Master Thesis

How Digital Transformation Changes Work Design: A Butterfly Emerging from its Chrysalis?

Abstract

Due to rapid technological development and its increasing impact on our everyday life, the way we work, and the conditions under which we do so, organizations may lose their competitive edge if they do not participate in the digital transformation. Extant literature highlights individually researched areas on how digital transformation changes work design such as virtual teams or communication technologies but rarely examines the phenomenon in more general terms. However, because work design is vital for a range of outcomes including but not limited to employee cognitions and learning, productivity and innovation, job satisfaction and commitment, as well as employee health and well-being providing a broad view on how digital transformation affects work design in today's organizations is beneficial. Therefore, this Master Thesis provides an overarching picture of the changes in work design owed to digital transformation in contemporary societies, combining previously researched change dimensions with new insights from empirical data in a comprehensive framework. Two different qualitative methods, an online qualitative expert survey conducted with 39 participants followed by three semi-structured expert interviews revealed that changes in work design owed to digital transformation can - in line with the literature reviewed prior to conducting the study though varingly strong discussed - be categorized into the following six domains: Performance measurements, higher job demands and increasing competency requirements, increasing technologization, increased influence, work-life setup, communication and collaboration. Next to that, results suggest performance measurements as another change dimension evolving from digital transformation. Moreover, this Master Thesis suggests a strong relation between changes in work design and changes in leadership owed to digital transformation, wherefore future research may aim to study the interrelations between changes in both subject areas in more depth.

Keywords

Digital transformation, work design, job design, digitalization, digitization, leadership

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1. Introduction

The future of work has provoked a considerable amount of debate in light of the rapid technological developments of recent years. Since the Industrial Revolution, major economic and technology-driven shifts have caused significant social change (Mutekwe, 2012). New technologies, data analytics and social networks have had an impact on the way technology is used at the workplace. Coupled with this has been a major change in the way that work is organized and managed, and in which people interact, communicate and collaborate (Towers et al., 2006). Today, the use of digital technologies is not about internal business efficiencies alone anymore. Rather, customers expect companies to be up-to-date offering them various features that digital technology can provide, fostering positive but also negative repercussions (Mutekwe, 2012). To name only a few, the introduction of technologies may for example render a job that used to be done by a human obsolete or at least require skill re-orientation, yet open up more possibilities for both employers and their workers by means of remote-based work or the facilitation of independent contractors. Similarly, while fostering efficiency, it may also raise increasing privacy concerns due to the access to unprecedented levels of data (Cascio & Montealegre, 2016). Hence, while digital transformation is necessary for businesses to remain competitive, it is changing the landscape of work as we know it tremendously. As a result, technology and work are topics that are omnipresent concerning each and everyone of us, wherefore they deserve to be studied.

1.1 Background

As one of the first scholars weaving together the technological, sociological, and psychological processes that shape the modern workplace, Shoshana Zuboff (1988) published her book 'In the Age of the Smart Machine: The Future of Work and Power' more than 31 years ago (Cascio & Montealegre, 2016). The central themes of the study on work implications associated with the extensive involvement of information technology in organizations are found to be equally if not more relevant today. Although technological progress improves our lives in some areas, making it for example easier to exchange information, fostering faster decision-making or to social interaction (Vitt et al., 2011), it has

also complicated it in a way, leading e.g. to a lack of permanent and safe jobs or demanding extreme attention and availability at all times (Bucher et al., 2013). Hence, technological development remains a controversial subject and has certainly changed the way we work, communicate, collaborate, and innovate. By means of a collective interplay of innovations in digital technologies like vast improvements in mobile internet, computing power and a variety of software applications as well as nomadic workplace arrangements, existing business models are disrupted and organizations are transformed (Colbert et al., 2016). Tools such as big data analytics, knowledge-sharing platforms, corporate social networks and cloud computing have become reality in many organizations today so that work simply does not look the way it used to 20 or 50 years ago; it became more elastic and is constantly modified (Cascio & Montealegre, 2016; Loebbecke & Picot, 2015).

Next to that, also workspaces have changed tremendously during the past three decades. In that regard, roughly until 1990 offices were made up of c-suites, encouraging employees to stay focused and work independently, which is entirely different from the modern, collaboration-encouraging workplace (Hua et al., 2010). Today, the focus in the workplace is increasingly on making employees feel comfortable and enhance their motivation, introducing concepts such as remote working, standing desks or comfortable seating. New technology and tools have transformed the way that we work and the conditions under which we do so, from video software such as Skype being introduced in the early 2000's and a rise in social media only a couple of years later. Smartphones, online file sharing and the internet have made it possible to work from anywhere, at any given time, enabling collaboration with people around the world with ease (Kossek et al., 2015; McOrmond, 2004). Nevertheless, the distractions that are associated with an increased use of technologies result in taking up around 40% of one's productive time by shifting between tasks (Beniger, 2009). Also, the flexibility in everyday working life resulting from technology leading to employees working from anywhere also means that the natural breaks that usually take place are reduced or even completely eliminated (American Psychological Association, 2013; Bellezza et al., 2016). The physical separation from work that technology offers also has an impact on the social well-being, as constant attention and accessibility can often cause personal relationships with family or friends to fall behind, at the expense of relationships across distances and time zones (Morris, 2015; Turkle, 2011).

Moreover, the skills being rewarded in the labour market have changed over time. The demand for non-routine cognitive and socio-behavioral skills like critical thinking and managing emotions at work is constantly on the rise, because robotics may complement workers who engage in tasks that require advanced analytical interpersonal or manual skills, yet, fail to replace them completely (Bresnahan et al., 2002; World Bank Group, 2018). Instead of standard long-term contracts, today short-term work, often carried out via online work platforms, is more and more common letting on-demand services thrive (World Bank Group, 2018).

Following from this, today's leaders are put under tremendous pressure to understand the implications of digital transformation on their organization and employees. They do not only need to construct a more fulfilling workplace, but also to avoid the rather disappointing outcome of automation to undo the promise of a transparent and multivalent workplace in which information could have played an enlightening role (Colbert et al., 2016).

1.1.1 Digitization or digitalization? Digital transformation.

'Digitization' and 'digitalization' are two conceptual terms that are closely associated and often used interchangeably in a broad range of literature. Digitization however is most often referred to as "...the process of changing from analogue to digital that makes it more feasible to archive, readily access, and share information" (Gimpel & Röglinger, 2015, p.5), while digitalization is most often associated with "...the increasing penetration of digital technologies in society with the associated changes in the connection of individuals and their behaviors" (Gimpel & Röglinger, 2015, p.5). Digitalization enables, improves and/or transforms business- operations, functions, models, processes and/or activities, by leveraging digital technologies and a broader use and context of digitized data turned into actionable knowledge with a specific benefit in mind. While digitization is more about systems of record and increasingly systems of engagement, digitalization is about systems of engagement and systems of insight, leveraging digitized data and processes (Kagermann, 2015). Digitalization is seen as the road of moving towards digital business and digital transformation and as the way in which many domains of social life are restructured around digital communication and media infrastructures. Hence, digitalization is the "...integration of digital technologies into everyday life by the digitization of everything that can be digitized" (BusinessDictionary,

2019). Because both concepts are very specific, they are not only difficult to understand in isolation, but also fail to provide the scope anticipated for this study. Therefore, an umbrella term that covers the general application of technological developments in organizations is more suitable and will be used for this study: Digital transformation. As a combination of two definitions on digital transformation by Fitzgerald et al. (2014) and Hanelt et al. (2015) respectively, the authors of this study understand digital transformation as *the overarching phenomenon resulting from shifts in society and organizations due to an increasing use of new, computerized digital technologies (social media, mobile, analytics or embedded devices)*.

1.1.2 Work design

Work design as a comprehensively studied concept in literature refers to the content, structure, and organization of tasks and activities, and emerged in times of the Industrial Revolution with the aim to break down complex jobs into simpler jobs to enhance performance (Parker et al., 2001). This job simplification in turn required less skilled people and therefore enabled companies to rely on cheaper labour and a most efficient way to execute tasks (Grant & Parker, 2009). Subsequent research however has shown that simplified jobs are often boring, tiring, dissatisfying, and potentially damaging mental health (Grant & Parker, 2009), wherefore inter alia job rotation (moving people between simplified jobs), horizontal job enlargement/enrichment (including a wider range of tasks within jobs) and autonomous work groups (groups of employees encouraged to manage their own work and work practices) were later introduced and are today still used to motivate employees as part of work design (Parker et al., 2001).

Work design is often interchangeably used with job design and particularly studied in terms of job characteristics such as autonomy, roles, workload and feedback (Morgeson & Humphrey, 2006). Further, work design is vital for a range of outcomes including but not limited to job satisfaction and commitment, employee cognitions and learning, productivity and innovation, as well as employee health and well-being (Parker et al., 2001; Van den Broeck & Parker, 2017). In line with the aim of this study to provide a broad view on how digital transformation affects work design in today's organizations, working with a broader definition of work design as recommended in existing research is applicable. Accordingly,

the following definition for work design is used for the purpose of this study: *"The way in which employees work in organizations as well as the conditions under which they do so"* (Parker et al., 2001, p.253). Due to their different nature, please note that this study is mainly concerned with office work design instead of with work design in factories.

1.2 Problem discussion

While around a decade ago research has already recognized technology use as an important work characteristic making organizations more reflexive, flexible, and dynamic (Morgeson & Humphrey, 2006), it has up to the present day only seldom considered how digital technologies affect the design of work in more general terms. Research fails to provide an overarching picture of the recent, contemporary changes in work design owed to digital transformation that organizations are dealing with. However, because work design is vital for a range of outcomes including but not limited to employee cognitions and learning, productivity and innovation, job satisfaction and commitment, as well as employee health and well-being (Parker et al., 2001; Van den Broeck & Parker, 2017), providing a broad view on how digital transformation affects work design in today's organizations is beneficial, both from a theoretical as well as from a practical point of view, as outlined in *section 1.3.1* and *section 1.3.2* respectively.

In previous studies, specific aspects of digital transformation and work design like the role of virtual teams or teleworking have been studied in detail. However, earlier reviews express their disappointment over the all too small extent to which organizational development researchers have incorporated technology into their studies (Gardner et al., 2010). Existing perspectives in the management research literature each generate distinctive blind spots in dealing with how technology is changing organizational life (Cascio & Montealegre, 2016), while surprisingly little research focuses on how technology is altering work systems or the work that people do, respectively the way in which employees work in organizations and the conditions under which they do so in general (Cascio & Montealegre, 2016; Parker et al., 2001).

Accordingly, individual, very specific areas how digital transformation influences, alters or changes work design have been studied (e.g.: automation; changes in hierarchies; spatial flexibility;...), however, literature does not examine the phenomenon in more general

and comprehensive terms. In other words, no overview of the current changes in work design owed to digital transformation has been established in the literature reviewed prior to this study. Therefore, this study builds upon establishing an overarching framework that visually represents the changes in work design resulting from digital transformation in contemporary societies.

1.3 Research objective and question

If one does accept that work only exists in combination with people, organizational behaviour as a field has the responsibility of understanding the effects of technology on work and its design (Cascio & Montealegre, 2016). As mentioned previously, existing literature outlines changes in work design owed to digital transformation, yet only considers these changes in isolation instead of providing an overarching picture of contemporary changes. Furthermore, it is doubtful that all aspects/changes resulting from digital transformation in the design of work today have been considered (Purnam et al., 2014), keeping in mind that technology is evolving swiftly (Ran, 2013). Therefore, this study leans on empirical data collection instead of solely combining findings from existing literature, aiming to provide new insights, and thus to extend the current picture on changes in work design owed to digital transformation.

Accordingly, this study aims to 'zoom out' of the very specific changes in work design owed to digital transformation and to establish an up-to-date overview on how digital transformation affects work design while structuring knowledge in this domain into a comprehensive framework. Hence, this study aims to answer the following research question:

How does digital transformation change work design in contemporary societies?

