PAPER SERIES

No. 1/2019



HUMAN SIDE OF DIGITILIZATION

A study of organizational structure, leader and employee competencies, and work-life balance

Ghulam Mustafa, Department of International Business, NTNU in Ålesund

Hans Solli-Sæther, Department of International Business, NTNU in Ålesund

Jon Ivar Håvold, Department of International Business, NTNU in Ålesund

Anam Ilyas, Department of International Business, NTNU in Ålesund

Antoni Vike Danielsen, Department of Ocean Operations and Civil Engineering, NTNU in Ålesund

Bella B. Nujen, Department of International Business, NTNU in Ålesund

Department of International Business, NTNU in Ålesund, 6025 Ålesund, Norway



Norwegian University of
Science and Technology

Research Report

HUMAN SIDE OF DIGITALIZATION

**A study of organizational structure, leader and employee competencies, and
work-life balance**

Ghulam Mustafa, Hans Solli-Sæther, Jon Ivar Håvold, Anam Ilyas,
Antoni Vike Danielsen, Bella B. Nujen

Ålesund

June 17, 2019

ABSTRACT

Digitalization creates numerous opportunities for businesses and organizations, but also implies key challenges in relation to building structures and developing new competencies to manage digital transformation and operate effectively in the digital era. However, research on the intersection of digitalization and organizational structure is still scarce, and there have been scant attempts to address the skills and competencies of leaders and employees in the context of digitalization. This study aims to understand how digitalization is related to organizational structure, leader and employees skills/competencies, and maintaining borders between work and private life. To achieve this, we conducted a pilot study in Møre and Romsdal region of Norway in 2018. The study included two cross-sectional surveys (administered at two different times) using a sample of young employees, and managers/organizational leaders and focus group interviews with young employees. The results of two survey studies using a frequency and descriptive analysis show that the respondents perceive organizational structure dimensions of interdependence, integration and skill variety as more compatible while formalization and centralization as less compatible with digitalization. Leader communication, learning and development, practical change and applied change skills were considered as important to effectively lead in the digital era. Employee competencies in the category of applied knowledge, personal, people, and workplace also emerged as important to thrive in the digital age. The results of path analysis in SmartPLS reveal that digitalization related technological transformation has a significant positive relationship with structural characteristics of interdependence and integration and a significant negative relationship with specialization (low skills variety) for both samples, and a significant negative relationship with formalization in the managers' sample only. The analysis further shows a significant relationship of digitalization with leader skills of applied change for young employees and learning and practical change skills for the managers' sample respectively. We also found significant indirect relationships between digitalization and certain leader skills through organizational structure, and certain employee competencies through structure and leader skills. Achieving work-life balance was found to be more a matter of personal management, though the respondents in the managers' sample perceived that digitalization would affect boundaries between work and private life. The qualitative findings generally seem to support the results from the survey studies.

TABLE OF CONTENTS

Introduction.....	3
Theoretical background.....	4
Digitalization and organizational structure	4
Dimensions of organizational structure.....	7
Digitalization and leadership skills.....	7
Digitalization and employee competencies.....	11
Work-life balance.....	13
Method.....	14
Study 1.....	14
Study 2.....	15
Measures.....	18
Control variables.....	19
Construct validity and reliability.....	19
Common method variance.....	29
Results.....	20
Frequency and descriptive analysis of responses	20
Structural model results.....	21
Indirect effects	24
Comparison based on demographic variables.....	24
Qualitative data analysis and findings.....	26
Implications and conclusions.....	28
References.....	30
Appendices.....	35

INTRODUCTION

Digital transformation triggers multifaceted changes in various organizational aspects, while creating both opportunities and challenges. These changes can bring new possibilities for conducting organizational activities more effectively or affordably, but they can also pose challenges to a company's current operations. According to Parviainen et al. (2017), "digital transformation is changes in ways of working, roles, and business offering caused by adoption of digital technologies in an organization, or in the operation environment of the organization". This is different from digitization and digitalization processes. A digital transformation implies a larger change than for example, converting an analogue transcript to a digital representation (cf. digitization) as well as the process of technologically induced change that, for example, a software program can provide (cf. digitalization) (Khan, 2016; Parviainen et al., 2017). This suggests that digital transformation can affect a company's entire operating environment and/or internal functioning. As such, technological transformations can result in disruptive processes, which in turn may change the pace or direction of a company's business (Parviainen et al., 2017).

Digital transformation is shaping the modern organization in many different and far-reaching ways. Almost every aspect of modern organization including but not limited to organizational form/design, organizational culture, strategy and business models, knowledge transfer and resource sharing, and employee boundaries between work and private life is being impacted by digitalization. Thus, it will be apt to say that we are at the beginning of an exciting transformation of work, work practices, and workplaces, and these developments warrant us reconsidering our existing understanding and exploring new research questions. New insights may inform debates about organizational design (e.g., Snow et al., 2017), the changing role of leaders (Whittington et al., 2017) and leadership in the digital era (e.g., Khan, 2016), competence requirements of a digital workforce (Gekara and Neguyen, 2018), as well as how to leverage technology while countering its potential downsides (e.g. Colbert, Yee and George, 2016). For example, digitalization may influence the tension between top-down versus bottom-up planning and centralized versus decentralized decision-making, as big data and new analytical tools make novel ways of decision making/strategizing possible. Likewise, research is required to examine how best to use technology in the service of organizational goals while countering the downsides of constant connectivity or the burgeoning use of technology for employee well-being. Moreover, it will be insightful to revisit the existing models of skills and competencies to explore if they capture the aspects of capabilities important for leaders and employees to thrive in the digital era.

The purpose of this study is to develop an understanding of how digital transformation affects organizational structure, leadership skills, employee competencies and work-life balance. As indicated earlier, by digital transformation we refer to the larger change/transformational process than mere conversion of information from the analogue to the digital form, and in the rest of this paper we use terms such as digitalization, digital work environment, digital age/era etc. to refer to the digital transformation. We addressed the following research questions:

- How will digitalization affect organizational structure?
- What effects will digitalization have on leadership skills and employee competencies?
- Does digitalization affect work-life balance; how balance between work and private life can be achieved?
- What is the role of organizational structure in shaping skills and competencies of leaders and employees in a digital work environment?
- What leadership skills are associated with employee competencies in a digital work environment?
- What leadership skills/employee competencies are important for achieving work-life balance in a digital work environment?

Our study may contribute to developing an understanding of how organizations might be restructured/redesigned to take advantage of the digital transformation and how such a transformation shapes leader and employee competencies in a way that might lead to effectiveness in the digital era. As this study is based on two different samples (managers, and millennial employees), insights from the study will be of particular interest for scholars and practitioners in getting preliminary knowledge of how millennials /digital natives differ from experienced members in their expectations of work and work/organizational practices, and how these differences might influence the future workplace. Our findings may also be useful for organizational change and development initiatives aimed at redesigning organizations and developing the competencies of leaders and employees in embracing digital transformation in the Norwegian context.

THEORETICAL BACKGROUND

Digitalization and organizational structure

The introduction of new technology often presents complex opportunities and challenges for organizations, leading to changes in managerial practices and the emergence of new organizational forms. Technological changes can be incremental or disruptive. A technological environment with incremental changes is stable and predictable and organizations operating in

such environments often respond to the incremental changes through improvements within the existing hierarchical forms of organizing (Altman et al. 2015). Disruptive changes on the other hand represent an unstable, unpredictable and a volatile environment, and organizations operating in these types of environments achieve coordination and control through lateral mechanisms (e.g. collaboration) and are less reliant on hierarchy (Snow et al., 2017). Contrary to incremental changes, digital transformation exposes organizations to continuous adaptation and improvement to meet the changing demands of the business environment (Parviainen et al., 2017). Digital technologies often disrupt established ways of organizing and require adaptation through collaboration as well as self-organization (Ostrom, 2010). Human agents in traditional organizations control technological artefacts, while employees in digital organizations collaborate with technology in use rather than merely controlling it, so organizational designs have to encompass both human and digital agents (Snow et al., 2017).

While research efforts in organization theory have greatly improved our understanding of the organizational structure, the emergence of the ‘digital age’ presents some fundamental challenges to our understanding of the way we think about organizing. Khan (2016) identified six characteristics of digitalization (interconnectedness, diminishing time lag and abundance of information, increased transparency and complexity, hierarchy removal and dissolution of personal barriers, decision enabler and integrity enhancing, and the humanising effect), which may have distinctive effects on leading and organizing in the digital era. Although environmental stability/dynamism and organizational structure has been the topic of early contingency theories, there have been scant attempts to propose an organizational architecture as an adaptive response to digitalization. Nonetheless, the contingency theories somehow underpin our understanding of the relationship between the nature of the technological environment and organizational structure in the digital age, though these theories were developed keeping in view a different era/conditions in mind.

Contingency theory argues that the most ‘appropriate structure’ for an organization is the one that best fits a given operating contingency, such as scale of operation (Blau, 1970), technology (Perrow, 1970; Woodward, 1965) or environment (Burns and Stalker, 1961; Lawrence and Lorsch, 1967). Burns and Stalker’s (1961) polar typologies of ‘mechanistic’ and ‘organic’ organizations demonstrate how the differences in technological and market environment, in terms of their rate of change and complexity, affect organizational structures and innovation management. A key part of Burns and Stalker’s (1961) theory is that the choice of structure is contingent on the external environment, with organic structures being more appropriate for volatile environments, and mechanistic structures being more appropriate for stable

environments. Later research has supported this notion. That is, when faced with environmental uncertainty and/or environmental complexity, organizations tend to move towards organic structures (Head, 2005) and that, under dynamic conditions, organizations employing organic structures tend to be more productive (Wilden et al., 2013).

Another important contribution is that of Lawrence and Lorsch (1967) who recognized that mechanistic and organic structures can co-exist in different parts of the same organization owing to the different demands of the functional sub-environments. Their suggestion that mechanistic and organic structures can coexist is reflected in the contemporary debate about the importance of developing hybrid modes of organizations – ‘ambidextrous organizations’ – that are capable of coping with both incremental and disruptive technological changes (Souitaris et al., 2012; Tushman et al., 2010).

Mintzberg’s (1979) five archetypes about the basic structural configurations of organizations operating in different environments also provide another important framework to understand the effects of digital transformation on organizational structure. According to Mintzberg’s ‘configurational hypothesis’, organizations/firms are likely to be dominated by one of the five pure archetypes, each with different innovative potential: simple structure, machine bureaucracy, professional bureaucracy, divisionalised form and adhocracy. The simple structure and the adhocracy are classified as organic organizations, which are characterized by a highly flexible project-based organization relying on the mutual adjustment of problem-solving teams. It is capable of radical innovation in a volatile environment. The other three remaining archetypes are argued to be more inhibited in their innovative capabilities and less able to cope with novelty and change.