1.3.1 Potential theoretical contributions

Providing an up-to-date broad theoretical framework on the changes that are caused in work design owed to digital transformation in contemporary societies, this study makes meaningful contributions to the literature: The broad array of considered changes in work design might not only confirm dimensions identified in earlier studies, such as the automation of a wide range of jobs or changes in work-life setup, but might also extend the current picture. This

can be achieved by pointing out the importance of other areas that have so far not received much attention despite their high relevance in the current state of digital transformation, such as higher job demands, changes in performance measurement or the changing role of leadership. Study results therefore provide a basis for future research pointing out requirements for the digital age.

1.3.2 Potential practical contributions

Aimed at creating an environment for the full use of the possibilities of new technologies today and working on their effective and innovative use in the future, digital transformation is a topic that sooner or later concerns all of us, and therefore deserves to be studied. The results of this study might help organizations to familiarize themselves with the changes that employees are confronted with, and the changes that leaders may inflict during the digital age, providing them with indications on how to select and develop their personnel, focusing on specific skills and qualities required during the digital transformation.

1.4 Preview report

Following from background information, crucial definitions related to the research topic - digital transformation and work design - and purpose of the study, this thesis report presents a literature review in *chapter 2*. The latter covers more general topics related to the subject area of the thesis such as network society and sharing economy, the changes in time perception due to the technological improvements and digital inequality. Subsequently, the topic of digital transformation and work design and the associated areas are discussed in more detail. In *chapter 3*, the authors elaborate on the chosen methodological approach, addressing all layers of Saunders's 'research onion' respectively. *Chapter 4* presents the findings of the primary data collection including a visual representation of all change dimensions identified. The findings are then discussed in *chapter 5* in conjunction with the literature reviewed prior to the study. Finally, in *chapter 6* conclusions from the study are drawn and an overarching framework outlining the changes in work design in contemporary societies owed to digital transformation is provided. Beyond that, future research scenarios, research limitations, and a project process evaluation commenting on each authors' contributions are presented.

2. Literature review

In order to formulate the research question as presented in *section 1.3*, a review of available secondary sources and studies previously undertaken in the field of digital transformation and work design was conducted.

As an initial start of the literature research, an expert in the field of e-government, technology and digital strategy working in an upper management position in the private sector in Germany was approached, providing valuable insights into commonly used sources and well-known authors in the field. However, because humans are naturally biased according to their background, expertise and opinion on the subject matter (Schneider et al., 2014), sources could not be considered objective nor comprehensive, wherefore the researchers got a second opinion in respect of the sources that could be used for this study from an expert on digital transformation working in an institution in Sweden. Additionally, following from research question and objective, key words such as 'technology', 'digitization', 'digital transformation', 'work environment', 'work design' or 'job design' were defined and further refined while being used in search engines such as Google Scholar, ERIC and ResearchGate. As a result, a comprehensive list of sources was generated that was then compared and evaluated regarding their suitability for the thesis according to their legitimacy. Hence, sources were chosen that are cited by most other sources, while generally solely credible papers, journals, and books were used. Nevertheless, because both researchers tend to believe that technology has important effects on our lives and that the internet is revolutionizing society and economy as described in the theory of technological determinism (Lawson, 2007), sources may somewhat be biased anyways.

The aim of this literature review is to provide an overview not only of how work has changed in general over the past decades, but even more so to gain insights of the topics most frequently studied in relation to digital transformation and work design. The following section provides a review of relevant theoretical concepts and perspectives and their applicability for this Master Thesis.

2.1 Network society, shifting ideas of work and sharing economy

With the advancement of digital transformation a phenomenon that is contrasting to the concept of community arose: network society (Howcroft & Taylor, 2014). Network sociality focuses on integration and disintegration, on informational, ephemeral, yet intense social relations, on an exchange of data and 'catching up' combining both work and play, constructed on the grounds of transport and communication technology. Because networks are open structures, highly dynamic and able to expand almost without limits, they are often deemed "...appropriate instruments for a capitalist economy based on innovation, globalization and decentralized concentration..." (Wittel, 2001, p.52) as well as for "...a culture of endless deconstruction and reconstruction" (Wittel, 2001, p.52). As a result thereof, research argues that network sociality based on deeply embedded technology and individualization will become the new cultural economy moving from having relationships towards doing relationships. Hence, social bonds are expected to be continuously produced, reproduced, and consumed (Wittel, 2001). Further, the emerging network society leads inter alia to a fragmentation of skilled jobs letting firms do more with fewer workers (Howcroft & Taylor, 2014). However, if one fails to fully acknowledge complex, contingent and unintended outcomes when using Information and Communication Technology (ICT) to reconfigure work and restructure employment viewing it als solely transformative, one may also fail to recognize that some jobs become obsolete or are displaced. Similarly, one may fail to recognize that the "...totality of societal change may be greater than the sum of the constituent occupational parts" (Howcroft & Taylor, 2014, p.2).

Another phenomenon that evolved resulting from digital transformation is the sharing economy. Before digitization e.g. information for a product was limited, leading to an asymmetry of information; the seller had more information about the product than the buyer (Constantiou et al., 2017). Today, information about any product is abundant on many websites, such as recommendation systems on Amazon or Yelp, leading to the reversal of asymmetry of information and power on the side of buyers (Hamari et al., 2015). The governance of digital infrastructure is open and allows all participants to contribute. Users are encouraged to proactively innovate and create, building on communities of practice in which the abundance of information and information sharing is the prelude (Constantiou et al.,

2017). Over the past decades, digital sharing economy platforms such as Airbnb and Uber have entered a number of industries and changed the landscape of competition (Schor, 2014). Users do not only consume services anymore but contribute to value creation by means of active knowledge-sharing (Constantiou et al., 2017). Nevertheless, although a sharing economy endorses sharing the consumption of goods and services through online platforms, it also frequently leads to unauthorised copying of content by individuals (Hamari et al., 2015; Liebowitz, 2005). Following from both phenomena network society and sharing economy, one can once again argue that digital transformation and its effects on work (design) and society need to be treated with the utmost caution, because they can be both positive and negative.

2.1.1 Changes in time and spatial perception

One of our most subjective experiences is time (Wittmann & Paulus, 2008). While most modern societies are very time-oriented and depend on one common experience of it, e.g. by giving structure to their days in defining work and leisure time, dissolution thereof may not only affect different cultural concepts but also own personal time experience in today's networked modern media world. In information technology, individual time management is one of the biggest requirements because one needs to deal with more information than ever and act on various levels simultaneously, often leading to the subjective feeling of an acceleration of time (Dedyukhina, 2017; Wittmann & Paulus, 2008). People can participate in events around the globe nearly without delay, providing users with the feeling of real-time experience. Research argues that time may increasingly be experienced as deeper and thicker because all the devices in today's hyperconnected world provide access to information on various layers of time, history, present, as well as simulations of the future (Goerlich, 2015). A threat thereof may be that not everyone is able to cope with these perceptions according to their cultural background, possibly leading to a cognitive overkill (Schneider et al., 2014). Nevertheless, researchers believe that our brains likely have a sufficient ability to evolve with technology. Hence, though we may not be able to envision perceiving different layers of time simultaneously at the present day, this may very well change in the future by allowing us to perceive the flow of time very differently through augmented reality. Overall, the more

connected the world, the greater the probability that different cultures and different individuals may adopt a different meaning of time (Dedyukhina, 2017; Goerlich, 2015).

Similarly, digital transformation does not only remove the distance barrier between people but creates a sense of space of its own (Barichello & Carvalho, 2013). The cyberspace, in which participants are given the sense of occupying the same space, although they are physically not at the same location, enables multiple virtual interactions next to the number of interactions one already has in the 'real-world' (Barichello & Carvalho, 2013). Nevertheless, online communication does not replace real-life interactions but creates a convergence of the two - in addition to the interaction with people in real-life one may additionally chose to contact the exact same person through social media for example. Also, though one may not have seen a person for a longer period of time, one may still be aware about recent events in their lives (Kweon et al., 2011).

2.1.2 Digital inequality

While digital transformation is often depicted as a great potential equalizer, research has suggested that it may contrary also be a source of inequality (Hargittai & Hsieh, 2013). Hence, while some individuals, organizations and countries, depending on their demographic background and socioeconomic status may benefit greatly from the medium's diffusion, online experiences and abilities beyond core technical internet access may be very different (Buente & Robbin, 2008). New technologies, services, and tools continue to emerge consistently, requiring new know-how to navigate them. However, this knowledge required is likely not distributed randomly but will rather privilege those that are already in advantageous positions by means of a having e.g. a high socioeconomic status that provides ownership of smartphone, internet connectivity, broadband access or other resources (Hargittai & Hsieh, 2013).

Today, already 50% of the world's population has access to the internet (Statista, 2019). Access to digital technologies depends on many factors, one of which is the social class (Yates et al., 2015). On one hand it is argued that the development of digital technologies are empowering and promoting social integration and further enable a simpler and faster leap in the sense of 'advancing' in the classes. On the other hand, it is claimed that

digital technologies benefit privileged groups and further exclude disadvantaged social classes (Willis & Tranter, 2006).

Following from this it can be concluded that even if one assumes that everybody will benefit from digital media uses to some extent, the implications thereof are dissimilar depending on the level of benefit by different groups across society (Hargittai & Hsieh, 2013). As a consequence, the assumption that everyone benefits from digital transformation will need much more empirical investigation to be deemed true (Buente & Robbin, 2008), wherefore the following sections of the literature review aim to shed light on both positive and negative changes in work design owed to digital transformation.

2.2 Digital transformation and work design

Research has recognized that information technology has major implications for the way in which work is conducted (Towers et al., 2006). Today's organizations are more integrated than ever while strict boundaries between departments are disappearing and even boundaries between organizations become more blurry with more and more organizations engaging in partnerships and joint ventures (Fitzgerald et al., 2014). Hence, research has identified that digital technologies enable geographic and temporal flexibility, and that knowledge workers influenced by new technologies, collaborate in increasingly flexible, agile and distributed contexts (Fitzgerald et al., 2014, Purnam et al., 2014). More specifically, literature has recognized the following aspects that change work design due to digital transformation most detailed, which are explained in the following: Automation, flatter hierarchies, shifting job demands and increasing competency requirements, communication technologies and telecommuting, virtual teams and flexible work arrangements.

2.2.1 Automation

The automation of low-and-middle-skilled jobs is one topic that has been studied in relation to work design and digital transformation. The digital revolution has displaced many middle-skilled jobs while high-skilled jobs are on the rise, requiring more problem solving and overall skills, as a result of which many researchers argue that the shift to an increase in knowledge-based organizations is on the rise (Cascio & Montealegre, 2016). Contrary, in

their book 'The Stupidity Paradox' Alvesson and Spicer (2016) argue that "...the role of very advanced knowledge is often more limited than claimed" (Alvesson & Spicer, 2016, p.31), meaning that knowledge in organizations is often not needed in the course of day-to-day operations, wherefore knowledge-based organizations do not even exist as such. Although during the past few decades employees have downed tools and picked-up laptops, according to Alvesson and Spicer (2016) the real work of knowledge-intensive organizations is to persuade the client that they are smart, building a public image while hiding uncertainties at the heart of knowledge. Alvesson and Spicer (2016) argue further that highly skilled human work in turn has been replaced by machines for centuries, promising to free employees from the drudgery of work, providing them with a twenty-hour work week. Today however, even more parts of life are devoted to work, considering for example that the first thing most people do in the morning is checking their smartphone. As a result thereof, jobs that are not replaced by robots require more 'passion and love' than ever, due to increasing availability demands (The Economist, 2014). As a result, one can argue that automation may have created more work instead of reducing it, whereof a great amount is however considered to be meaningless (Alvesson & Spicer, 2016). The creation of 'bullshit jobs', low- and mid-level positions that serve to occupy workers for whom the economy has no longer much use is on the rise, simply for the ruling class to retain control over the lives of others rather than resulting from economic choice (The Economist, 2014).