The above widely supports the notion that when technological environments become more complex and uncertain, organizations move away from bureaucratic and hierarchical to organic forms of organizing by adopting more adaptive and flexible structures. It has been argued that digital technologies signify disruptive changes in the organizational environment, which challenge established ways of organizing and require adaptation through collaboration as well as self-organization (Snow et al., 2017). This suggests that organizations will work effectively in the digital age when structured organically (Bounfour, 2016). Since organizing digitally means more collaboration and communication between different entities, flexible and organic structures will offer greater communication flow between employees and subsequent knowledge sharing. Earlier research suggests that organizations with organic structures will facilitate greater communication flow between employees and subsequent knowledge sharing (Kessler et al., 2017). Our expectation is consistent with previous assertions that propose an

actor-oriented structure for organizations that need to continuously learn and adapt (Fjeldstad et al. 2012). An actor-oriented structure, which advocates collaboration and self-organizing as mechanisms for coordination and control (Snow et al., 2017), is conceptually closer to a team-based structure, which is a flexible organic form of organizing.

Dimensions of organizational structure

Traditionally three structural components – formalization, centralization, and specialization – have been identified as the main dimensions of organizational structure (e.g., Dischner, 2011). However, other structural characteristics such as interdependence and integration have also been recognized as important components of organizational structure (Lee, Kozlenkova and Palmatier, 2015, see Table 1 below). Formalization refers to the extent to which clearly defined rules, standardized policies, and procedures are instrumental in governing decision-making and working relationships in organizations. Centralization relates to the extent to which the authority to make decisions and take action resides in the upper levels of the organizational hierarchy. Specialization refers to the extent to which jobs in the organization require narrowly defined skills or expertise. Interdependence is the degree to which workflows within the firm require cooperation among groups, while integration has been defined as the extent to which different organizational units, departments, or partners tightly coordinate their activities. The different combination of these structural characteristics lead to the different organizational structures.

Digitalization is not a strong focus area in organization theory/design research and the research on the intersection of organizational structure and digitalization is scarce; so far, there is a missing link between the two research fields. Thus, it will be interesting to analyse how digitalization is linked to the structural characteristics – formalization, centralization, specialization, interdependence, and integration – considered as important components of organizational structure in the relevant contemporary studies.

Table 1. Link between types and structural characteristics of organizational structure

Types of Organizational Structure	Characteristics of Organizational Structure				
	Centralization	Formalization	Specialization	Interdependence	Integration
Functional Structure	High	High	High	Low	Low
Multidivisional Structure	Moderate	Moderate	Moderate	Low	Low
Matrix Structure	Moderate	Moderate	Moderate	Moderate	Moderate
Team Structure	Low	Low	Low	High	High
Network Structure	Low	Low	High	High	High

Source: Lee et al. (2015)

Digitalization and leadership skills

Effective patterns of management can be defined by specific skills. Two broad categories of leadership skills – interactive skills and initiating skills are widely recognized in the leadership literature (Shipper and Davy, 2002). Interactive skills, which include skills such as participation, facilitation, and recognition, are defined as the abilities required for meaningful collaboration between people for work accomplishment (Shipper and Davy, 2002). Initiating skills are abilities related to goal setting and achievement and planning, time emphasis and controlling details are classified under this category of skills. Although this model is useful in classifying leadership skills into two broad categories, it falls short of explaining the dimensionality of digital leadership. Actually, these skills were proposed with leaders working in traditional organizations in mind. Thus, they do not specifically capture the challenges faced by leaders in a digital environment. For instance, leaders may play a central role in virtual team functioning, particularly as they influence how a team deals with obstacles and how the team ultimately adapts in the face of such challenges (Gilson et al. 2015). Likewise, they maybe confronted with high levels of diversity, with employees of different ages, backgrounds, and life experiences coming together to complete a task. Along with the entry of digital natives into the workforce, improvements in health care and longevity have allowed individuals to work longer, creating an aging workforce in many countries in the developed world (Kulik et al., 2014). Given that the digital workforce will share the workplace with an older cohort of coworkers less comfortable with technology, leaders will also need to reconcile the conflicts that may arise as these groups collaborate. Thus, managing conflict in the context of high diversity may specifically be challenging. In a similar vein, bringing together members who possess the necessary combination of skills particularly the ones with complementary skillsets and who have some degree of loyalty to one another is even more challenging (e.g., Colbert et al., 2016). Thus, managing in a digital environment entails more and different challenges to managing work groups in traditional organizations.

Moreover, rapid technological changes associated with digitalization call into question the role of leaders in the digital era. Since, digital transformation involves the reshaping of the very context and structure of organizations, leaders face continual reorganizing and competence-based competition (e.g., Rogers, 2016). They need to create value in the organization through technological innovations and organizational reforms. These developments challenge the skills and competencies of leaders and warrant them to learn constantly about the new developments. In addition, dealing with change, which is one of the primary tasks of a leader (Kotter, 2012), is even more important in the digital era because digitalization brings a lot of change to the

world of business (Rogers, 2016). Digital transformation involves continuous change, so change managers should be adept at using all facets of change management to cope with socio-cultural challenges and challenges that arise due to the difficulty in understanding and adopting a new technology (Parviainen et al., 2017).

According to DasGupta et al., (2011), digitalization also brings more practical considerations as well as less tangible ones, such as communication skills. The authors argue that for leaders to thrive in the digital age, they should have a multi-cultural mind-set and a 24*7 orientation.

In leadership literature, leader skills and competencies and their link to effectiveness has been a topic of great interest, but research has not paid a lot of attention to which structural conditions facilitate or inhibit the development of certain leader skills. Earlier research however suggests that leaders tend to be more effective in organic rather than mechanistic structures (Kessler et al., 2017). Moreover, there have been scant attempts to specifically identify the skills needed by leaders to be effective in the digital age. According to Khan (2016), there is a missing link between existing leadership studies and digitalization. The author argues that the leadership scholars are studying leadership practices within contemporary, complex and changing organizations, often without the component of digitalization. It is, however, gaining a wider acceptance among contemporary scholars that digitalization is posing a prime challenge for leaders and top management of modern organizations (Collin et al., 2015; Kakabadse et al., 2011; Westerman et al., 2014), which has important implications for leader capabilities. A few studies have focused on such capabilities mainly from the perspective of leading digital change and managing digital transformation (Andervin and Jansson, 2016; Westerman et al., 2014). Khan (2016) in his study, identified three digitalization specific perspectives related to leader capabilities – virtualism, holism, and networked hubs –, which the author argues are the premier attributes for leading in the digital age beyond transformational, ethical and value based leadership. Based on a literature review, Balan and Katie (2017) identified a comprehensive list of four categories of skills - communication, dealing with change, learning, and practical changes - necessary for leadership effectiveness in the digital era. These authors integrated elements from different studies introduced in the previous literature. In the present study, we focus on these four categories of leader skills. Table 2 presents examples of skills in different skill categories.

Table 2. Leadership skills in digital era

Leadership skills	Functions
Communication	<ul style="list-style-type: none"> • Dealing with information overload. • Open and continuous communication to increase responsiveness. • Effective virtual communication in place of face-to-face interaction. • Ensuring consistent communication of values. • Strong written communication skills. • Strong social networking skills
Dealing with Change (DWC)	<ul style="list-style-type: none"> • Willing to make fundamental changes to the business model or vision. • Being able to guide people in the face of uncertainty and complexity. • Adaptability to digital developments. • Quick response to opportunities and threats in the business environment. • Less control, more empowerment.
Learning	<ul style="list-style-type: none"> • Growth mind-set in the whole organization • Openness to mistakes • Willingness to learn • Digital literacy • Bridging the gap between digital natives and others
Practical changes	<ul style="list-style-type: none"> • Leading/inspiring virtual teams • Ensuring clear communication between teams. • Creating shared identities. • Global/multicultural mind-set. • Empowerment to more colleagues • Openness to collaboration • Encouraging self-management. • 24x7 orientation. • Mindful approach towards the effects of digital technologies in the organization

Source: Balan and Katie (2017)

Digitalization and employee competencies

Human capital attributes have been argued to be a critical resource in firm performance (Hatch and Dyer, 2004). One way to generate firm-specific human capital is the internal development of employees' competencies (Lepak and Snell, 2002; Wernerfelt, 1984). Fink and Neumann (2007) identified three areas of employee competencies associated with a firm's performance. Those are technical competency (specific expertise in technical areas), behavioural competency (e.g. communication or interpersonal ability) and business competency (understanding of business strategy and environment). These competencies are important for employee productivity, but the typologies of competencies, including the one presented by Fink and Neumann (2007), are general and they do not take digitalization specifics into account. It has been recognized that working in the digital age is different from working in a traditional organizational setting (e.g., Ashford et al., 2018; Colbert et al., 2016). Gekara and Nguyen

(2018) argue that the implementation of new digital technologies means comprehensive changes in the competence requirements of many professions. For example, digitalization has eliminated hard and specific operations skills such as accurate, safe and efficient machinery and equipment operations and has enhanced the need for softer, generic and transferable ones, such performance analysis and problem diagnostics, and production monitoring and management etc. (Gekara and Nguyen, 2018). Thus, employees working in a digital environment must know how to use different programs and basic applications in addition to being proficient in manipulating information, constructing ideas, and using technology to achieve strategic goals (Colbert et al., 2016). Acquiring these digital skills is important because they provide tacit information about the competence and suitability of an employee in the firm (Bokek-Cohen, 2018).

Moreover, as the digital workforce will share the workplace with an older cohort of co-workers less comfortable with technology, they should specifically be good at interpersonal skills to act as good team players while working with members of different demographic characteristics and radically different work experiences. Digitalization may also shift the work structure in many respects. For example, the number of people working normal hours in co-located spaces with a clear supervisor and long-term colleagues will decline in a gig/digital economy, and a growing number of employees will only virtually connect to a physical workspace (Ashford et al., 2018). As it becomes less common for teams to be co-located, organizations need employees who are proficient in using virtual collaboration tools and have the ability to effectively communicate and collaborate with people from diverse backgrounds. Consequently, competencies possessed by individual employees in the digital context might differ from those possessed by employees working in traditional organizations.

There is no direct evidence regarding the effects of organizational structure and leadership skills on employee competencies; however, there is other evidence that supports such links. For example, a work context that is supportive of creativity is argued to be important for the acquisition of new knowledge, skills and competencies. In many past studies, organic structures were found to facilitate employee creativity (Pan et al. 2012), learning and knowledge creation (Martínez-León and Martínez-García, 2011). Likewise, employees in organic structures as compared to mechanistic structures scored higher on a creative, stimulating, challenging and enterprising orientation (Jin et al. 2013), all of which are dispositional attributes linked to knowledge acquisition and competence development. Regarding the role of leaders, effective managerial skills have been argued to result in more favourable subordinate attitudes (Hannah

and Lester, 2009). An attitude is not a competency itself, but it is an important component of a competency (Spenser and Spenser, 2008).