Accordingly, while innovation has never been greater, advances in communication and information technology are one explanation for a greater destruction of jobs than the creation thereof. Hence, technological progress is eliminating the need for many types of jobs, leaving an increasing amount of workers worse off than before (Alvesson & Spicer, 2016; Cascio & Montealegre, 2016).

2.2.2 Flatter hierarchies

Another direction of research regarding changes in work design owed to digital transformation concerns the increase in team-based structures, where more responsibilities are allocated to lower levels in the hierarchy (Morgeson & Campion, 2003). This research direction has focused mainly on cross-cultural teams and virtual teams (Sinha & Van de Ven, 2005).

In this regard, research has identified that hierarchies can be a barrier to innovation and will become one of the dinosaurs of digital transformation (Santiago de Costa et al., 2018). While hierarchies reinforce levels and boxes of a formal organizational chart, digital transformation requires fluidity and agility, letting informal teams come together to tackle emerging or challenging older issues and disband them once the issue has been solved (Sinha & Van de Ven, 2005). Digital transformation further evolves around transparent organizational cultures, in which sharing information is often more valuable than protecting it, and in which anybody can be an innovator and entrepreneur, wherefore flatter hierarchies are more and more on the rise (Morgeson & Campion, 2003). Nevertheless, this newly evolving concept, which is very different from the traditional power structure defining who interacts with whom as well as the borders to information access, also bears challenges and difficulties. A flat hierarchical structure may not only make employee retention and therewith motivation more difficult because promotions as such do not exist anymore, but also call for role confusion because it is hard for workers to focus on their tasks and specialize at their jobs (Mayhew, 2018). Further, a flat organizational structure typically limits the amount of leadership available to employees because the ratio of employees to executives is higher than the employee-supervisor-ratio. In line with this, employees may not receive one-on-one mentoring as typically provided in hierarchical structures, may lack on-the-job training as well as the personal attention needed to feel confident about their performance and skills (Mayhew, 2018).

2.2.3 Shifting job demands and increased competency requirements

Literature further provides a rich variety of sources on shifting or increasing job demands based on digital transformation. Among the most obvious competencies needed to settle in today's digital workforce, research greatly leans on 'digital fluency', which is the individual's proficiency and comfort in achieving desired outcomes using technology (Colbert et al., 2016). Digital fluency does not only require knowing how to use few programs and applications but a level of proficiency that allows the individual to manipulate information technology to achieve strategic goals, and to construct ideas. Although "...technology is seductive when what it offers meets our human vulnerabilities..." (Turkle, 2011, p.1), in the light of increased workplace diversity and communication across all

organizational levels, today's jobs may require even more relationship building and interaction with each other than jobs did decades ago (Colbert et al., 2016). Digital connections may offer the illusion of companionship without the demands of friendship, not only in our private life, but also at the workfloor. When machines are romanticized and people become inseparable from their smartphones, relationships are remade through the intimacy with machines (Turkle, 2011). As a consequence, even entry-level workers will be more and more required to join the workforce with high levels of digital fluency (Rintala & Suolanen, 2005). Instructions will be more and more technology-based, employees will be sought who are proficient in using virtual collaboration tools like Google Drive, and employees who understand and leverage the power of social media to generate firm-based content to connect with customers and build their brands will be valuable to organizations (Rintala & Suolanen, 2005). Although whether one can or cannot handle the changes in job demands owed to digital transformation greatly depends on the individual abilities, one may argue that an older cohort may be less willing to and/or able to adapt to the digital workplace, wherefore interpersonal competencies are still relevant in today's organizations to ensure smooth collaboration between the two groups (Colbert et al., 2016).

2.2.4 Communication technologies and telecommuting

Communication Technologies (CT) as supplemental work is one of the topics in relation to digital transformation and work design that has been studied most in previous research (Bieser & Hilty, 2018; Watson-Manheim et al., 2002). Literature argues that increasingly affordable and sophisticated technologies have made it more feasible for employees to stay connected to work, and hence deals to a great extent with 'technology-assisted supplemental work' and 'anytime-anywhere connectedness to work' (Boswell & Olson-Buchanan, 2007). The rise in communication technologies has facilitated telecommuting, where workers perform some or all of their work outside of their traditional office setting or where employees in traditional work settings are provided with the opportunity to stay connected to the job while away from the office during non work hours (Boswell & Olson-Buchanan, 2007). This widespread practice has compelled firms to unbind time and task from place, enabling common, even synchronous activities to be distributed across employees at remote locations, and increasingly blurred the line between work and home (Haeger & Lingham,

2014). As pointed out by Boswell and Olson-Buchanan (2007), studies regarding telecommuting/telework/remote work have most frequently highlighted one or more of the three conceptual themes detailed hereafter. (1) Psychological control or perceived autonomy: "Structure and control how and when they do their particular job tasks" (Spector, 1986, p.1006). However, there are of course several perspectives here as well. In the case of an employee with crucial skills in a complex and autonomous job, the remote work is expected to strengthen the autonomy and self-control regarding the job. An example where the autonomy is restricted is when the employee's qualifications are currently not in demand and/or the employee has no other choice than to work remotely due to private circumstances, which may, among other things, also result in lower remuneration and fewer chances for advancement (Olson & Primps, 1984). (2) Positive and negative effects of telecommuting on the work-life interface (including work-family). Some scholars view telecommuting as a good thing that leads to greater integration between the work and family roles (Raghuram & Wiesenfeld, 2004). Others argue, that it may also allow for greater control and flexibility over managing the demands of different domains (Boswell & Olson-Buchanan, 2007). Contrary, research also highlights telecommuting as a bad thing that may intensify conflicts by increasing the permeability of work and family boundaries (Gajendran & Harrison, 2007; Ladner, 2008). Furthermore, boundary blurring/integration caused by this phenomenon may also come at a price for the individual, tying them to their jobs, leaving little room to disengage as technologies hold the potential to interrupt or distract the individual at any time (Boswell & Olson-Buchanan, 2007). (3) Telecommuting's potential for relational impoverishment at work. Telecommuting may reduce face-to-face interactions, lower the frequency and richness of communication, decrease the individual's social presence and therewith lead to weaker interpersonal bond with co-workers and supervisor (Boswell & Olson-Buchnan, 2007). It may also have stress-related outcomes because managers often work extreme hours and stay connected due to psychological as well as financial rewards for doing so (Gajendran & Harrison, 2007).

2.2.5 Virtual teams

One of the main research directions and most studied phenomenon relating digital transformation and work design is the increase in team-based structures, more specifically the evolvement and development of virtual teams. This way of working leverages the full capabilities of technology and assigns responsibilities to employees lower in the hierarchy, as it makes sure that the points of view of all organizational members can be heard. Furthermore, global virtual teams provide "...a means of connecting and engaging geographically dispersed workers, lowering the costs associated with global collaboration, enabling greater speed and responsiveness and spurring innovation" (Schneider et al., 2014, p.207). Contrary, next to these evident advantages, virtual teams may also lead to difficulties: Members may experience some sort of a generation gap because the under 30s are "...more likely to to be computer-facile than their more senior leaders" (Bergiel et al., 2008, p.106). In line with this, many employees engaged in virtual teams will likely need sophisticated training on higher level technological applications. Further, Bergiel et al. (2008) argue that virtual teams are not suitable for any type of work that is very sequential or integrated; hence, not every organization can profit from it. Finally, some employees are entirely unsuited to work in virtual teams because they need interaction with others or external structure to flourish (Bergiel et al., 2008). Nevertheless, alternative work arrangements as discussed in the paragraphs above have lead to increasing use of virtual teams, who more and more make use of advanced technological solutions to facilitate collaboration, document sharing and communication (Gilson et al., 2015). As technology is advancing, virtual team members may in the future even be able to increase their presence and psychological experience of being there by means of three-dimensional virtual environments reducing the perceived distance between users (Cummings & Bailenson, 2015). Already today, technology goes so far that virtual reality systems allow for the opportunity to bring a three-dimensional prototype or website inside the shared virtual space, enabling participants to work on it together (Mims, 2015). Accordingly, as technologies will continue to develop, the potential for rich interactions for virtual teams becomes more and more likely despite its disadvantages, and the meaning of presence is expected to shift from physically being there to a sole psychological experience of being there (Colbert et al., 2016).

2.2.6 Flexible work arrangements

Previous research about the effects of digital transformation on work design has focused predominantly on increased spatial and temporal flexibility that digitization may provide to employees. Supported by new technologies work is often shifted to home office arrangements, giving employees the freedom to complete work outside their regular working hours (Mazmanian, 2013). Remaining connected to work when at home results in blurry lines between work and non-work domains (Reyt & Wiesenfeld, 2015). Employees often demand or want flexibility in terms of time and place of work. In connection with this, they hope to have a better work-life balance and ultimately be able to spend more time with their family or hobbies (Allen & Shockley, 2009). In contrast to the just mentioned positive view on flexible work arrangements, research also claims that exactly the opposite is the case, that flexible work arrangements lead to more work-life balance conflicts (Allen & Shockley, 2009; Boswell & Olson-Buchanan, 2007). For organizations themselves, the flexibility of their employees may have the advantage that production times can be extended, profitability increased and, in a positive case, autonomy can be provided for the employees (Costa & Sartori, 2005; Shagvaliyeva & Yazdanifard, 2014). In addition, there are also studies which show that flexible working hours can lead to higher productivity (Bloom et al., 2014). However, irregular working hours may also lead to inferior health and well-being (Costa & Sartori, 2005). Hence, ICT might enable employees to structure their work more flexible, but the fact that technology makes them always available, disregarding time or space, can also have negative impacts (Berkowsky, 2013; McNall et al., 2010).

2.3 Conceptual framework

Figure 1 below provides an overview of the individual areas studied regarding digital transformation and its effects on work design and therewith summarizes the literature review previously presented.