Below we provide an overview of the skills/competencies required by the digital workforce and Figure 2 shows these competencies.

Personal skills

Personal skills refer to an employee's capability to be a 'striver' and a role model. These skills include treating others with respect, demonstrating a willingness to work and seeking out new challenges, exhibiting responsibility, adaptability and resilience, and demonstrating professionalism in a digital environment.

People skills

People skills refer to an employee's ability to act as a team player. These skills centre on a worker's ability to work effectively with others, to maintain open lines of communication, and to work effectively with other people from diverse backgrounds.

Applied knowledge skills

Applied knowledge skills refer to an employee's ability to logically analyse information in digital organizations to inform conclusions. These skills include a range of abilities including understanding written documents, clear written communication, ability to logically analyse information, and the ability to use different programs and applications in addition to being proficient in manipulating information, constructing ideas, and using technology to achieve strategic goals.

Workplace skills

Workplace skills in a digital environment demonstrate that the employee is a problem solver and decision maker. This skill set includes planning and organizing, problem solving, decision-making, customer focus and working with tools and technologies.

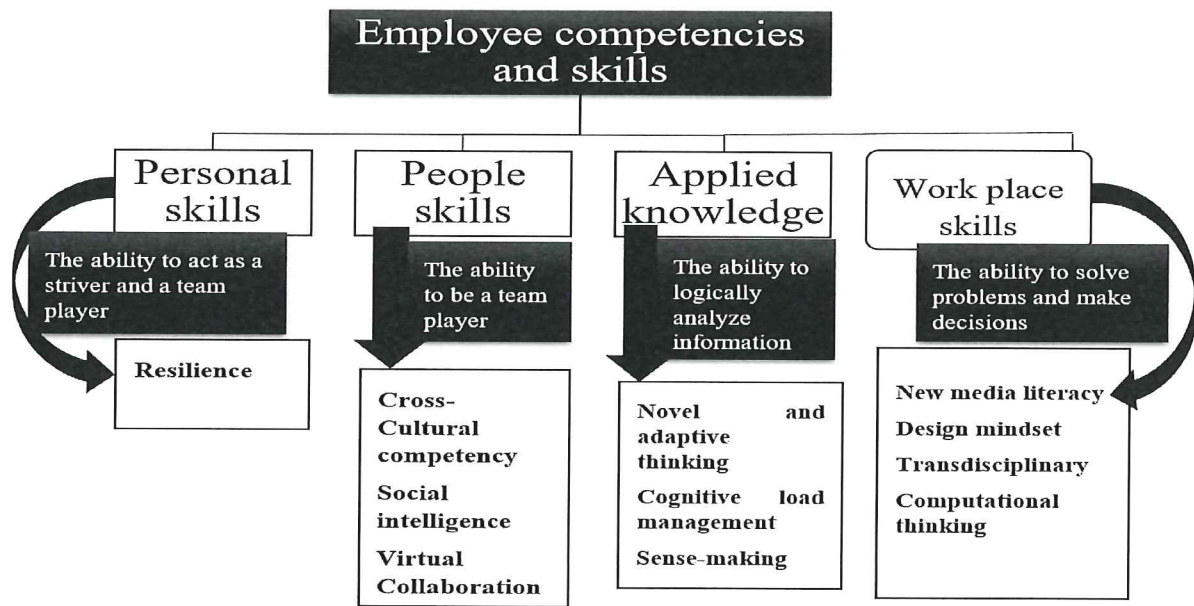


Figure 2. Employee skills/competencies in digital age

Digitalization and work - life balance

Just as increased technology use has many benefits for employees, it has certain downsides as well. For example, digital technology has blurred the lines between work and nonwork domains (Ramarajan and Reid, 2013; Reyt and Wiesenfeld, 2015). While email, the Internet, and even social media are integral tools for doing work, they also makes it possible for employees to remain connected to work when they are at home. Such a connection to work during nonwork hours reduces the opportunity for psychological detachment, relaxation, and recovery (Sonnentag, Binnewies, and Mojza, 2008). Earlier evidence shows that email intrusion during nonworking hours and time required to respond to emails outside of work is associated with negative emotions, which in turn leads to increased work–family conflict (Butts, Becker, and Boswell, 2015).

There is no clear evidence in the literature regarding how organizations can leverage digital technology while avoiding its potential downsides. Thus, we do not know yet whether setting boundaries between work and private life depends on how an individual employee manages it, or whether it is the responsibility of managers and organizations to demarcate these lines through structural and social controls. There are however a few studies that provide some clues about the individual differences and the role of organizations in boundary management. A study by Mazmanian (2013) suggests that the most effective way to use technology may vary from person to person. The author argues that even in the presence of certain group norms regarding constant connectivity, individual employee’s usage pattern of the technology differ from other group members. Related to this, Schlachter et al. (2018) in their study found that voluntary use

of technology during non-work hours blur the boundaries between work and private life leading to negative effects on wellbeing. Interestingly, older workers have been reported to be better at maintaining work and non-work boundaries, which is linked to better work-life balance (Spieler et al., 2018). Regarding the role of managers/organizations, Colbert et al. (2016) argue that the potential downsides of digital technology can be avoided through redesigning work and introducing certain changes in the design of technology itself.

METHOD

We conducted two studies to answer our research questions for which the data were collected in 2018. In Study 1, we assessed the technological dynamism with specific reference to digitalization, dimensions of organizational structure, leader skills, employee competencies, work-life balance and the control variables. Study 2 replicated Study 1 by testing the same relationships. Study 1 also included a qualitative part, which aimed at complementing and providing depth to the quantitative findings. The context of both studies was public/private sector organizations in the Møre and Romsdal region of Norway. At the start of the questionnaire, the purpose of the study was briefly described. Since, data was collected on the spot in Study 1, the purpose of the study was explained by one of the members of the research group. This indicated that the survey was being conducted solely for academic research purposes to better understand the effects of digitalization on organizations. The participants were assured of the confidentiality of their responses. The respondents represented young employees (millennials), who are also referred to as digital natives, and managers from various tiers of management, suggesting that all the respondents should have good insight into the subject area of this study. The data used in this report is part of a data set for the 'human side of digitalization' project.

Study 1

In Study 1, data were collected from young employees working in the Møre and Romsdal region of Norway. The participants were invited to a workshop named the Rock and Research festival. During this workshop, the survey questionnaire was first administered and then focus group interviews were conducted to collect qualitative data from the same participants. The survey questionnaire was sent out through email to 145 participants. A total of 117 questionnaires were answered, representing a response rate of 80.6%. The sample consisted of 60 males and 57 females. The age of the respondents ranged from 20-35 years with an average age of 30.2 years. Employees between the ages of 26-30 were the most frequent respondents (49%).

Study 2

Study 2 was conducted three months after Study 1. A survey was administered to a sample of managers working in different sectors in the Møre and Romsdal region of Norway. The survey was distributed online to 673 senior, middle and junior level managers. A total of 141 managers returned the completed surveys representing a response rate of 21%. The final sample consisted of 94 males and 46 females. The age of the respondents ranged from 30-80 years with an average age of 51.4 years. Senior managers were the most frequent respondents (51.4%), followed by managers working at mid-level management (46%). Respondents coming from junior level management represented only 2.1% of the sample.

Table 3 presents demographic information of the respondents in Study 1 and 2.

Table 3. Demographic characteristics

Demographic characteristics	Category (young employees)	Frequency	%	Demographic characteristics	Category (managers)	Frequency	%
Gender	Male Female	60 57	51.3 48.7	Gender	Male Female	94 46	67.1 32.9
Age	20-25 26-30 31-35	35 57 24	30.3 49.0 20.7	Age	30-40 41-50 51-60 61-70 71-80	14 33 42 15 1	13.3 31.4 40.0 14.3 1.0
Education	Phd / Master / university Bachelor / Høgskolen High school / Videregående Primary school / Grunn school	41 61 12 3	35.0 52.1 10.3 2.6	Education	Doctorate degree Master degree Bachelor degree Secondary school	4 76 45 15	2.9 54.3 32.1 10.7
Occupation	Manager/coordinator/secretary/supervisor/C EO Student / trainee / e-commerce Engineer / IT / industrial / entrepreneur Advisor / economist / consultant / teacher / librarian / lawyer / recruitment / researcher / doctor / lecturer Insurance / associate / self - employed / biologist	31 20 15 30 18	27.2 17.5 13.2 26.3 15.8	Sector	Public sector Private sector	55 84	39.6 60.4
Industry	Ship building / production / product development Bank / service / company / consulting / support Marketing / sales / distribution / logistics Advocates / law / education / health Others (IT / HR / engineering / innovation / student)	41 44 5 19 5	36.0 38.6 4.4 16.7 4.4	Industry	Production Bank and finance Management and consulting Marketing, sales, purchasing & distrib. Health and education Others	26 23 21 12 30 27	18.7 16.5 15.1 8.6 21.6 19.4
				Management level	Senior/top level management Mid-level management Junior / operational level management	72 65 3	51.4 46.4 2.1

Measures

The original survey used was constructed in English, but as we were applying this in a Norwegian context, we translated the English version into Norwegian. Translation was first performed by a Norwegian academic with proficient in English skills; then another Norwegian academic, a professor in organizational studies, finally checked back-translation. The same scales/measures were used in Study 1 and 2. In the survey questionnaire for study 2, we however included only those scale items that achieved acceptable loadings in study 1 and were retained for further analysis. Appendix A contains the Norwegian version of the survey questionnaire used in Study 1.

Digitalization. To capture digitalization, we adapted measurement items from the technological/environment dynamism scales developed by Jaworski and Kohli (1993) and Schilke (2014).

Organizational structure. Centralization was captured with a five-item measure developed by Jaworski and Kohli (1993). We assessed formalization with three items based on the scale developed by Deshpande and Zaltman (1982). To capture specialization, we used a five-item measure based on scales by Doty, Glick, and Huber (1993) and Hackman and Oldham (1976). Interdependence and integration were assessed with three and five items each by adapting the scales developed by Sethi (2000), Stank et al. (2001), and Wong et al. (2011) respectively.

Leader skills. We referred to the work by Balan and Katie (2017) to define and capture the four domains of leader skills: *communication, dealing with change, learning, and practical changes*. We developed four items each to assess the skills in these four categories.

Employee competencies. Following future skills by Institute for the Future, we developed a 19-item scale to measure employee competencies. After specifying the domains of competencies, we retrieved measures from the previous literature to capture each dimension (Brown and Ryan, 2003; Connor and Davidson, 2003; Feldman et al., 2007; Giancarlo et al., 2004; Portalla and Chen, 2010; Silvera et al., 2001; Smith et al., 2008). The overall scale contains five dimensions, including personal skills, people skills, applied knowledge, and work place skills.

Work-life balance. We captured work-life balance based on studies by Parkes and Langford (2008), and Stein, Jensen, and Hekkala (2015).

All the perceptual items of the questionnaire were measured on a Likert-scale from “1” to “7”, where “1” represented strongly disagree and “7” stood for strongly agree.

Control variables

We used gender, age, education and the industry affiliation of the respondents as control variables. For managers' data, we also controlled for management level.

Construct validity and reliability

The psychometric properties of the measures were assessed using SmartPLS software application. SmartPLS is a partial least squares path modeling technique that simultaneously tests measurement (relationship between indicators and their constructs or latent variables) and structural model (relationship between constructs). PLS is very useful for model estimation when sample size is small, the study is of exploratory, and when the model is complex with a high number of constructs, indicators and relationships (Hair et al., 2014). The authors assessed the measurement model with respect to individual item reliability, internal consistency and discriminant validity. In PLS, loadings of respective factors on their respective latent constructs are examined to assess the reliability of the factors (Hulland, 1999). In this study the criteria of 0.50 recommended by Hulland (1999) was adopted for the retention of the factors. Internal consistency was assessed using Fornell and Larcker's (1981) composite reliability (CR) index. The composite reliability index for all constructs exceeded the acceptable value of 0.7.

Evidence of convergent validity was assessed by inspection of average variance extracted (AVE) for each construct. Convergent validity is established if the variance extracted value exceeds 0.50 (Fornell and Larcker, 1981). Results indicated that the variance extracted for all constructs exceeded or approached 0.50 except for 'integration' which was 0.449. However, we decided to include 'integration' in further analysis because the item loadings, composite reliability index and discriminant validity coefficient exceeded the acceptable values.

Discriminant validity is the degree to which any single construct is different from the other constructs in the model (Carmines and Zeller, 1979). The discriminant validity is confirmed if the diagonal elements (square root of AVE) are significantly higher than the off-diagonal values in the corresponding rows and columns. An examination of loadings and cross loadings shows that all constructs were more strongly correlated with their own measures than with any other constructs, suggesting good discriminant validity. Appendix B to D present factor loadings, composite reliability and AVE values, and discriminant validity coefficients.

Common method variance

The data on all variables came from single respondents in a one-time survey in both our studies, which meant that there could be concerns of common method variance. Although we tried to reduce the chances of biased or socially desirable responses by ensuring respondents

confidentiality and anonymity in the information provided, we used Herman’s one factor test to assess common method variance (Podsakoff et al., 2003). An exploratory factor analysis for both samples showed that the largest factor explained only 15.03% of the variance for employees’ data, and the variance explained by the largest factor was 24.4% for managers’ data. This suggests that there were no issues of common method bias in our data.

RESULTS

Frequency and descriptive analysis of responses

Table 4 presents the responses of the participants from both samples with respect to their average scores on study constructs and the extent of their preference for a particular attribute by expressing agreement or disagreement with the statements capturing that attribute. The findings indicate that the mean scores for all constructs except centralization (3.9; 3.6) and formalization (3.5; 3.4) exceed the response scale average of 4. The higher mean scores indicate a higher preference of the respondents for a particular attribute while lower mean scores suggest a low preference. Higher mean scores on certain constructs such as interdependence (5.9; 5.7) and integration (5.7; 5.5) suggest that respondents consider these characteristics of the structure as important in the digital age.

Next, we examined the average agreement/disagreement of respondents with regards to the statements capturing a particular construct. Higher agreement indicates a higher preference or importance for a particular attribute or event and vice versa for low agreement. For example, with regards to formalization both samples share a low agreement and high disagreement which suggests that both managers and young employees perceive a bureaucratic structure as less compatible with digital technology. Likewise, there is high agreement with respect to other structural dimensions such as interdependence and integration and leader skills and employee competencies such as leader dealing skills and employee workplace competencies. This suggests that the respondents perceive these structural and personal attributes as important for organizations and employees to thrive in the digital era. Table 4 presents these findings.

Table 4. The extent of relevance/importance of study constructs in the digital age

CONSTRUCTS	Young employees			Managers		
	Mean	Agree (%)	Disagree (%)	Mean (%)	Agree (%)	Disagree (%)
Digitalization	6,0919	93	2	6,1554	96	1
Organizational structure (centralization)	3,9231	40	40	3,6268	30	50

Organizational structure (formalization)	3,5216	32	51	3,4821	30	51
Organizational structure (interdependence)	5,9316	90	4	5,7000	86	4
Organizational structure (integration)	5,7214	83	6	5,5879	82	4
Organizational structure (low specialization/high skill variety)	5,8461	90	3	5,4929	85	2
Leadership skills (communication)	6,3654	97	1	6,1804	96	0
Leadership skills (dealing with change)	6,2927	95	2	6,2304	96	0
Leadership skills (learning)	6,3704	95	1	6,2107	96	0
Leadership skills (practical change)	5,8205	89	7	5,8464	92	0
Employee competencies (people skills)	6,0752	88	6	5,9568	92	1
Employee competencies (personal skills)	5,9846	90	4	5,7453	92	1
Employee competencies (workplace skills)	6,1179	93	2	5,8910	92	1
Employee competencies (applied knowledge)	4,9808	68	16	5,0252	69	14
Work life balance	5,3487	76	8	5,1372	71	11

Structural model results

Next, we examined relationships between digitalization and organizational structure, leader skills, employee competencies and work-life balance to give additional insight into the effects of digital technology. Assessment of the path coefficients was done by bootstrap analysis in SmartPLS3 to assess the significance of the path coefficients. Table 5 shows the results of the path analysis for significant relationships between digitalization and other study constructs.

Digitalization and structure. For employees' data, we found a significant positive relationship for digitalization with interdependence and integration, and a significant negative relationship with specialization (low skills variety). For managers' data, we found a significant negative relationship with formalization in addition to the above pattern of relationships.

Digitalization - leader skills and employee competencies. The analysis revealed a significant positive relationship in one category of leadership skills (practical change) for employees. In the case of managers, digitalization was positively related to dealing with change and the

learning skills of managers. For employee competencies, we found no significant relationships except for workplace skills for managers' data.

Table 5. Effects of digital technology

Young employees	Betas	P values	Managers	Betas	P values
Interdependence	0,358	0,000	Formalization	-0,199	0,007
Integration	0,279	0,018	Centralization	-0,171	0,068
Specialization	-0,408	0,000	Integration	0,432	0,000
Practical change	0,289	0,002	Interdependence	0,363	0,000
			Specialization	-0,501	0,000
			Dealing With Change	0,323	0,000
			Learning	0,243	0,018
			Workplace skills (employee)	0,208	0,033
			Work-life balance	-0,199	0,007

Organizational structure - leader skills and employee competencies. The findings show only two dimensions of structure that is integration and interdependence, to be related leader skills for employees' data. Integration has a positive relationship with communication, dealing with change, practical change, and learning skills, while interdependence has a positive relationship with the learning skills and practical change skills of leaders. For managers, integration emerged as a salient dimension having significant relationships with practical change, learning and communication skills, while interdependence and low specialization (high variety) were positively related to dealing with change and practical change skills, and communication skills respectively. Related to employee competencies, only formalization was found to be significantly related to workplace skills. Table 6 presents path coefficients for significant relationships between structure and leader skills and employee competencies.

Table 6. Effects of organizational structure

Young employees	Betas	P values	Managers	Betas	P values
Interdependence -> Learning	0,298	0,011	Integration -> Practical Change	0,209	0,043
Interdependence-> Practical change	0,247	0,026	Integration -> Communication	0,206	0,011
Integration -> Communication	0,311	0,002	Integration -> Learning	0,184	0,038
Integration -> Dealing with Change	0,348	0,004	Interdependence -> Dealing with change	0,215	0,033
Integration -> Learning	0,199	0,070	Interdependence -> Practical Change	0,274	0,005

Integration -> Practical change	0,244	0,009	Specialization-> Communication	-0,218	0,018
Formalization-> Employee applied skills	0,343	0,020			

Leader skills and employee competencies. For employees' data, leadership skills (communication, learning and practical change) were found to be significantly related to employee competencies: people skills, workplace skills, people skills, and applied knowledge skills respectively. For managers, leader skills (communication, dealing with change and practical change) skills were found to be positively related to employee competencies: personal, workplace, people, applied and personal skills respectively. Table 7 presents path coefficients for significant relationships between leader skills and employee competencies.

Table 7. Leader skills and employee competencies

Young employees	Betas	P values	Managers	Betas	P values
Communication-> Employee People	0,328	0,008	Communication -> Employee personal	0,221	0,047
Communication-> Employee workplace	0,358	0,009	Communication -> Employee work Place	0,282	0,005
Learning->Employee People	0,363	0,000	DWC -> Employee people	0,355	0,002
Practical change-> Appliedskills (employee)	0,323	0,013	Practical change -> Applied knowledge Skill	0,236	0,080
			Practical change -> Employee Personal	0,257	0,007

Work-life balance. For employees' data, the applied skills of employees were found to have a significant relationship with work-life balance, while for managers a significant positive relationship was found between employee personal skills and work-life balance. Interestingly, we found a negative relationship between digitalization and work-life balance for managers.

Indirect effects

In our analysis, we also found some indirect effects of digital technology on leadership skills and employee competencies and the effects of organizational structure on employee competencies. Digital technology seems to have an indirect affect on some of the leadership skill (communication and practical change) and some employee competencies (people and workplace skills) through integration. For managers, we found the same indirect relationships, but in case of managers interdependence and specialization (low skill variety) also played a

role in mediating the effects of digitalization on practical change, dealing with change and communication skills respectively.

We also found some indirect effects of organizational structure (interdependence and integration) on employee competencies (people and applied knowledge skills) via leadership communication, learning and practical change skills. These indirect effects were only significant for employees' data. Please see appendix E for significant indirect relationships.

Comparison based on control variables

Since we found some significant relationships of control variables (e.g., gender, education, sector) with certain study constructs, we decided to make a comparison through analysis of variance. Our analysis showed that mean scores for females were slightly higher than males for certain leader skills such as communication, and learning for both employees' and managers' data, and such differences in mean scores were statistically significant. This suggests that women consider these skills as more important for leaders in the digital age. For employees' data, the health and education sector mean score was significantly higher for employees applied skills compared to other sectors. We further noted that for managers' data, mean scores on work-life balance for individuals with a bachelor degree was higher than other education categories. Table 8 presents results of multivariate analysis of variance.