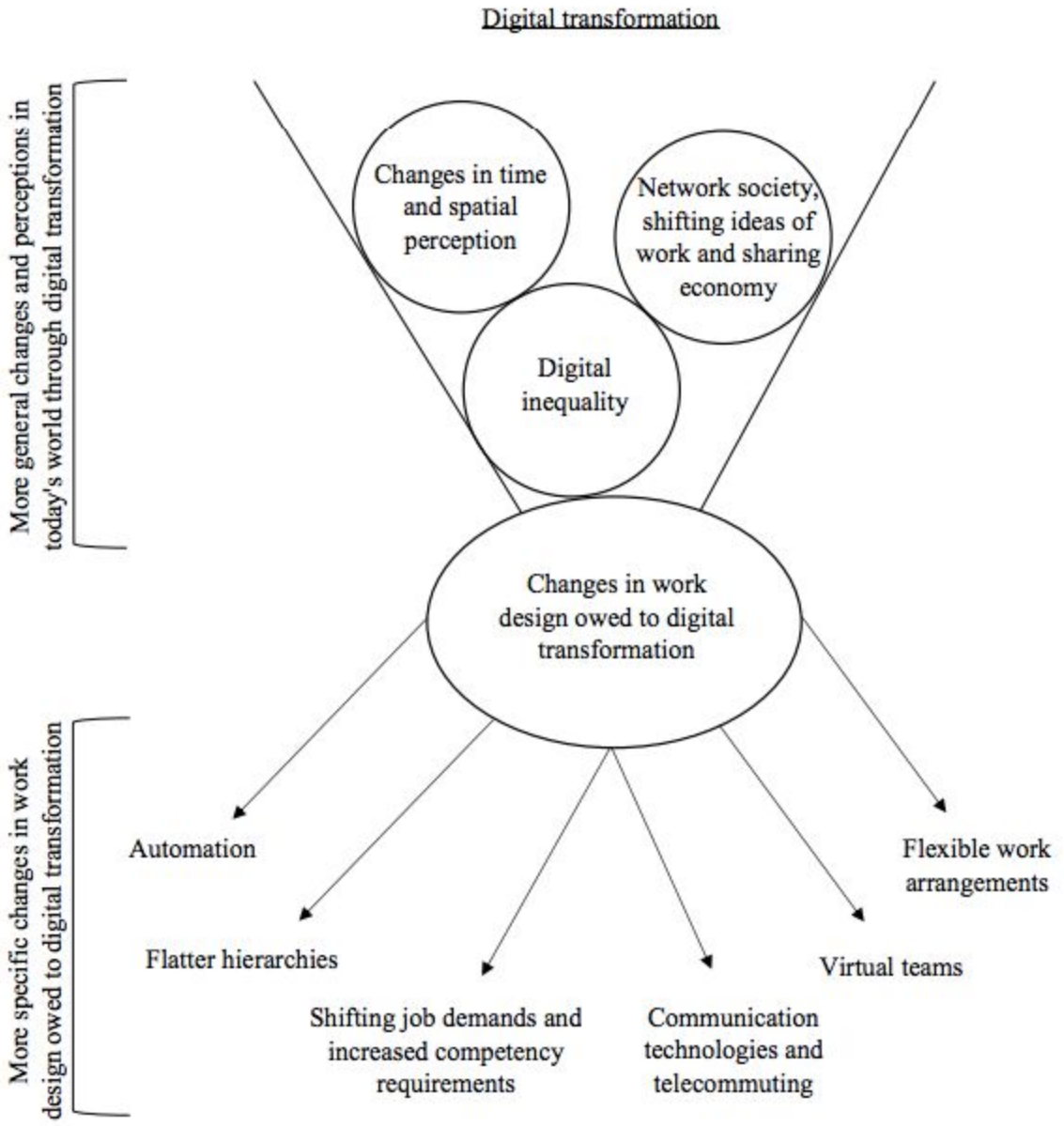


Figure 1: Summary Literature Review

Following from the literature review as presented previously, work design is strongly influenced and changed by digital transformation. *Figure 1* displays the more general drivers of changes in work design owed to digital transformation identified in the literature as well as its evident effects as discussed in previous research. In the upper part, the funnel, the following influencing factors are located: 'Changes in time and spatial perception', 'Network society, shifting ideas of work and sharing economy' and 'Digital inequality'. As a result of the advancement of technology, the phenomenon of network society (Howcroft & Taylor, 2014) and sharing economy evolved (Constantiou et al., 2017), also leading to a change in the perception of time (Dedyukhina, 2017; Wittmann & Paulus, 2008) and spatiality (Barichello & Carvalho, 2013). However, by far not all countries and people experience the digital transformation similarly and have access to the same digital tools, which in turn causes digital inequality (Hargittai & Hsieh, 2013). All three influencing factors represent more general changes and perceptions in today's world through digital transformation and thus also influence organizations and, conversely, the work of employees - work design.

Following from this, more specific changes in work design owed to digital transformation occur that previous literature has focused on in detail: Automation; Flatter hierarchies; Shifting job demands and increased competency requirements; Communication technologies and telecommuting; Virtual teams and Flexible work arrangements. The automation of low-and-middle-skilled jobs but also the development of new professions has been researched in relation to work design and digital transformation (Cascio & Montealegre, 2016). The structure of companies has also changed towards flatter hierarchies, inter alia due to the emergence of cross-cultural and virtual teams (Morgeson & Campion, 2003; Sinha & Van de Ven, 2005). Due to increasing digital standards, jobs demands have changed as well towards increased competency requirements (Colbert et al., 2016). Communication technologies and telecommuting is another topic that has been studied intensively and brings the advantages of flexible work but at the same time blurs the boundaries of work and private life leading to over-work and stress (Boswell & Olson-Buchanan, 2007).

In summary, it can therefore be concluded that digital transformation has a great impact on work design but can be perceived as positive and negative.

3. Methodology

A well-developed methodology is vital as it lays the foundation for valid and reliable research results (Styhre, 2013). Leading towards the goal of answering the research question, it serves as the blueprint for how research is conducted (Yin, 1994). Therefore, this section provides an overview of the methods used explaining the study's setup and purpose.

Saunder's 'research onion' was used throughout the study to determine a systematic framework for data collection, insights and analysis. This study is descriptive and exploratory examining existing literature as the foundation for empirical data collection; yet, it aims to gain a deeper understanding of the topic by means of posing open questions to study participants to gain new insights (Cameron & Price, 2009; Saunders et al., 2016).

This study is concerned with how digital transformation is changing work design and how it is perceived today. Therefore, the research question deliberately focuses on contemporary societies represented in three countries: Germany, Sweden and The Netherlands. To generate empirical insights, experts from these countries were chosen, because Germany, Sweden and The Netherlands are among the top 15 most technologically developed countries worldwide according to the Digital Economy & Society ranking (Digital-agenda-data.eu, 2018). As the strongest economy in Europe, Germany alone generated more than 20% of the total EU gross domestic product in 2017 (Ec.europa.eu., 2018) and was therefore worth considering. Furthermore, as Germany is the home country of both researchers, connections to a comprehensive amount of potential participants for the study existed. Sweden in turn is one of the globally most advanced countries when it comes to digital technologies (OECD iLibrary, 2018), ranking second in the 'Digital Economy and Society Index' (DESI) (European Commission, 2018). Moreover, as one of the researchers gained their Bachelor's degree and first work experiences in the Netherlands and has therefore a comprehensive network in this country, this is the third country that was investigated. Beyond that the Netherlands rank number four in the DESI (European Commission, 2018). Findings are possibly transferable to other contemporary societies, hence, similarly technologically developed countries as the Netherlands, Germany or Sweden, too. Transferability could be assumed because the subject was deliberately kept broad referring to how digital transformation changes work design in general.

3.1 Research philosophy

The research philosophy influences how knowledge is acquired and how the reality is seen (Mack, 2010). This study leans towards critical realism based on the intellectual belief of the researchers, that "...we will only be able to understand what is going on in the social world if we understand the social structures that have given rise to the phenomena that we are trying to understand" (Saunders et al., 2016, p.115). In line with this and in order to dive deeper into social impressions, the researchers of this study decided to collect qualitative data. However, critical realists also believe that the world is so complex that knowledge can be misleading (Roberts, 2014). Therefore, the researchers of this thesis have deliberately chosen to conduct two qualitative data collection methods supporting the validity of the findings.

3.2 Research approach

An abductive approach was the most suitable one for this study and therefore applied, as it "...starts by collecting data to explore a phenomenon. Subsequently, themes are identified and patterns are explained, to generate a new view on or modify an existing theory, which is then tested through additional data collection" (Saunders et al., 2016, p.145). This approach is a combination of deduction, which "...starts with theory, often developed from reading of the academic literature, and designing a research strategy to test the theory" (Saunders et al., 2016, p.145) and the contrasting induction, which is "...collecting data to explore a phenomenon used to generate or build theory" (Saunders et al., 2016, p.145). For this study, in line with the abductive approach, first a literature review was conducted to get a good understanding and a comprehensive picture of the subject area (Bryman & Bell, 2015). The aim was then to explore, confirm and possibly extend the topics identified in existing theory by means of primary data collection. This was done in two steps: First, an online qualitative expert survey with open questions was carried out. The aim hereof was not only to confirm existing topics, but as well to generate unpredictable results that support the emergence of new insights. Following from this, semi-structured interviews were conducted, building upon the findings of the previous step, deepening the topics addressed. The results were then analysed and consolidated in conjunction with the literature to enrich the latter.

3.3 Methodological choice

In this study, qualitative data collection and analysis was applied to gain a better understanding on how digital transformation changes work design in contemporary societies combining two different methods. To predict the changes in work design owed to digital transformation, making first use of an online qualitative expert survey as suggested by other researchers (Grant & Parker, 2009) and subsequently of semi-structured interviews was highly suitable for this study. Both qualitative methods built upon open questions to allow for surprising results and give informants the leverage to provide unpredictable information to develop new theoretical insights.

The combination of two qualitative approaches had the advantage of triangulation. However, the results from the online qualitative expert survey could not entirely be seen as verified by the semi-structured interviews, because answers given by participants were equally subjective. Hence, the overall purpose was to use two independent sources of data within one study to get a broader picture, while deepening but also critically scrutinizing the findings to enhance their validity.

The order of qualitative data collection was chosen to generate a wide array of subject areas, which were then clarified and deepened conducting semi-structured interviews. Approaching the data collection the other way around would have had the benefit of first 'browsing' through changes in work design due to digital transformation that (a limited amount of) experts identify to be of great importance. Those already very specific insights could have then be verified by means of answers generated in the online qualitative expert survey through rather closed questions compared to a semi-structured interview. However, as this study aimed at broad results and to provide an overview, the online qualitative expert survey, covering a relatively large sample for a qualitative study, was conducted first.

3.4 Research strategy

Due to the approach of data collection described previously this study does not fit holistically into a pre-defined research strategy. In the first step of the primary data collection, the authors aimed to influence the participants as little as possible and therefore gave no indication about

possible changes in work design due to the digital transformation. Instead, participants of the online qualitative expert survey freely provided their perceptions and opinions on how digital transformation changes work design today. Many different changes were addressed, providing the researchers with a broad overview of related topics. In the second step, the insights gained were taken up and further discussed with other experts than those participating in the qualitative survey adding more depth making research results more tangible.

3.5 Time horizon

Since the objective of this study is to provide an up-to-date picture to a specific phenomenon at a specific point of time by means of providing an overview on how digital transformation is perceived to change work design in contemporary societies, a cross-sectional study was highly suitable also keeping the given the time frame of eight weeks for conducting the graduation project in mind (Saunders et al., 2016).

3.6 Data collection and analysis

This section provides an overview of the methods and procedures used for data collection and analysis, gives information about the sample as well as about the coding process used to analyse the data. Therewith, this section explains how the two primary data collection methods were used in combination to add depth to the data collected.

3.6.1 Method

To encompass a variety of viewpoints, the study sample consisted of experts in digital transformation located in Sweden, The Netherlands, and Germany from several different domains targeting different indicators of expertise.

Online qualitative expert survey

Initially, experts in the field of digital transformation were asked to fill in an online survey that used open questions, similar to an interview. The open questions enabled the generation of unexpected findings and gave the participants the opportunity to provide unforeseeable information supporting the emergence of new knowledge and ideas.

To identify who made up for a suitable candidate to fill in the qualitative survey, a comprehensive internet search at LinkedIn within the network of both researchers targeting indicators of expertise on digital transformation, such as positions or people involved in the advancement of digital transformations, was conducted. The focus was on individuals holding positions analyzing or advancing the digital transformation in companies or foundations. Additionally, authors, including researchers, of books, articles or dissertations in the field of digital transformation were targeted. However, one must acknowledge that other experts outside of the researchers' network may have been able to provide even better insights but would have been more difficult to reach in reverse. Consequently, the potential candidates contacted were biased by means of being part of the researchers network. Further, based on the same criteria as explained previously, the researchers also identified suitable candidates in their 'offline network' as well as in the network of well connected contacts to whom there is a personal relationship. This procedure can be described as 'snowball sampling', starting with a small sample that then grows across the network of the initial participants (Crossman, 2018). Consequently, a comprehensive amount of study participants was available, but at cost that it could not be ensured whether all of them truly suited the target group and make up for experts in digital transformation. However, since only contacts with whom a trustworthy, personal relation exists were asked to forward the online qualitative expert survey to appropriate persons in their network, it is assumed that the survey was shared selectively rather than randomly. Experts were invited to the survey via email.

Initially, 63 people were directly asked to participate in the online qualitative expert survey. Hereof, 20 experts were invited to participate in the survey via LinkedIn according to the criteria explained previously, and 43 people from the direct network of the researchers were contacted, making up for potential participants. Determining how many experts eventually participated in the survey from the respective channel is however challenging, as the survey was conducted anonymously and snowball sampling was used for further

distribution. Overall, 39 experts participated in the online qualitative expert survey, which corresponds to a participation rate of 62%. Research shows that the average response rate for external online surveys lays at 33% (Nulty, 2008), wherefore the participation rate for this study can be considered good, though it is caused by the distortion of the values from the snowball effect and the existing personal contact to many potential participants.