Table 8. Results of multivariate analysis of variance

Predictor (managers)	Criterion	Sig.	Mean	Predictor (employees)	Criterion	Sig.	Mean
Gender (Females)	Communication	0,009	Females 6,387 Males 6,083	Gender (Females)	Communication	0,001	Females 6,544 Males 6,196
Gender (Females)	Dealing with change	0,004	Females 6,464 Males 6,133	Gender (Females)	Learning	0,007	Females 6,538 Males 6,211
Gender (Females)	Learning	0,001	Females 6,460 Males 6,078	Gender (Females)	People skills	0,000	Females 6,337 Males 5,807
Gender (Females)	Practical change	0,009	Females 6,065 Males 5,733	Education (Bachelor degree)	Work life balance	0,005	PhD/Masters 4,859 Bachelor 5,657 High school 5,600 Primary school 5,400
Gender (Females)	Work place skills	0,007	Females 6,083 Males 5,776				
Gender (Females)	Work life balance	0,033	Females 5,395 Males 5,015				
Industry (Health and education)	Employee applied knowledge skills	0,005	Production 4,720 Bank and finance 5,325 Management and consulting 4,548 Marketing, sales, purchasing and distribution 5,000 Health and education 5,397 Others 4,820				
Sector (public sector)	Communication skill (Leadership)	0,010	Public sector 6,358 Private sector 6,072				

Qualitative data analysis and findings

As stated earlier, in Study 1 all the participants took part in e focus group interviews after completing the survey questionnaire. The interviews were conducted with the support of 13 facilitators/moderators. The moderators asked the prescribed questions in order to create discussions among the respondents. The language of interviews and discussion was Norwegian. There were 13 tables with 10 people at each, including a moderator. The topics were planned so that three tables covered each topic during one round. When the first round started, the first three tables discussed their first topic, for example, digital technology and organizational structure; the next three tables discussed digital technology and leadership skills following the same pattern. The next three tables discussed digital technology and employee competencies and finally the remaining three/four tables discussed digital technology and work-life balance. When one round was completed, the participants at each tables were shuffled and given a new topic to discuss. By doing this, we were able to capture the maximum number of views, perceptions and opinions on each topic. The third round followed the same pattern.

We did not record these sessions but took extensive notes. Before proceeding with analysis, all the notes were translated from Norwegian to English and were arranged according to topic. Afterwards we discussed impressions, potential themes, and patterns in the data. Based on the similarity of responses, we identified certain themes related to every topic that are briefly discussed below.

The respondents viewed digitalization as a disruptive process and thought that digital transformation will tremendously affect all aspects of organizations including structure, leadership and employee competencies and work-life balance.

Organizational structure. Three questions related to digitalization and structure were asked: 1) what design/structure related changes do you think are most important for organizations in connection with the implementation of digital technology? 2) what do you think about control and coordination in organization regarding the introduction and implementation of digital technology? For example: which structural elements in organizations will work best (high/low formalization, high/low centralization etc.)? 3) will digital organization affect information flow and competence transfer between different departments?

A general impression of the respondents was that there will be fewer physical frames and less human interaction in future organizations, which implies a fluid organizational design. The other important features of organizational structure that emerged were: centralized vs decentralized structure/decision-making; structuring task and technology; flow of information and competence; and flexibility and diversification of structure. For example, related to

hierarchy, the respondents opined that the structure should be flatter, decisions should be closer to the expertise and there should be shared management responsibilities. Related to the structuring of task and technology, one of the responses was that technology should be structured instead of imposing any controls on the people. In the category of flow of information and competence, examples of responses that emerged are - knowledge sharing, and collaboration and sharing platforms etc. The respondents further perceived that the structure should be resilient, and it should nurture openness of tasks, which denotes flexibility and diversification of structure.

Leadership skills. Next, we focused on leadership skills in the digital era. We were specifically interested in what kind of leadership skills respondents thought would be important in a digital environment. We asked two questions here: 1) what skills and qualities do you think the leader should possess to be effective in a digital environment? 2) Do you think changes in a company's structure will require new skills among managers?

The findings suggest that considering the differing requirements of digital technology, the skill-sets required by the leaders will be significantly different. They will require a higher order of digital fluency meaning that they should have the ability to use different programs and applications to capture, analyze and use complex data and information and use digital channels and means to perform virtual leadership. The respondents perceived that the leaders should have broader understanding of both strategy and market and are able to use digital technology for strategic goals. Moreover, strong communication skills featured as an important attribute to be effective in the digital era. There was a general consensus among the respondents that given the dynamic nature of the technological environment, leaders should be open for change and learning, and they should have an innovative mind-set in addition to having the capability of managing change and innovation. Given the extra reliance on team-based work, virtual collaboration and demographic and cultural diversity, the leaders should be high on team management skills in both virtual and physical realms, good at managing and promoting interpersonal relationships, and should have a good understanding of cross-cultural differences. Leaders should have a special interest in identifying the development needs of their employees and facilitate employee growth and competence development. The respondents further networking, empowering, coaching, motivating and employee consideration as important attributes for leaders in the digital era.

Employee competencies. In the third round, we asked three question related to employee competencies: 1) If you were to run a digital company in the future where many tasks could be digitized, what people would you like to hire and why? 2) Will changes in company structure

require new skills among employees? 3) What skills and qualities do you think employees should have to work effectively in digital work environments?

The respondents perceived that technological developments will have a huge impact on the requirements for digital skills. This means that the respondents consider it important for the digital workforce to develop a higher understanding and use of complex digital systems/devices, and skills related to data entry, retrieval and interpretation. But, the respondents perceive a lot of other skills as important for thriving in the digital age. They think that employees should be creative, adaptable, versatile, and have the ability to work independently as well as in teams. They need to be socially competent and open for different perspectives, learning and change.

Work-life balance. Regarding work-life balance, we asked two questions: 1) Does the work place have good practices for employees who need help combining/balancing demands from their work and private life (family obligations)? 2) Will managerial leadership skills affect how employees deal with the distinction between working life and private life?

The respondents thought that digital change and increased connectivity is not without consequences for work and private life balance. The clear majority of responses concerned specific and clear boundary limits between work and personal life. The respondents believe that a good work-life balance can be achieved through different actions such as planning and scheduling one's work and time, closing email accounts during vacations and other leisure activities, and setting their own limits. The respondents also saw the role of management/organizations in helping employees in setting boundaries between their work and private lives. They suggested that there should be clear requirements for minimum interference in the private life of employees. Managers should respect the privacy of employees, and should create a framework to ensure that they should not work beyond a particular limit.

IMPLICATIONS AND CONCLUSION

The findings of this study indicate that digital transformation may succeed if organizations build a structure that could foster the change and renew the capabilities of their leaders and employees. So, lack of an organizational design compatible with digital technology together with insufficient skills in the human resources may be the most typical obstacles for digitalization.

Our findings suggest that changes in digital technology tend to be associated with organizational/management structures characterized by interdependence, integration, and skill variety (low specialization). This suggests that structures that nurture cooperation and exchange

of information among work groups, that are high on integration within and across functions and that foster skills variety will be more capable of coping with digital transformation in the operational environment and may facilitate adoption of digital technology in the modern organization. On the other hand, structures characterized by formalization and centralization seem to be more inhibited in their innovative capabilities to cope with novelty and change in the digital age.

Our findings further show that the respondents perceive that all leader skills and employee competencies are important development areas among managers and employees in general. They perceived digital as well as social and interpersonal competencies as crucial for any employee in modern organizational life. However, only leaders' dealing with change, practical change and learning skills were significantly related to digitalization, and many of the leader/employee competencies were indirectly linked to digitalization through the organizational structural dimensions of integration and interdependence. In addition, structure (interdependence and integration) was also related to employee competencies through leader skills. This suggests that digital transformation challenges the capabilities of managers and employees in organizations, but these competencies can be better nurtured if an interdependent and integrated structure is in place. The positive effects of integration and interdependence on leader skills and employee competencies support previous research that suggest that organic structures have a positive impact on leadership processes and employee development related outcomes such as creativity and learning (Kessler et al., 2017).

Regarding work-life balance, our findings suggest that the most effective way to use technology may depend upon the mindful use of a particular employee. However, managers may also be careful in not interrupting employees after the workday through technologically mediated communication. Organizations may also consider how to encourage mindful use of technology in ways that promote employee wellbeing. While it is possible that employees can be sensitized to using technology more consciously, changing patterns in the use of technology, such as changes in the design of the technology itself, may be helpful¹.

¹ An in-depth discussion of the findings along with study limitations and implications will be offered in the planned forthcoming conference/journal submissions.

REFERENCES

- Altman, E.J., Nagle, F., & Tushman, M. (2015). *Innovating without information constraints: organization, communities, and innovation when information costs approach zero*. In: Hitt MA, Jing Z (eds.), *The Oxford Handbook of Creativity, innovation, and Entrepreneurship*. Oxford University Press, New York, pp 353–379.
- Andervin, M., Jansson, J., (2016). *Att leda digital transformation*, 1st ed. Hoi Förlag.
- Ashford, S. J., Caza, B. B., & Reid, E. M. (2018). From surviving to thriving in the gig economy: A research agenda for individuals in the new world of work. *Research in Organizational Behavior*.
- Balan, A. C., & Cavendish, K. (2017). Leadership in the Digital and Social Era-A Theoretical Review and Digital Gamification for Employee Development.
- Blau, P. M. (1970). A formal theory of differentiation in organizations. *American Sociological Review*, 201-218.
- Bokek-Cohen, Y. A. (2018). Conceptualizing employees' digital skills as signals delivered to employers. *International Journal of Organization Theory & Behavior*, 21(1), 17-27.
- Bounfour, A. (2016). Digital futures, digital transformation. *Springer International Publishing, Cham, Switzerland. doi, 10, 978-3*.
- Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: mindfulness and its role in psychological well-being. *Journal of personality and social psychology*, 84(4), 822.
- Burns, T., & Stalker, G. M. (1961). *The management of innovation*. London. *Tavistock Publishing*.
- Butts, M. M., Becker, W. J., & Boswell, W. R. (2015). Hot buttons and time sinks: The effects of electronic communication during nonwork time on emotions and work-nonwork conflict. *Academy of Management Journal*, 58(3), 763-788.
- Carmines, E. G., & Zeller, R. A. (1979). *Reliability and validity assessment* (Vol. 17). Sage publications.
- Colbert, A., Yee, N., George, G. (2016). The digital workforce and the workplace of the future. *Academy of Management Journal*, 59(3), 731-739.
- Collin, J., Hiekkanen, K., Korhonen, J.J., Halén, M., Itälä, T., Helenius, M., (2015). *IT Leadership in Transition-The Impact of Digitalization on Finnish Organizations*. Research rapport, Aalto University. Department of Computer Science.
- Connor, K. M., & Davidson, J. R. (2003). Development of a new resilience scale: The Connor-Davidson resilience scale (CD-RISC). *Depression and anxiety*, 18(2), 76-82.
- DasGupta, P. (2011). Literature review: e-Leadership. *Emerging Leadership Journeys*, 4(1), 1-36.
- Deshpande, R., & Zaltman, G. (1982). Factors affecting the use of market research information: A path analysis. *Journal of marketing research*, 19(1), 14-31.

- Dischner, S. (2015). Organizational structure, organizational form, and counterproductive work behavior: A competitive test of the bureaucratic and post-bureaucratic views. *Scandinavian Journal of Management*, 31(4), 501-514.
- Doty, D. H., Glick, W. H., & Huber, G. P. (1993). Fit, equifinality, and organizational effectiveness: A test of two configurational theories. *Academy of Management journal*, 36(6), 1196-1250.
- Dotlich, D. (2017). Leadership in times of transition. *People & Strategy*, 40(1), 24-28.
- Feldman, G., Hayes, A., Kumar, S., Greeson, J., & Laurenceau, J. P. (2007). Mindfulness and emotion regulation: The development and initial validation of the Cognitive and Affective Mindfulness Scale-Revised (CAMS-R). *Journal of psychopathology and Behavioral Assessment*, 29(3), 177.
- Fink, L., & Neumann, S. (2007). Gaining agility through IT personnel capabilities: The mediating role of IT infrastructure capabilities. *Journal of the Association for Information Systems*, 8, 440-462
- Fjeldstad, Ø. D., Snow, C. C., Miles, R. E., & Lettl, C. (2012). The architecture of collaboration. *Strategic management journal*, 33(6), 734-750.
- Fornell, C., & Larcker, D. F. (1981). Structural equation models with unobservable variables and measurement error: Algebra and statistics.
- Gekara, V. O., & Thanh Nguyen, V. X. (2018). New technologies and the transformation of work and skills: a study of computerisation and automation of Australian container terminals. *New Technology, Work and Employment*, 33(3), 219-233.
- Giancarlo, C. A., Blohm, S. W., & Urdan, T. (2004). Assessing secondary students' disposition toward critical thinking: Development of the California Measure of Mental Motivation. *Educational and Psychological Measurement*, 64(2), 347-364.
- Gilson, L. L., Maynard, M. T., Jones Young, N. C., Vartiainen, M., & Hakonen, M. (2015). Virtual teams research: 10 years, 10 themes, and 10 opportunities. *Journal of Management*, 41(5), 1313-1337.
- Hackman, J. R., & Oldham, G. R. (1976). Motivation through the design of work: Test of a theory. *Organizational behavior and human performance*, 16(2), 250-279.
- Hair Junior, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2014). A primer on partial least squares structural equation modeling (PLS-SEM).
- Hannah, S. T., & Lester, P. B. (2009). A multilevel approach to building and leading learning organizations. *The Leadership Quarterly*, 20(1), 34-48.
- Hatch, N. W., & Dyer, J. H. (2004). Human capital and learning as a source of sustainable competitive advantage. *Strategic management journal*, 25(12), 1155-1178.
- Head, T. C. (2005). Structural changes in turbulent environments: a study of small and mid-size Chinese organizations. *Journal of Leadership & Organizational Studies*, 12(2), 82-93.
- Hulland, J. (1999). Use of partial least squares (PLS) in strategic management research: a review of four recent studies. *Strategic management journal*, 20(2), 195-204.

- Jaworski, B. J., & Kohli, A. K. (1993). Market orientation: antecedents and consequences. *Journal of marketing*, 57(3), 53-70.
- Jin, K. G., Drozdenko, R., & DeLoughy, S. (2013). The role of corporate value clusters in ethics, social responsibility, and performance: A study of financial professionals and implications for the financial meltdown. *Journal of business ethics*, 112(1), 15-24.
- Kakabadse, A., Omar Abdulla, M., Abouchakra, R., Jawad, A., (2011). *Leading Smart Transformation*. Palgrave Macmillan, Basingstoke.
- Kessler, S. R., Nixon, A. E., & Nord, W. R. (2017). Examining organic and mechanistic structures: do we know as much as we thought?. *International Journal of Management Reviews*, 19(4), 531-555.
- Khan, S. (2016). Leadership in the digital age – A study on the effects of digitalization on top management leadership, Master Thesis, Faculty of Social Sciences, Stockholm Business School.
- Kotter, J. P. (2012). *Leading change*. Harvard business press.
- Kulik, C. T., Ryan, S., Harper, S., & George, G. (2014). Aging populations and management. *Academy of Management Journal*, 57: 929 –935.
- Lawrence, P. R., & Lorsch, J. W. (1967). Differentiation and integration in complex organizations. *Administrative science quarterly*, 1-47.
- Lee, J. Y., Kozlenkova, I. V., & Palmatier, R. W. (2015). Structural marketing: Using organizational structure to achieve marketing objectives. *Journal of the Academy of Marketing Science*, 43(1), 73-99.
- Lepak, D. P., & Snell, S. A. (2002). Examining the human resource architecture: The relationships among human capital, employment, and human resource configurations. *Journal of management*, 28(4), 517-543.
- María Martínez-León, I., & Martínez-García, J. A. (2011). The influence of organizational structure on organizational learning. *International Journal of Manpower*, 32(5/6), 537-566.
- Mazmanian, M. (2013). Avoiding the trap of constant connectivity: When congruent frames allow for heterogeneous practices. *Academy of Management Journal*, 56(5), 1225-1250.
- Mintzberg, H. (1979). *The structuring of organizations*, Englewood Cliffs, NJ: Prentice-Hall.
- Ostrom, E. (2010). Beyond markets and states: polycentric governance of complex economic systems. *American economic review*, 100(3), 641-72.
- Pan, W., Sun, L. Y., & Chow, I. H. S. (2012). Leader-member exchange and employee creativity: Test of a multilevel moderated mediation model. *Human Performance*, 25(5), 432-451.
- Parkes, L. P., & Langford, P. H. (2008). Work–life balance or work–life alignment? A test of the importance of work-life balance for employee engagement and intention to stay in organisations. *Journal of Management & Organization*, 14(3), 267-284.
- Parviainen, P., Tihinen, M., Kääriäinen, J., & Teppola, S. (2017). Tackling the digitalization challenge: How to benefit from digitalization in practice. *International Journal of Information Systems and Project Management*, 5(1), 63-77.

- Perrow, C. B. (1970). *Organizational analysis: A sociological view* (No. 04; HM131, P3.).
- Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of applied psychology*, 88(5), 879.
- Portalla, T., & Chen, G.-M. (2010). The Development and Validation of the Intercultural Effectiveness Scale. *Intercultural Communication Studies*, 19(3).
- Ramarajan, L., & Reid, E. (2013). Shattering the myth of separate worlds: Negotiating nonwork identities at work. *Academy of Management Review*, 38(4), 621-644.
- Reyt, J. N., & Wiesenfeld, B. M. (2015). Seeing the forest for the trees: Exploratory learning, mobile technology, and knowledge workers' role integration behaviors. *Academy of Management Journal*, 58(3), 739-762.
- Rogers, D. (2016). *The Digital Transformation Playbook: Rethink Your Business for the Digital Age*. Columbia University Press.
- Schlachter, S., McDowall, A., Cropley, M., & Inceoglu, I. (2018). Voluntary Work-related Technology Use during Non-work Time: A Narrative Synthesis of Empirical Research and Research Agenda. *International Journal of Management Reviews*, 20(4), 825-846.
- Schilke, O. (2014). On the contingent value of dynamic capabilities for competitive advantage: The nonlinear moderating effect of environmental dynamism. *Strategic management journal*, 35(2), 179-203.
- Sethi, R. (2000). New product quality and product development teams. *Journal of Marketing*, 64(2), 1-14.
- Shipper, F., & Davy, J. (2002). A model and investigation of managerial skills, employees' attitudes, and managerial performance. *The Leadership Quarterly*, 13(2), 95-120.
- Silvera, D., Martinussen, M., & Dahl, T. I. (2001). The Tromsø Social Intelligence Scale, a self-report measure of social intelligence. *Scandinavian journal of psychology*, 42(4), 313-319.
- Smith, B. W., Dalen, J., Wiggins, K., Tooley, E., Christopher, P., & Bernard, J. (2008). The brief resilience scale: assessing the ability to bounce back. *International journal of behavioral medicine*, 15(3), 194-200.
- Snow, C. C., Fjeldstad, Ø. D., & Langer, A. M. (2017). Designing the digital organization. *Journal of organization Design*, 6(1), 7.
- Souitaris, V., Zerbinati, S., & Liu, G. (2012). Which iron cage? Endo-and exoisomorphism in corporate venture capital programs. *Academy of Management Journal*, 55(2), 477-505.
- Spieler, I., Scheibe, S., & Stamov Roßnagel, C. (2018). Keeping work and private life apart: Age-related differences in managing the work–nonwork interface. *Journal of Organizational Behavior*, 39(10), 1233-1251.
- Spencer, L. M., & Spencer, P. S. M. (2008). *Competence at Work models for superior performance*. John Wiley & Sons.
- Sonnentag, S., Binnewies, C., & Mojza, E. J. (2008). "Did you have a nice evening?" A day-level study on recovery experiences, sleep, and affect. *Journal of Applied Psychology*, 93(3), 674.

- Stank, T. P., Keller, S. B., & Daugherty, P. J. (2001). Supply chain collaboration and logistical service performance. *Journal of Business Logistics*, 22(1), 29-48.
- Stein, M-K., Jensen, T. B. and Hekkala, R., (2015). Comfortably 'Betwixt and Between'? Delimiting and Blending Space, Time, Tasks and Technology at Work. In: Proceedings of the International Conference on Information Systems, Ft. Worth, Texas, USA.
- Tushman, M., Smith, W. K., Wood, R. C., Westerman, G., & O'Reilly, C. (2010). Organizational designs and innovation streams. *Industrial and corporate change*, 19(5), 1331-1366.
- Wernerfelt, B. (1984). A resource-based view of the firm. *Strategic management journal*, 5(2), 171-180.
- Westerman, G., Bonnet, D., McAfee, A., (2014). *Leading digital: turning technology into business transformation*. Harvard Business Press.
- Whittington, R., Yakis-Douglas, B., Ahn, K., & Cailluet, L. (2017). Strategic planners in more turbulent times: The changing job characteristics of strategy professionals, 1960–2003. *Long Range Planning*, 50(1), 108-119.
- Wilden, R., Gudergan, S. P., Nielsen, B. B., & Lings, I. (2013). Dynamic capabilities and performance: strategy, structure and environment. *Long Range Planning*, 46(1-2), 72-96.
- Wong, C. Y., Boon-Itt, S., & Wong, C. W. (2011). The contingency effects of environmental uncertainty on the relationship between supply chain integration and operational performance. *Journal of Operations management*, 29(6), 604-615.
- Woodward, J. (1965), *Industrial Organization, Theory and Practice*, London: Oxford University Press

APPENDICES

Appendix A. Survey questionnaire

Forskningsprosjekt "Human side of Digitalization"

Digitalisering betyr bruk av digital teknologi og av data (digitalisert og opprinnelig digitalt) for å skape inntekter, forbedre forretningslivet og offentlig sektor (ikke bare prosessene) og skape en digital kultur der kjernen består av digital informasjon.