Semi-structured interviews

Following from the online qualitative expert survey, semi-structured interviews, in which the researchers had "a list of themes and key questions to be covered, although their use may vary from interview to interview" (Saunders et al., 2016, p.391) were conducted to clarify, verify, and add depth to the results. The semi-structured interviews further enhanced the transferability of the findings to apply them to other, similarly technologically developed countries that evidentially focus on digital competitive dynamics instead on yesterday's realities. Hence, countries in which organizations make an effort to develop a modular digital ecosystem, focus on increasing use of multisided-platforms and network effects, seek industry convergence, use information and data power to personalize and actively create, as well as seek agile, continuous improvement (Nagy, 2016) may benefit from study results, too.

To collect valuable data from different viewpoints, an interview with at least one expert from each contributing country was conducted. The interviews were audio-taped and transcribed to provide full insight on how the respective data has been collected. After the interviews were conducted, the respective transcript was sent to every interviewee with the request to confirm the accuracy of the data.

For the semi-structured interviews, only well-known persons from the direct network of the researchers who are considered suitable experts in the field of digital technologies based on their work tasks, experience and current projects were contacted. Nevertheless, one must acknowledge that this selection of experts was contingent upon subjectivity, wherefore one may argue that other experts would have possibly provided even more valuable insights. Five experts were approached, whereof three, respectively one from each country considered, agreed to participate. In order to generate spontaneous, impartial and honest answers, neither interview questions were sent to participants beforehand, nor were participants asked to fill in

the online qualitative expert survey. Details of the interviewees can be found in *table 1* below.

	Position/Criteria	**Type of organization**	**Expert from**	**Date of interview**	**Time of interview**	**Medium**	**Duration**
Expert 1	Growth Marketing Consultant; specialized in Digital Strategy	One-stop shop for cutting-edge commerce tools	Sweden	15.04.2019	08:30 AM	Skype	45:49 min
Expert 2	Director E-Commerce; involved in all growth projects regarding the advancement of Digital Strategy, Presentation to Senior Management on how digital technologies optimize internal processes	International Distributor and Wholesaler for cosmetics and liquor	The Netherlands	17.04.2019	07:00 AM	Skype	35:44 min
Expert 3	CEO of IT company, Chairman e-government network, Recent publication on digital technologies and its effects on communication	Broadband GmbH	Germany	17.04.2019	09:00 AM	Skype	40:52 min

Table 1: Details Interviewees

3.6.2 Sample

Overall, 42 experts, 39 of whom participated in the online expert survey, three of whom were interviewees, took part in the study. Around 80% of them were male with a mean age of 37 (SD = 9.99). In the online qualitative expert survey, 51% of the candidates were German, 31% Dutch, 3% Swedish, and 15% from other countries, though, employed in either Sweden (11%), Germany (55%) or The Netherlands (34%). Experts who were interviewed were from each of the three countries respectively. Most participants worked in the private sector (74%), some in research institutions (11%), others in the public sector (8%) or in different fields (7%). Sixty-one percent of participants reported occupying a leadership role (Upper, middle, lower management or CEO), leading an average of 21 employees (SD = 34.4). Thirty-nine percent of participants reported to be an employee. Confirming their expert status, 79% of

participants indicated that digital transformation significantly affects their current work, opting for a 4 or 5 on a scale from 1 (not at all) to 5 (a lot).

3.6.3 Procedure

Survey participants were informed that the survey dealt with changes in organizations/work resulting from digital transformation. Next to general questions dealing with demographic information, the main request for the participants was to name at least six specific changes (buzzwords) resulting from digital transformation for work design, and then to describe these changes in open-ended text fields. On average, written descriptions were about 66 words long. An overview of the survey questions can be found in Appendix B.

In the semi-structured interviews, participants were first asked to elaborate on their own definition of digital transformation, provide their opinion on whether digital transformation is important for today's businesses, as well as to state four general, to them most important changes resulting from digital transformation for work design. Further, they were asked to comment on the most frequently mentioned terms that evolved from the online qualitative expert survey, and to elaborate on the future of digital transformation and its effects on work design. Finally, participants were invited to describe digital transformation as an animal. This out of the box question aimed at testing how the interviewees are able to connect an abstract, very technical phenomenon with something tangible we know from everyday life. It was used to see how they translate the characteristics, attributes, qualities and weaknesses of an animal to digital transformation, and therewith gave the researchers a fairly clear idea of whether participants generally classify the effects digital transformation as rather positive or negative. The answer further provided a lot of information on the interviewees' worldview, creativity and ability to think critically. The interviews took on average 40 minutes and were held via Skype. For the detailed interview questions please refer to Appendix C.

3.6.4 Coding

The coding process for the online qualitative expert survey was done independently of the analysis of the semi-structured interview data to be able to compare results subsequently, to

identify overlapping dimensions, as well as to determine those left in the rear. For both qualitative methods a visual framework was developed that was subsequently used to establish links and contrasts between the two as well as with the reviewed literature and to extend the latter through newly gained insights.

For quoting purposes, participants in the online qualitative expert survey were labelled expert one to thirty-nine [E1 - E39], while in the semi-structured interviews participants were labelled expert forty to forty-two [E40 - E42]. Though both qualitative data collection methods provided different insights e.g. with regards to clarity and depth, the researchers of this study decided to refer to both participant groups in the same way, enabling the reader to quickly grasp the respective source of information.

Online qualitative expert survey

To synthesise the primary findings from the online qualitative expert survey open coding and 'summative content analysis' were used to establish code families and inherent codes (Hsieh & Shannon, 2005). Both researchers of this study first categorized the collected data independently of each other (Bengtsson, 2016; Rennstam & Wästerfors, 2018). Frequently cited topics were categorized into first-order codes and preliminary second-order categories by means of counting the answers and subsequently summarizing them into kindred groups (Bengtsson, 2016; Hsieh & Shannon, 2005). To achieve this, results were examined by means of keyword-scanning and subsequently interpreted and grouped into corresponding patterns with the aim to discover their underlying meaning. Nevertheless, one must acknowledge that the quality and length of answers varied greatly. While some answers comprised 120 words or more, others solely provided a few keywords. Moreover, some explanations were unclear and left plenty of room for interpretation, meaning that keywords without sufficient explanation were difficult to classify. They could be interpreted both positively and negatively, therefore possibly leading to biased conclusions not truly reflecting the participants' intended meaning. In case only buzzwords without explanations were given, the answers were counted but not taken into consideration for further interpretation.

The individual results of both coders were compared and discussed with the aim to limit their subjectivity in order to ensure that the resulting categories well reflect the gathered data (Burnard, 1991; Graneheim & Lundman, 2004). In this process, new categories were

constructed and existing ones further revised to combine the separate codings into one overall scheme leading to first-order codes, second-order codes and their respective overarching dimension. Residual differences among the coders were sorted out by discussion. The categorized topics were labelled with terms reflecting the underlying dimensions in the best possible way based on a combination of empirical data and occurrence in the literature as reviewed prior to the study, to be clearly distinguishable from each other (Bengtsson, 2016).

Semi-structured interviews

Synthesizing the insights evolving from the semi-structured interviews, a different approach for analysis was followed due to the richer nature of the data. Although open coding was used to establish code families and inherent codes, almost no priori and fewer emergent codes were established because the data was not analysed by means of categorizing frequently cited topics but according to the importance participants ascribed to it. Hence, depending on whether participants mentioned phrases like “this is particularly important to me...” or “I would like to lend weight to...” in line with the duration (presumably the longer one talks about a particular subject the more important it is) on how long they talked about a particular subject, the researchers clustered topics into first-order and second-order codes according to their own judgements. To ensure that the data was presented as accurately as possible and to limit its subjectivity, both researchers of this study first went through the collected data independently of each other (Bengtsson, 2016; Rennstam & Wästerfors, 2018) and subsequently discussed the individual results. To ensure that the resulting categories well reflect the gathered data (Burnard, 1991; Graneheim & Lundman, 2004), the established order of importance of topics was then sent by email to study participants for them to confirm it. Subsequently, new categories were constructed and existing ones further revised to finally combine the separate codes into one overall scheme leading to overarching dimensions.

3.7 Research ethics

Ethics were considered from the initial stages of planning of the research project throughout its lifecycle, particularly as it includes primary research components like semi-structured interviews. The aim of the researchers was to maximise the benefits of the research while at

the same time minimizing any harm or risk for participants (Halej, 2017). The latter was given appropriate information about the purpose, methods and intended uses of the research, and what their participation entails including the fact that they can refuse to participate in the research, without any reasoning. Also, they were educated about the amount of time the data will be stored and how it will be treated. Furthermore, the research results were made available to the participants (Halej, 2017). Hence, neither the participation in the study itself nor the conclusions drawn from the data should cause any harm, discomfort or stress to the participants (Koskei & Simiyu, 2015). After all, integrity is an important topic by means of keeping agreements made and acting truthful while respecting the law (Saunders et al., 2016). Consequently, informed consent was reached through an open and sincere exchange with all participants before the start of data collection. In addition, the participants of the semi-structured interviews had the choice of whether their data should be anonymised or not to protect their identity. All primary data collected was and still is therefore treated highly confidential and not shared with third parties (Allmark et al., 2009; Halej, 2017).

3.7.1 Research credibility

Unlike quantitative research, qualitative research handles nonnumeric information and their interpretation, depending on human senses and subjectivity (Leung, 2015). Thus, the selection of sources, interview questions and the method(s) of data evaluation are related to the general trustworthiness and credibility of the research. Accordingly, "...every step of the research logistics has to be validated if it is transparent or consistent enough. In this manner, both the research process and results can be assured of high rigor and robustness" (Leung, 2015). To ensure the credibility of a qualitative study, Noble & Smith (2015) identified several strategies, researchers can adapt, which were followed throughout this research project:

1. Accounting for personal biases which may have influenced findings: As the researchers of this study see the effects of digital transformation rather positive, controversial literature is actively sought to promote awareness;

2. Ongoing critical reflection of methods to ensure sufficient depth and relevance of data collection and analysis: The researchers of this study used the advantage of working in

pairs to continuously discuss various issues in order to optimize the methods and thus the overall result;

3. Demonstrating clarity in terms of thought processes during data analysis and subsequent interpretations: The data analysis was performed individually and independently by each researcher and subsequently discussed in the team as well as reviewed several times by supervisor and examiner;
4. Respondent validation/member checking: includes inviting participants to comment on the interview transcript and whether the final themes and concepts created adequately reflect the phenomena being investigated: The transcripts of the semi-structured interviews were shared with the participants, feedback was obtained and incorporated, before the findings were analysed;
5. Data triangulation, whereby different methods and perspectives help produce a more comprehensive set of findings: In this study, an online qualitative expert survey was conducted, followed by semi-structured interviews;

4. Empirical findings

This chapter presents the research results of this study conducted to establish an up-to-date overview in the form of an overarching framework on how digital transformation changes work design in contemporary societies.

4.1 Online qualitative expert survey

From the experts' answers regarding how digital transformation changes work design today, nine overarching dimensions were identified: Increased technologization, changes in work-life setup, higher job demands, increased competency requirements, changes in communication and collaboration, sharing economy/networked society, increased influence, structural changes and changes in performance measurement. *Figure 2* on the next two pages summarizes the coding process as described previously for all changes in work design owed to digital transformation identified in the online qualitative expert survey. Following from the visual representation, please find a description of each of the change dimensions in the order of the overall frequency with which they were mentioned. Quotes from experts are numbered E1 to E39 respectively and displayed accordingly.

Outcomes coding process / coding trees: Online qualitative expert survey

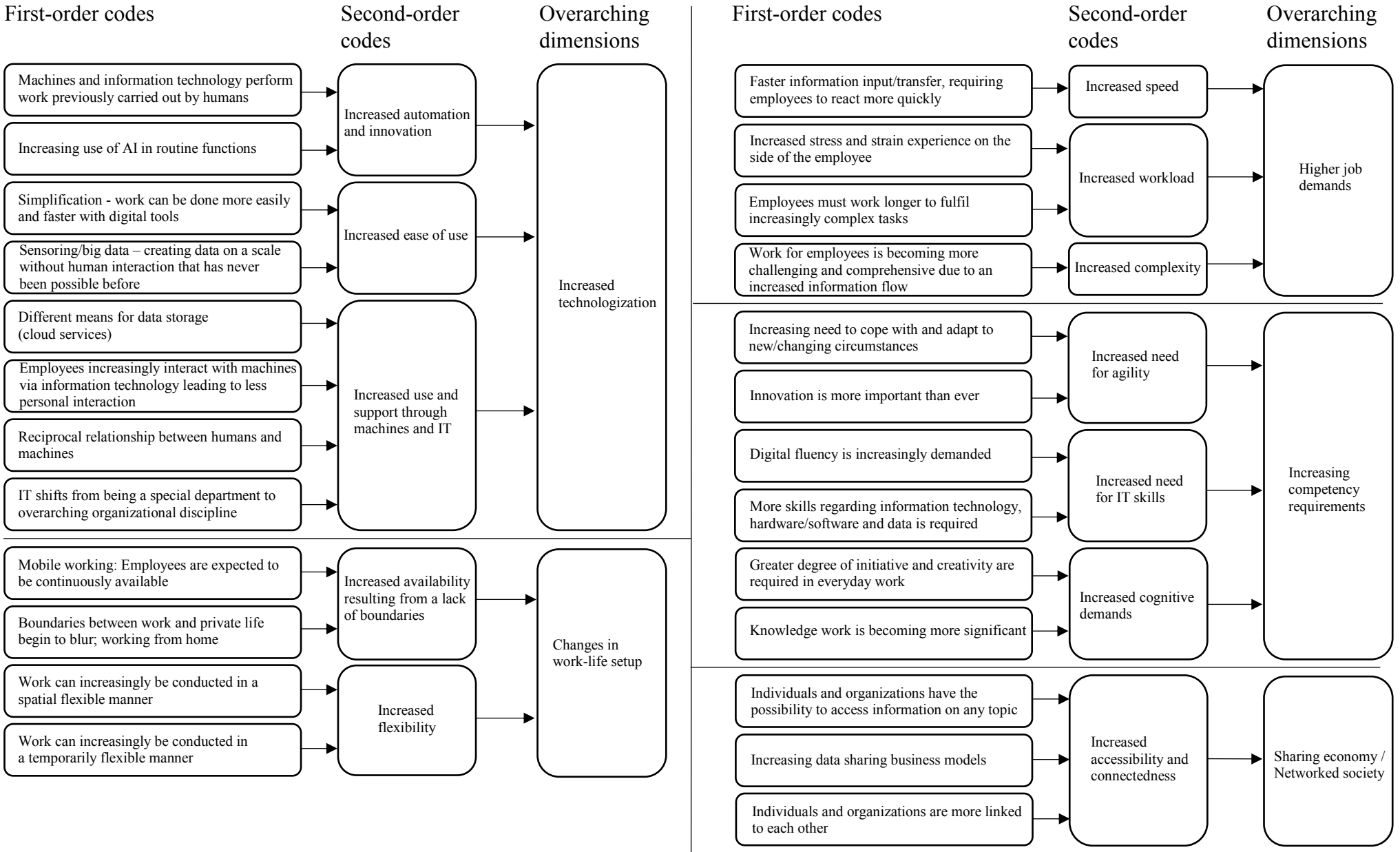


Figure 2: Coding trees: Online qualitative expert survey (1/2)

Outcomes coding process / coding trees: Online qualitative expert survey

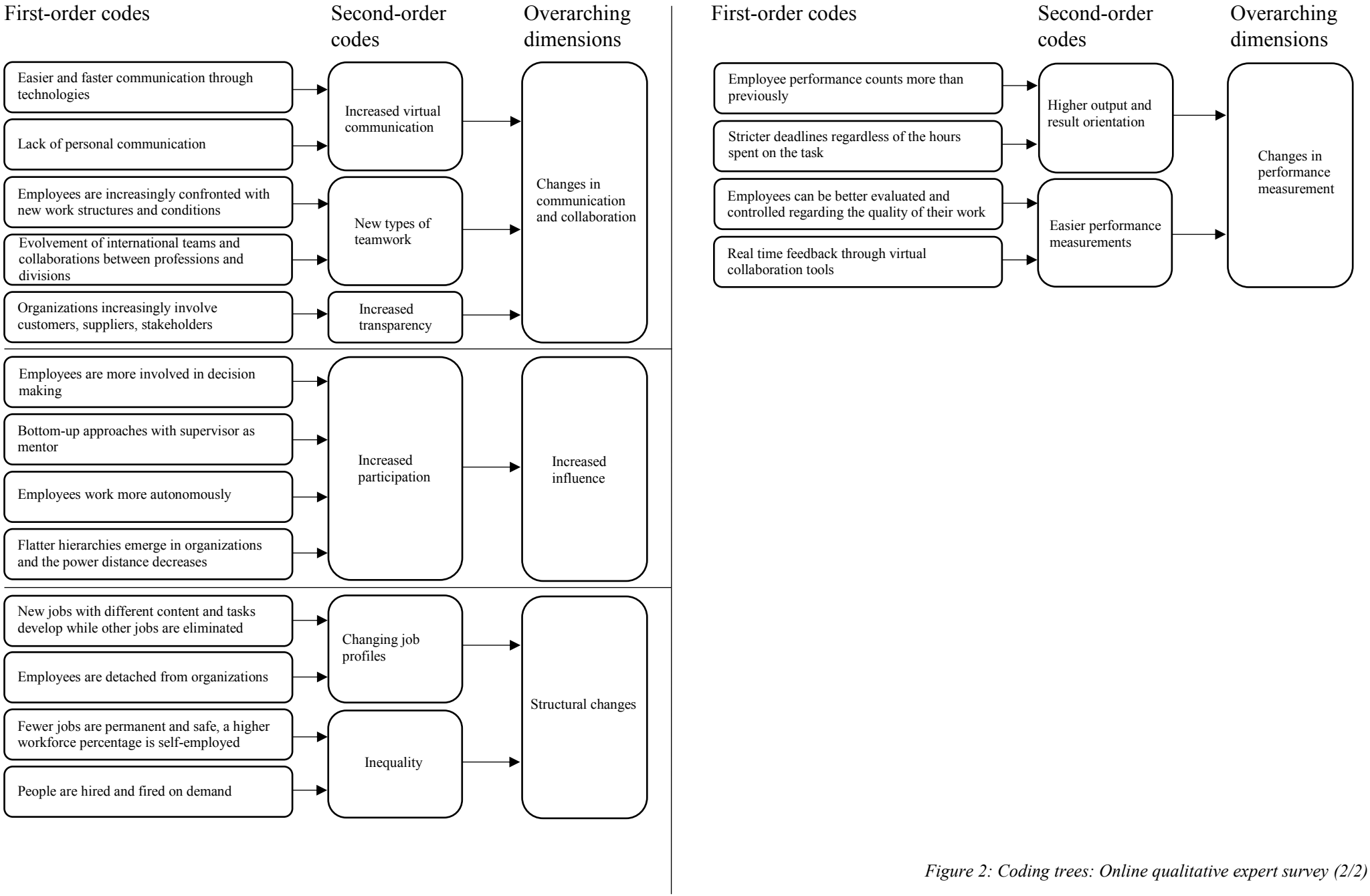


Figure 2: Coding trees: Online qualitative expert survey (2/2)

Increased technologization (59 mentions)

Today, information technology does not only change work location and time, but also how one works. Employees are increasingly able to do their work more easily and faster with the help of digital tools, of machines and information technologies. Big data and the visualization thereof may support in controlling processes "on a scale without human interaction that has never been possible before" [E29]. Data is more and more centrally stored in the cloud, making it "available everywhere due to systems running on smartphones and mobile devices" [E26], which in turn allows for more collaboration.

Nevertheless, employees are not only supported but replaced by technology and Artificial Intelligence, especially in repetitive, low-cognitive, and administrative tasks; yet, this may also affect social, more complex domains as work continues to be automated: "Due to digitalization and automation in many areas, less jobs are required. In turn however, while jobs are lost to automation, this creates new jobs in other areas, enabling companies that use automation to focus its staff on less tedious tasks to develop new business opportunities" [E12] "...hence, to gain additional benefits from it" [E10]. Automation is often used to make processes more efficient and scalable, to reduce or eliminate human failure, and to foster innovation. "It makes test results more comparable and enables a constant quality by keep the added delta in good shape" [E4]. "It allows for shorter innovation cycles" [E10]. "Some jobs will be better solved by intelligent systems than they could ever be by humans" [E2]. However, following from this, "employees increasingly interact with machines and develop a reciprocal relationship with them, which in turn decreases personal interaction between employees" [E30] "...leaving only management-by-exception for human interaction" [E29].

Changes in work-life setup (35 mentions)

Experts identified that digital transformation increasingly changes the relation between work and private life. Today, work is no longer defined by working hours from 8am to 5pm. Rather, it takes place around the clock: "People just like systems need to be available at all times. Colleagues expect immediate responses - this puts a strain on people" [E17]. Continuous availability demands in turn often results in overwork, distraction and/or stress: "It becomes harder to keep focussed [...] there are extreme demands on time and attention all

the time, there is no escape to find calm and focus" [E1]. "Activities are kept running 24/7, there's a lot of pressure to be available all the time - we need to be 'always-on'" [E26]. "Stress is potentially caused by an overflow of information opening up for an overwhelmingly large range of possibilities and options" [E8]. As a result of increased temporal flexibility employees often find themselves finishing important projects on weekends, or in the evenings, outside regular working hours - office hours simply lose their importance.

Also, information technologies allow for greater spatial flexibility of employees: "People are not just available via phone or email; mobile internet, new media and messaging platforms like WhatsApp bring less bound to the regular workplace" [E10]. Working from home become more attractive and common because households are increasingly equipped with modern communication technologies [E26]. "Generally, it is not necessary to work at a certain place anymore. You can be wherever you want, which has the advantage of flexibility" [E18].

Overall, the foregoing factors seem to lead to a blur of boundaries between work and private life - "the personal becomes public, boundaries between professional and private life and between the person and the public become more fluid and bendable" [E1]; "work and private life mingle, which has both advantages and disadvantages" [E3].

Higher job demands (28 mentions)

Experts believed that digital transformation changes the demands that work poses on employees. Because digital work is often characterized by increased speed, thus increasing time pressure, employees are required to react more quickly and to make decisions fast: "Information are shared at a fast-pace" [E32], "Employees need to be able to change with their environment, develop and make decisions faster than ever before" [E30]. In line with this, innovations today spread rapidly, wherefore time to market becomes more relevant. Organizations need speedy times to market; otherwise, they the competition leaves them in the rear with already saturated markets - "that puts pressure on employees" [E34].

Additionally, employees today often must work longer and more to fulfill increasingly complex tasks. Further, the individuals workload is likely to increase due to the amount of information and data available and the frequency of decisions demanded. Therefore, not

losing track becomes a central challenge, which in turn poses tremendous stress on employees: “Everything has to happen immediately, everything turns into a crisis if one doesn't react at once” [E1]. “Due to digital communication channels the amount of available information increases continuously, which forces employees to maintain an efficient working method avoiding to get distracted by less important tasks” [E39].

Moreover, due to the rapidly changing environment in which organizations operate, workplaces change and employees must adapt accordingly. The latter face the “challenge to continuously adapt to new ways of working” [E4]. This ultimately leads to the challenge of staying ahead of the competition, again exposing employees to enormous stress.