Alder

Your answer

Kjønn

- Kvinne
- Mann

Utdanning (nivå)

- Doktorgrad
- Mastergrad
- Bachelor grad
- Videregående utdannet, diplom eller tilsvarende
- Grunnskole

Yrke

Short-answer text

Forretningsvirksomhet

- produksjon
- Bank og finans
- Ledelse og rådgivning
- Markedsføring og salg
- Innkjøp og distribusjon
- andre
- Other:

Del 1: Teknologisk dynamikk

Understående uttalelser handler om hvordan teknologiske framskritt påvirker organisasjoner. Vennligst gi uttrykk for enighet/uenighet på en skala fra 1 til 7. (1=svært uenig, 2=uenig, 3=litt uenig, 4 = verken enig eller uenig, 5=litt enig, 6=enig, 7=svært enig).

1. Omgivelsenes krav til organisasjoner er i konstant endring.

- | | | | | | | |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

2. Teknologien er i rask endring.

- | | | | | | | |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

3. Den teknologiske utviklingen i industrien er betydelig.

- | | | | | | | |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

5. Teknologiske endringer skaper store muligheter for min organisasjon.

- | | | | | | | |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

6. Mange nye produkter og tjenester er muliggjort/skapt gjennom teknologiske gjennombrudd.

- | | | | | | | |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

7. Teknologiske endringer utsetter organisasjoner for en stor trussel.

- | | | | | | | |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

8. Dagens organisasjoner er godt forberedt på digital endring.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Del 2: Organisasjonsstruktur

De understående spørsmål gjelder hvordan beslutninger kan skje i organisasjoner som jobber i digitale omgivelser. Velg det tallet som gir best uttrykk for din mening om hver av uttalelsene (1=svært uenig, 2=uenig, 3=litt uenig, 4 = verken enig eller uenig, 5=litt enig, 6=enig, 7=svært enig).

Organisasjonsstruktur: sentralisering

I digitale organisasjoner:

9. Lite vil skje før en overordnet tar en avgjørelse.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10. En person som ønsker å ta en egen beslutning, vil bli demotivert.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

11. Også mindre saker sendes oppover i organisasjonen for endelig vedtak.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

12. Enhver avgjørelse som en ansatt tar, må godkjennes av vedkommendes leder.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Organisasjonsstruktur: formalisering

I digitale organisasjoner

13. De fleste må følge skriftlig jobbeskrivelse.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

14. Måten ting gjøres på kan aldri bli avgjort av personen som utfører arbeidet.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

15. Folk må få gjøre nesten som de ønsker under arbeidet.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Organisasjonsstruktur: spesialisering

I digitale organisasjoner:

16. Alle ansatte trenger detaljerte beskrivelser av arbeidsansvar.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

17. De fleste ansatte må ha jobber som krever spesialkompetanse.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

18. Man må ha standardiserte treningsprosedyrer til ulike jobber.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

19. Arbeidet vil gi muligheter for å gjøre ulike ting.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

20. Der må være tilstrekkelig variasjon i den ansattes jobb.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Organisasjonsstruktur: gjensidig avhengighet

I digitale organisasjoner:

21. Informasjon og kompetanse om andre avdelinger er viktig for at ansatte skal lykkes med jobben.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

22. De ansatte må samarbeide med andre medlemmer i organisasjonen for å lykkes i arbeidet.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

23. Ansatte pålegges å ta prosjektrelaterte avgjørelser sammen.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Organisasjonsstruktur: integrering

En digital organisasjon:

24. vil beholde en integrert database og access som letter informasjonsdeling.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

25. vil effektivt dele brukerinformasjon mellom avdelingene.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

26. vil ha tilfredsstillende mulighet til internt å dele standardisert og skreddersydd informasjon.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

27. vil være lydhør for andre avdelingers behov.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

28. vil legge vekt på informasjon og fysisk bevegelse mellom avdelinger i organisasjonen.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Del 3: Lederkompetanse

I hvilken grad er beskrivelsene under viktig for en leder som vil lede ansatte/team på «en digitalt preget arbeidsplass».
Angi svaret ved å trykke på ett av alternativene (1=svært uenig, 2=uenig, 3=litt uenig, 4 = verken enig eller uenig, 5=litt enig, 6=enig, 7=svært enig).

Lederferdigheter og -egenskaper: kommunikasjon

Følgende lederkompetanse er viktige på en digital arbeidsplass:

29. kunne håndtere informasjon overload.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

30. kunne håndtere konflikter.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

31. Lette kommunikasjonen mellom grupper og sikre klar forståelse for prosjektmål.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

32. Sikre at det enkelte medlemmer er involvert i prosesser og har klar ansvarsforståelse

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Lederkompetanse: endringsledelse

Følgende lederkompetanse er viktige på en digital arbeidsplass:

33. kunne gjøre større endringer i forretningsmodell eller visjon

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

34. kunne veilede personell i komplekse og usikre perioder.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

35. kunne tilpasse seg digital utvikling.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

36. kunne respondere på muligheter og trusler i omgivelsene.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Lederkompetanse: læring

37. ønske å lære ny teknologi.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

38. kunne oppmuntre ansatte til å lære kommunikasjon med mennesker fra ulik kulturell bakgrunn.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

39. kunne takle ansatte som motsetter seg endring.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

40. se feil som mulig læringsarena.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Lederkompetanse: praktisk endring

Følgende lederkompetanse er viktige på en digital arbeidsplass:

41. tilrettelegge for ansattes raske respons i forretnings spørsmål ved å stole på at de kan ta egne beslutninger.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

42. dele oppdatert informasjon om nye utviklingstrekk.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

43. hjelpe å sette grenser for å redusere responskrav.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

44. finne og tilpasse ansattes ulike teknologiske preferanse for kommunikasjon.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Del 4: Ansattes kompetanse

Angi i hvilken grad du tror hver av de følgende ferdigheter og egenskaper er viktig for ansatte som vil jobbe i en digital organisasjon. Angi svaret ved å velge ett av sju alternativ: 1= ikke viktig, 2=lite viktig, 3=litt viktig, 4=nøytralt, 5=noe viktig, 6=svært viktig, 7=ekstremt viktig.

Ansattes kompetanse: personlige egenskaper

Følgende kompetanse er viktig for ansatte i en digital organisasjon:

45. kunne tilpasse seg endringer.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

46. være raskt tilbake etter en hard periode

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

47. kunne tenke klart under press.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

48. komme seg raskt etter en stresset situasjon.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

49. ha evne til å se noe positivt i vanskelige perioder.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Ansattes kompetanse: personlige egenskaper

Følgende kompetanse/sosiale egenskaper er viktige for ansatte i en digital organisasjon:

50. ha lett for å omgås mennesker fra ulike kulturer.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

51. vise respekt for motstandere fra ulike kulturer.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

52. ha evne til å gi klart uttrykk for ideer i samhandling med mennesker fra ulike kulturer.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

53. ha evne til å forstå andre menneskers oppførsel.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

54. ha god tilpassingsevne i sosiale situasjoner.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Ansattes kompetanse: anvendt kunnskap

Følgende kompetanse/egenskaper er viktige for ansatte i digitale organisasjoner:

55. kunne akseptere ting som ikke kan endres.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

56. ha evne til å fokusere i øyeblikket (der og da).

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

57. kunne fokusere på én ting i en lengre periode.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

58. kunne lytte til noen med ett øre, mens man samtidig gjør noe annet.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Ansattes kompetanse/ferdigheter i arbeidet

Følgende kompetanse/personlige egenskaper er viktig for ansatte i digitale organisasjoner:

59. Ha ønske om å lære noe nytt.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

60. være fokusert på en problemstilling.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

61. kunne håndtere kompliserte saker.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

62. kunne organisere tanker.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

63. ønske å finne ut av hvordan ting fungerer.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Del 5: Balanse i arbeidslivet (for ansatte)

Vis hvor ofte en digital arbeidsplass vil påvirke understående adferd. Bruk følgende skala:
1=aldri – 7=alltid

I en digital organisasjon:

64. Ansatte vil kunne opprettholde en god balanse mellom arbeidsliv og andre sider ved livet.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

65. Ansatte vil kunne takle familieansvar samtidig med jobbkrav.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

66. Ansatte vil kunne ha et sosialt liv utenom jobben.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

67. Ansatte vil kunne fortsette private aktiviteter utenfor jobben.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

68. Når man er på private reiser, vil ansatte ha en klar grense mellom arbeid og fritid.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

69. Ansatte vil foretrekke å kunne arbeide overalt (hjemme, på båt, på hytta, i bilen, på toget...).

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

70. Ansatte vil ha en tendens til å besvare epost om kvelden og i fritida.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

71. Ansatte vil foretrekke å bruke samme epostadresse både på jobb og privat.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Appendix B. CR, AVE and factor loadings

Construct	Indicators	Employees			Managers			
		CR	AVE	Loadings	CR	AVE	Loadings	
Digitalization	<ul style="list-style-type: none"> The environmental demands on organizations are constantly changing. The technology is changing rapidly. Technological developments in our industry are rather high. Technological changes provide big opportunities. 	0.799	0.499	0.692 0.714 0.787 0.563	0.799	0.499	0.724 0.678 0.721 0.701	
Organizational structure	<ul style="list-style-type: none"> Centralization Formalization Interdependence Integration Specialization <p>Centralization:</p> <ul style="list-style-type: none"> There would be little action taken until a supervisor makes a decision. A person who wants to make his or her own decisions would be discouraged. Even small matters would be referred to someone with higher up for a final decision. Any decision an employee makes would have to have his or her manager's approval. <p>Formalization:</p> <ul style="list-style-type: none"> Most people would have to follow written work rules for their job. 	0.869 0.800 0.853 0.835 0.819	0.626 0.666 0.659 0.505 0.693	0.869 0.799 0.853 0.835 0.819	0.869 0.799 0.853 0.835 0.819	0.626 0.666 0.659 0.505 0.693	0.750 0.660 0.808 0.821 0.942	0.728 0.737 0.888 0.802 0.796