Increased competency requirements (20 mentions)

In addition to increased job demands, also competency requirements are assumed to increase. Experts particularly pointed out that employees need to be increasingly agile in today’s competitive landscape. Digital transformation leads to more dynamic markets wherein competitors continuously emerge and innovation is more important than ever, wherefore employees need to be increasingly able “to detect, cope with and adapt to new and changing circumstances” [E15]. While the business one is working for may ask for ‘A’ today, it may tomorrow very well be asking for ‘B’, wherefore employees need to “constantly adapt their way of working to what the business is asking for” [E5].

Similarly, IT competencies might be more important than ever. Almost all jobs today require basic computer knowledge; yet, IT-related knowledge becomes a crucial prerequisite: “IT is no longer a special discipline or department but a hybrid component of all (!) business processes and tasks” [E22]; “Employees need to be digitally fluid and have a digital mindset” [E20]. Further, employees might face increased cognitive demands to solve tasks as a result of routine tasks in particular being taken over by machines: “Employees are increasingly involved in cognitive demanding work sessions” [E8], which may in turn be “related to more stress but as well to having the feeling of creating value/contributing more intensely” [E38]; “Knowledge workers will be relieved from routine tasks while the percentage of tasks that require a high degree of initiative and creativity that constitute high value increases” [E7].

Changes in communication and collaboration (20 mentions)

Digital transformation changes employee's collaboration and communication - with each other, as well as with stakeholders. Experts expect virtual communication to increase and in turn personal communication to decrease, often due to the ease of use and speed that digital technologies provide. While teamwork in general is expected to increase, especially collaborations between employees from different professions and divisions to foster innovation will become more common: "Through digital technologies, open, communicative interaction between employees increasingly gains importance because it is believed to increase the innovativeness of an organization" [E15]. Global teams in particular will work increasingly together in virtual modes via teleconference meetings and mobile work platforms [E26] while dynamic and project-based teams will become more common. Hence, new types of team work are expected to evolve while communication via new media and across interfaces will increase: "Knowledge as key resource is increasingly developed and advanced together, wherefore collaboration and teamwork in new structures and through new conditions are on the rise" [E15]; "Digital technologies allow for remote collaboration in distributed teams" [E7] and for "easier and faster communication" [E27], while "new collaboration tools allow for easy messaging, team channels and meetings" [E34], so that "teamwork is increasing" [E15] and "people use the web as main medium to connect with each other" [E23].

Additionally, experts have pointed out that also the interaction with customers, suppliers and stakeholders is changing, involving them more than ever in business processes by means of transparency: "Increasingly, business communicate with customers and suppliers to increase efficiency" [E3]; "We send notifications to our customers in every step of the process to guarantee maximum transparency. That's something new, only possible through digital media - and it also requires more people skills" [E23]. Generally, "the growing interconnectedness of system requires more communication across interfaces" [E38].

Sharing economy/networked society (20 mentions)

Digitalization provides organizations and individuals with "easy access to data, knowledge and information on any topic" [E13]. This in turn does not only let the consumer become

more powerful putting organizational members under pressure to perform better than the competition regardless of the information available, but also urges the individual to perform even better. Information and access to more general data is not as powerful as it used to be; "knowledge is widely available" [E23], we have "fast access from anywhere" [E35]. The high availability and access of data in turn "links everyone to everyone and reduces distances between individuals tremendously" [E1]. Data connectivity challenges and disrupts existing business models, new business models evolve (Uber, AirBnB, etc.) [E20], reinventing and therefore changing existing jobs as digital technologies are used. Further, "big data is expected to dynamically increase over time providing the chance and necessity to use the latter to add value to business processes, models and the conditions under which employees work" [E22]. Open-source platforms as data-sharing businesses models are on the rise, and competition is increasing through internationalization.

Increased influence (8 mentions)

According to experts, employees also gain more influence at work as a result of digital transformation. Following from digital tools, employees increasingly participate in organizational decision making: "Organizations more and more follow a bottom-up approach in which the manager steps out of the classic supervisory into a mentoring role, allowing for more collaboration and input" [E22]. Employees often even demand to be involved in decision making processes: "Even lower-level employees want to be involved today" [E15]. In line with this, experts anticipate employees to experience increased autonomy as a result of digital transformation, with a greater leeway to make decisions: "Previous control activities are left in the rear. Employees increasingly take responsibility and ownership for their work and focus on high quality contributions" [E8]. In line with this, organizations become more agile, focusing on flat hierarchies, experiencing a decrease in power distance between organizational levels, which is mainly facilitated through increasing information density and transparency owed to information technologies: "Organizations become more agile, they introduce frameworks like scrum to integrate people from all hierarchical levels into decision-making processes" [E15]. "Since it is easier to present, spread and share information, everyone can and wants to be involved now" [E17]; "Data and information transparency connects people across all organizational levels" [E33]. Hence, contact persons

for specific topics in an organization are more easy to find, direct contact and decision-making is possible without the involvement of managers and information and knowledge becomes more visible - knowledge is not a status characteristic anymore.

Structural changes (8 mentions)

Digital transformation further changes existing job profiles while it lets new jobs emerge: "New jobs are created, existing jobs are changing and old ones will disappear completely" [E12]. "Accounting software renders the typical accountant position void, intelligent tax softwares replaces tax advisors and skilled workers in factories carry out less diverse tasks on a greater number of machines. Employees turn into problem solvers who fix malfunctions in cooperation with machines instead of working solely on their own" [E22]. "Because standardized tasks are often taken over or at least partly replaced by machines, jobs which demand creativity, people skills and the willingness to operate transparently evolve" [E18]. In line with this, new technologies lead to new specializations and job profiles: "Blogging, online marketing, social media work, app development and influencing jobs gain more and more importance" [E38]. Also, because work is carried out in shorter cycles than ever, fewer jobs are permanent and safe, people are hired (and fired) on demand - inequality is on the rise. This in turn leads to "uberization turning everyone into an entrepreneur" [E1], leading to a higher workforce percentage that is self-employed on demand. "Freelancers, software developers, and one-man-enterprises that offer their services to a variety of clients, and workers that are not permanently attached to one organization anymore, people are less socially embedded in organizations" [E39] - the erstwhile considered stable and meaningful character of organizations fades out.

Changes in performance measurements (6 mentions)

Experts pointed out that digitalization changes performance measurement by means of expecting higher outputs and results from employees than ever when evaluating their performance. Today's work is much less about how present one is at the workplace and even more so about what one delivers: "More and more companies work according to the principle 'I don't really care where and when you do your work as long as you achieve the results we

agreed upon in time'" [E38]. "Result-oriented jobs are on the rise. Employees are often not only expected to perform, but outperform the rest" [E6]. This phenomenon is associated with higher performance transparency - employees can be measured more easily through virtual collaboration tools, they often receive "immediate, real-time feedback" [E13]. Through technology, "results are more comparable enabling companies to strive for constant quality" [E4]. If one does not deliver, one is quickly replaced by someone better performing. This in turn certainly "raises the individually perceived pressure to deliver/perform; we're constantly exposed to stressors" [E18].

4.2 Semi-structured expert interviews

From the experts' answers on how digital transformation changes work design today, five overarching dimensions were identified: Increased technologization, changes in work-life setup, higher/changing job demands, changes in communication and collaboration and leadership. *Figure 3* on the next page summarizes the coding process for all changes identified in work design resulting from digital transformation in the semi-structured interviews that were conducted for this study. Depending on their perceived importance according to participants' statements like "this is particularly important to me..." or "I would like to lend weight to..." in line with the duration on how long they talked about a particular subject, a description of each of them can be found after the visualization. Quotes from experts are numbered E40 to E42 respectively and displayed accordingly.

Outcomes coding process / coding trees: Semi-structured interviews

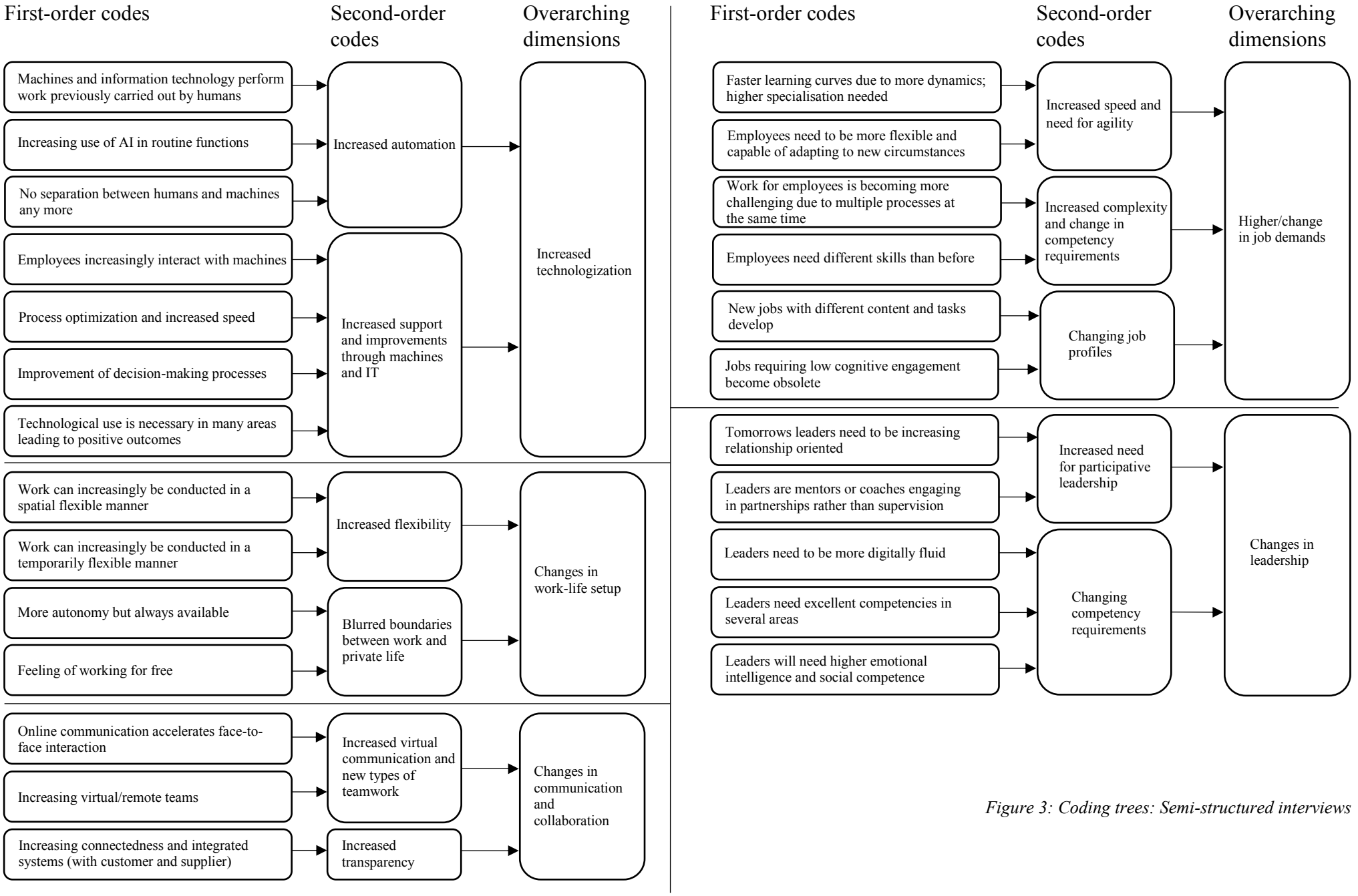


Figure 3: Coding trees: Semi-structured interviews

Increased technologization

Most evidently, all interviewees view digital transformation and its related changes in work (design) in a very positive light: “I see more the upsides than the downsides of digital transformation, I think” [E40]; “The effects of digital transformation are overall very good, a facilitation.” [E42]. Experts perceive changes that result from digital transformation in many areas as necessary and inevitable: “Companies should join the digital transformation because if you're not doing it you are going to be out of business; being an agile, digitally fluid organization is of utmost importance to stay ahead in the competitive game nowadays” [E41]; “If you completely ignore digitalization don’t adjust your processes and ways of working accordingly, you will be very soon pretty much behind the rest of the world” [E42]; “We only see the tip of the iceberg currently, we cannot imagine what is going to happen in the future - better let your organization evolve in line with technological developments, otherwise you’ll soon have a problem” [E40].