	<ul style="list-style-type: none"> • How things are done would never be left up to the person doing the work. 	0.621	0.843	0.576	0.836
	Specialization:				
	<ul style="list-style-type: none"> • One's job would provide opportunities to do different things. 	0.814			0.836
	<ul style="list-style-type: none"> • There would have to be enough variety in an employee's job. 	0.750			0.829
	Interdependence:				
	<ul style="list-style-type: none"> • Information and expertise of other departments would be important for members to successfully do their jobs. 	0.876			0.778
	<ul style="list-style-type: none"> • Members would need to have cooperation of other members to successfully do their jobs 	0.809			0.885
	<ul style="list-style-type: none"> • Members would be required to jointly make important project-related decisions. 	0.638			0.767
	Integration:				
	<ul style="list-style-type: none"> • Would maintain an integrated database and access method to facilitate information sharing 	0.656			0.669
	<ul style="list-style-type: none"> • Would effectively share operational information between departments. 	0.521			0.688
	<ul style="list-style-type: none"> • Would have adequate ability to share standardized and customized information internally. 	0.566			0.735
	<ul style="list-style-type: none"> • High level of responsiveness to meet other department's needs. 	0.755			0.801
	<ul style="list-style-type: none"> • Would emphasize on information and physical flows among departments within the organization. 	0.789			0.650
Leadership skills		0.810	0.523	0.843	0.576

<ul style="list-style-type: none"> • Communication skills • Dealing with change • Learning • Practical change 	<p>Communication:</p> <ul style="list-style-type: none"> • Dealing with information overload. • Ability to make sure that employees understand the goals of the business in order to avoid conflict. • Facilitate communication between the teams and make sure they are clear on the project goals. • Ability to make sure that each team member is feeling involved throughout the process and understands their responsibility clearly. <p>Dealing with change:</p> <ul style="list-style-type: none"> • Ability to make fundamental changes to the business model or vision. • Ability to guide people in the face of uncertainty and complexity. • Ability to adapt to digital developments. • Ability to respond to opportunities and threats in the business environment. <p>Learning:</p> <ul style="list-style-type: none"> • Being able to encourage employees for learning to communicate better with people from different cultural backgrounds. • Ability to deal with the employees who are resistant to change. • Open mindedness to mistakes and see them as learning opportunities. 	<p>0.834</p> <p>0.795</p> <p>0.814</p>	<p>0.561</p> <p>0.565</p> <p>0.525</p>	<p>0.504</p> <p>0.767</p> <p>0.861</p> <p>0.725</p> <p>0.670</p> <p>0.852</p> <p>0.653</p> <p>0.828</p> <p>0.745</p> <p>0.706</p> <p>0.766</p>	<p>0.876</p> <p>0.821</p> <p>0.879</p>	<p>0.639</p> <p>0.604</p> <p>0.644</p>	<p>0.643</p> <p>0.738</p> <p>0.795</p> <p>0.846</p> <p>0.746</p> <p>0.875</p> <p>0.762</p> <p>0.807</p> <p>0.778</p> <p>0.737</p> <p>0.815</p>
---	---	--	--	--	--	--	--

<p>Employee competencies</p> <ul style="list-style-type: none"> Employee people skills Employee personal skills Work place skills Applied knowledge skills 	<p>Practical change:</p> <ul style="list-style-type: none"> Ability to facilitate employees' quick response to business related issues by having trust in them to make decisions. Sharing updated business related information about new developments. Help setting boundaries in order to reduce the pressure to respond. Ability to identify and accommodate different technology preferences of colleagues to communicate. 	<p>0.617</p> <p>0.762</p> <p>0.743</p> <p>0.720</p>	<p>0.903</p> <p>0.873</p> <p>0.836</p> <p>0.802</p>	<p>0.797</p> <p>0.810</p> <p>0.793</p> <p>0.811</p>
<p>Employee competencies</p> <ul style="list-style-type: none"> Employee people skills Employee personal skills Work place skills Applied knowledge skills 	<p>0.848</p> <p>0.838</p> <p>0.829</p> <p>0.800</p>	<p>0.528</p> <p>0.513</p> <p>0.494</p> <p>0.500</p>	<p>0.652</p> <p>0.585</p> <p>0.506</p> <p>0.512</p>	<p>0.816</p> <p>0.823</p> <p>0.868</p> <p>0.748</p> <p>0.777</p>
<p>People skills:</p> <ul style="list-style-type: none"> Finding it easy to get along with people from different cultures. Showing respect to culturally different counterparts during interaction. Ability to express ideas clearly when interacting with people from different cultures. Ability to understand other people's behavior. Ability to fit easily in different social situations. <p>Personal skills:</p>	<p>0.703</p> <p>0.687</p> <p>0.815</p> <p>0.710</p> <p>0.739</p>	<p>0.703</p> <p>0.687</p> <p>0.815</p> <p>0.710</p> <p>0.739</p>	<p>0.816</p> <p>0.823</p> <p>0.868</p> <p>0.748</p> <p>0.777</p>	

	<ul style="list-style-type: none"> • Ability to adapt to change. • Bouncing back quickly after hard times. • Think clearly while under pressure • In difficult periods, having a tendency to find something good that help to thrive. • Recover fast from a stressful event. 	0.750 0.788 0.653 0.564			0.542 0.729 0.860 0.810 0.839
<p>Work place skills:</p> <ul style="list-style-type: none"> • Exploring new things to learn. • Staying focused when working on a problem. • Ability to deal with complicated things. • Ability to organize their thoughts. • Trying to figure out how things work. <p>Applied knowledge skills:</p> <ul style="list-style-type: none"> • Accepting things which cannot change. • Ability to focus on the present moment. • Able to pay close attention to one thing for a long period of time. • Listening to someone with one ear, while doing something else at the same time. 	0.625 0.654 0.766 0.707 0.758 0.698 0.695 0.758 0.687	0.739 0.579 0.741 0.739 0.745 0.719 0.867 0.812			
Work- life balance	<ul style="list-style-type: none"> • Employees will be able to maintain a good balance between work and other aspects of their life. • Employees will be able to meet their family responsibilities while still doing what is expected of them at work. • Employees will be able to have a social life outside of work. • Employees will be able to stay involved in non-work interests and activities. 	0.889 0.618 0.850 0.851 0.725 0.791	0.911 0.675	0.853 0.894 0.887 0.839	

	<ul style="list-style-type: none"> • While on private travel, employees will be able to have a clear boundary between work and leisure times. 			0.665			0.598
--	--	--	--	-------	--	--	-------

Appendix C. Discriminant validity coefficients- employees' data

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Applied skills (1)	0,707														
Centralization (2)	0,168	0,760													
Communication (3)	0,221	0,011	0,723												
DWC (4)	0,268	-0,051	0,510	0,749											
Digitalization (5)	0,150	0,085	0,323	0,322	0,697										
People skills (6)	0,313	0,033	0,509	0,272	0,235	0,727									
Personal skills (7)	0,358	-0,016	0,412	0,422	0,305	0,340	0,716								
Workplace skills (8)	0,329	0,155	0,495	0,361	0,297	0,405	0,523	0,703							
Formalization (9)	0,367	0,361	0,016	-0,038	0,117	0,161	0,085	0,070	0,800						
Interdependence (10)	0,113	0,042	0,490	0,350	0,343	0,291	0,280	0,407	0,022	0,778					
Integration (11)	0,208	0,082	0,412	0,421	0,297	0,153	0,369	0,463	0,037	0,379	0,670				
Learning skills (12)	0,209	-0,030	0,523	0,445	0,279	0,528	0,345	0,271	0,106	0,320	0,316	0,751			
Practical change Skills (13)	0,334	0,042	0,441	0,529	0,443	0,446	0,474	0,526	0,002	0,418	0,417	0,562	0,724		
Specialization (14)	-0,025	-0,078	-0,356	-0,235	-0,370	-0,188	-0,206	-0,272	0,018	-0,504	-0,311	-0,081	-0,304	0,789	
WLB (15)	0,280	0,100	0,249	0,251	0,117	0,207	0,096	0,274	0,060	0,135	0,053	0,078	0,248	-0,180	0,786

Appendix D. Discriminant validity coefficients- managers' data

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Applied skills (1)	0,715														
Centralization (2)	0,257	0,791													
Communication (3)	0,294	-0,076	0,759												
Dealing with change (4)	0,296	-0,183	0,692	0,799											
Digitalization (5)	0,033	0,240	-0,172	0,382	0,707										
People skills (6)	0,463	0,021	0,491	0,400	-0,014	0,807									
Personal skills (7)	0,461	0,085	0,496	0,406	0,055	0,538	0,765								
Workplace skills (8)	0,338	0,009	0,502	0,386	-0,077	0,473	0,573	0,711							
Formalization (9)	0,046	0,510	-0,111	-0,195	0,147	-0,152	-0,050	-0,141	0,816						
Interdependence (10)	0,365	0,073	0,349	0,317	0,319	-0,073	-0,129	-0,063	0,373	0,812					
Integration (11)	-0,138	0,375	0,413	0,045	0,315	0,341	0,333	-0,187	-0,075	-0,133	0,711				
Learning (12)	0,511	0,415	-0,112	0,484	0,442	0,432	-0,158	-0,297	-0,093	0,371	0,325	0,777			
Practical change (13)	0,316	-0,128	0,579	0,618	0,334	0,444	0,483	0,463	-0,253	0,428	0,375	0,618	0,803		
Specialization (14)	0,471	-0,090	0,347	0,350	0,340	-0,224	-0,106	0,024	0,368	0,352	0,300	0,137	-0,033	0,833	
Work life balance (15)	0,177	-0,036	0,214	0,211	0,299	0,353	0,275	0,323	-0,309	0,213	0,412	0,228	0,211	0,264	0,822

Appendix E. Indirect effects

Employees' data

Predictor	Mediator	Criterion	β	T	P
Digitalization	Integration	Communication	0,181	2,539	0,011
Digitalization	Integration	Practical change	0,135	2,067	0,039
Digitalization	Integration, communication/Learning	People	0,135	1,975	0,049
Digitalization	Integration, communication	Workplace	0,214	2,599	0,010
Interdependence	Communication, learning	People	0,190	2,705	0,007
Integration	Practical change	Applied	0,123	2,073	0,039
Integration	Communication	People	0,142	2,036	0,042

Managers' data

Predictor	Mediator	Criterion	β	T	P
Digitalization	Integration	Practical change	0,090	2,037	0,042
Digitalization	Interdependence	Practical change	0,099	2,525	0,012
Digitalization	Interdependence	Dealing with change	0,078	1,947	0,052
Digitalization	Integration	Communication	0,089	2,183	0,029
Digitalization	Specialization	Communication	0,109	2,270	0,023
Digitalization	Dealing with change	People	0,115	2,271	0,023
Digital	Integration	Learning	0,079	2,058	0,040