All experts similarly address the topic of automation. Though, they merely discuss its positive aspects: “We are automating a lot of manual work and are now able to adjust processes anytime, anywhere. Through new technology, we’re much more efficient than we used to be. It is my personal and our organizational goal that all repetitive work is automated. We can then use the freed human potential for developments that require a real brain” [E41]. “The jobs that are left over require aggregation and evaluation of knowledge” [E42]. “Because several tasks are automated today, employees don’t need to work from 9 to 5 anymore. They can often flexibly chose themselves when and how long to work, as long as the previously agreed upon result is achieved. Processes are optimized in such a way that the speed is massively increased and failures are kept to a minimum - technology has significantly improved our lives in several areas and will continue to do so” [E40]. Nevertheless, though the increased use of Robotics, machines and AI supports business operations in several areas, experts also see its risks: “Humans and machines are not separated anymore, employees directly interact with technical accessories. This in turn has the danger of overwhelming demands on humans - employees simply need to cope with very different challenges. Therefore, it’s important that human beings are still valued as important individuals in the process of work continuing to be automated” [E42].

Big data and its usage as such is another topic experts addressed in the interviews: “For me, it starts with accessibility. Digital transformation creates more opportunities for data storage and access to information. Everything can now be done online in the cloud” [E40], resulting in more transparency and collaboration.

Changes in work-life setup

Experts identified that digital transformation increasingly blurs the lines between work and private life. Work is no longer defined by regular working hours but takes place around the clock, which decreases the flexibility of private life that new home office arrangements usually facilitate: “Often, I have the feeling to work for free because my organization expects me to be constantly available. Weekend? I’m available. Holidays? Though less so, I’m available. Family celebration? I’m available. Sometimes, I have the feeling that I cannot breathe anymore. I feel stressed, distracted, don’t know what to focus on anymore, and I am certainly not the only one who feels like that. Though I am free to work from wherever I want, the continuous availability that is demanded from me in turn is exhausting” [E41].

Accordingly, employees are increasingly spatial flexible: “Generally, digital transformation facilitates a great-work life balance. Employees can work from wherever - almost whenever. They are more flexible than ever, which allows them to spend time with their spouse” [E42]; “I love working from home because it provides me with the benefit of having time for my kids when they need me. I can get my work done when they are sleeping - and I mean we know that some people are more efficient in the night than during the day. Also, people are more motivated when they are able to work when they want” [E40].

Nevertheless, increasingly existing home office and freelance arrangements bear the costs of experiencing organizational culture and frequent personal interaction: “We might think people who work from home may actually be much happier. But I am not too sure about that, because they miss out on the organizational culture that is usually created; There’s a lot you can do from home, but not everything. And I personally think that the human factor, the interaction, is important” [E40]. However, today’s organizations often even incentivize employees that are willing to work remotely or attract them by means of offering flexible work arrangements: “Big offices are huge costs for organizations. Therefore, more and more business look for co-working spaces and incentivize those that are willing to work from

elsewhere, often on a per hour basis. They tempt employees by promising increased flexibility and autonomy, but really all they want is to save costs" [E41]; "I think that today's employees demand flexibility and are decisive in whether they accept a job or not - depending on whether the company offers the option to work from home" [E42]. Hence, again, experts describe the positive and negative aspects of changes in work-life setups owed to digital transformation.

Changing/increasing job demands and competency requirements

The interviewees discussed that digital transformation changes the demands and requirements that work poses on employees. Because digital work is often characterized by high speed and increasing time pressure, employees are required to react more quickly and to make decisions fast: "Today's speed of change is really fast. We work in fast-paced environments in which no day is like the other. Employees need to be able to adapt and react to change and new situations quickly. They need to be able to work under pressure. And not everyone is comfortable in doing that" [E42].

Further, work is not only believed to become faster but also more complex: "Employees do not work linear anymore. Instead they need to be able focus on multiple processes at the same time, to make priorities, but still to achieve the objectives set prior to start in all given areas. That may cause a high amount of stress for some among us" [E41].

Moreover, because people increasingly interact with machines, self-learning is on the rise while jobs that are not automated require a higher level of specialization: "I do sometimes think, that we need more intelligent people than ever because of the tremendous pressure that digital transformation poses on today's work practices. Only if your smart, can keep up with and adapt to the latest developments while using your brain to drive the organization - in time - forward, you will survive" [E40]. Hence, the work that remains requires "higher social intelligence and competence, high emotional intelligence and the ability to interact on a personal level with humans - something, that the new generation is not used to anymore because everything is happening online" [E42]; "We need employees that are more digital advanced. People that know how to deal with systems. Today's jobs really require a totally different skill-set than jobs did 20 years ago" [E41].

Changes in communication and collaboration

Digital transformation changes collaboration and communication, whereof experts particularly elaborate on changes in communication with stakeholders, customers and suppliers. Although all experts expect virtual communication to increase, opinions diverge on whether personal communication will be held true in the future: “Companies today are able to create completely remote teams across time-zones due to digital technologies. Nevertheless, I see online communication as a way to accelerate face-to-face or direct interaction but not as a way to replace it. People will always seek the personal contact to other humans, that’s what characterizes us” [E40]; Contrary, another expert argues, “we can already see interaction changing nowadays. We increasingly communicate virtually, send whatsapp messages rather than that we call someone, we engage in virtual conversations somehow fleeing from the person that actually sits across us. We want to connected with everyone at the same time. And that’s the same at the workplace. Customers increasingly communicate with bots if they have an inquiry. I believe that the human-machine interaction will accelerate rapidly, let’s see what implications that has with personal communication...” [E42].

All experts unanimously pointed out that the interaction with customers, suppliers and stakeholders is changing, involving them more than ever, making business processes as transparent as possible: “Integrating systems are evolving, the customer somehow becomes part of the organization and is involved in all steps, from order to delivery and everything in between” [E42]; “Communication becomes more transparent in general, with all parties involved, also among each other. Everyone now has access to all the data” [E41]. Finally, experts did not point out in particular, that teamwork and/or collaboration in general is increasing due to digital transformation: “I don’t even need to mention that we are all connected more than ever. We share, like, comment, are available. That’s nothing new, it might only become even more” [E41]; “For me digital transformation basically is the online way of communication and everything that falls beneath it” [E40].

Changes in leadership

Though not explicitly asked for, experts pointed out that digital transformation does not only change the way we work but as well several dimensions in leadership: “Leadership will

change dramatically and become even more important, just in a different way than it used to" [E42]. In particular, experts found that tomorrow's leaders will increasingly need to be relationship oriented. This is reflected by engaging in a more mentoring, coaching partnership with their employees instead of supervising in the traditional way, providing adequate resources, empathically reacting in diverse situations and developing employees through feedback: "Because employees are more and more encouraged to solve tasks on their own, leaders will only need to intervene in conflict situations in a coaching manner" [E41]. Similarly, experts discussed that following from increasing technologization which reduces social embeddedness, leaders will need to "invest in personal relationships inter alia to be able to organize competencies for a given task in the most efficient way" [E41].

Moreover, competency requirements for leaders are expected to change drastically, too: "Just like employees, leaders will need more IT competencies to stay ahead of the game. Next to that, higher emotional intelligence and social competence are required, especially when leading dynamically changing self-organized teams" [E42]. "I also believe that leaders who are really really good at several things will succeed, because the risk of being replaced by a machine is far smaller - machines are often only good at replacing one thing perfectly" [E40].

4.2.1 Digital transformation as an animal

The conclusive question in the semi-structured interviews was "If you had to describe digital transformation as an animal, what animal would it be?".

Two out of three participants came up with a butterfly: "Digital transformation develops just like a butterfly, exponentially. It stays for a long time as a larva but then quickly emerges from its chrysalis and after a while disappears again to settle down elsewhere, just like when new technology takes over. A butterfly is a beautiful animal, and because I mainly believe in the positive changes in work design owed to digital transformation it suits it very well. It is a useful animal that is needed in many place but that may, if breeded to much, cause some harm or is just less useful. And that again is comparable with digital technologies and robots that can diminish child labor significantly, which is something very positive; and sometimes, increasing technologization can lead to jobs becoming obsolete, though they are needed to feed a family" [E42]. "I would say a butterfly.

Because they undergo four or five different stages in their life. They come as an egg, become a caterpillar, or larva and then become a chrysalis being able to fly. And I think digital transformation is pretty much the same. It started with the discovery of the Internet that was pretty much useless 50 years ago. No one really figured out how to use it. But then in the 90s, someone figured that it can connect people. And that was in an early stage, comparable to a caterpillar: A big computer and very slow internet. Only a small fraction of the population had access to it, it wasn't really visible. There's something there but you don't really know what it is or what you can do with it, comparable to the caterpillar. You do know it might become something - but you don't really know what it's gonna look like yet. And today, we are in the chrysalis stage of digital transformation, where people spread their wings and become digital artist or natives. But some companies are of course still in the larva stage, they are still sleeping. And the next stage would be full blown digital where more than 90% of the world is online, where actual butterflies make their way around. And that may very well happen in the next 10 to 20 years in my opinion. When everybody is ready, everyone is embracing it, digital transformation will be a beautiful things. A butterfly, a beautiful animal that can be ugly at some stages" [E40].

The other expert came up with a five-headed dragon as complement for digital transformation: "I think it's a five-headed dragon, which you can feed. It can be very dangerous. But if you treat it well, it can be your friend, protect and enable you to reach new spheres. And that's just like digital transformation, which can be dangerous, if you think for example of privacy issues, but which can at the same time be an enabler. Of course you need to treat it well. If you don't treat it well, or ignore it, it will die. Or it will break out and become dangerous. But it can protect you if you feed it, pet it and provide me with new business opportunities and new areas, because it's so strong that it can basically beat everyone else" [E41].

5. Discussion

The following section discusses the empirical data collected in conjunction with the literature reviewed prior to the study as well as analyses concepts, ideas and findings that seemed most interesting to the researchers with regard to the research question.

5.1 Digital transformation and its effects on work design: A positive phenomenon?

Despite possible negative effects resulting from digital transformation in work design like increasing availability demands causing overwork and stress or blurring boundaries between work and private life causing personal relationships to fall behind, overall, most experts surveyed and interviewed for this study seemed to believe that the positive effects of digital transformation for work design outweigh the negative ones. Presumably, this is caused by an interplay of several factors:

First of all, many of us prefer simple digital solutions that solve our traditional problems and provide us with a positive experience, meaning that we adapt and are receptive of newly evolving business models such as Netflix, Uber or AirBnB. Consequently, one may conclude that contemporary societies expect similar positive digital experiences no matter with whom or where they engage - in private life or at work. Organizations must therefore exploit the traditional experience of their employees, customers or suppliers into a positive digital experience that meets newly established expectations (Baxendale, 2019). Hence, today's society conveys an all-pervasive, positive image of digital technologies and its versatile use that one can hardly escape from, often depicted as if one can either accept and celebrate it, or one is out of the game (Baxendale, 2019). It may be assumable that study participants similarly have either not experienced its negative implications first hand, or are not given a chance to critically review the negative effects of digital transformation on their work and operating principles. That might be, because digital transformation as a journey will continue to endure, wherefore the majorities of organizations today focuses on a positive

display of its effects mainly employing workers that are digitally fluid already or strive to become the latter (Colbert et al., 2016) to achieve competitive advantage.

Further, from the average age of study participants (37 years) it is possible to assume that most of them belong to Generation Y (Millennials), who are said to be more connected to technology than any previous generation (Au-Yong-Oliveira et al., 2018). Millennials use technology in a respect that it influences the way companies do business and deliver services and communities find members and build identities (Au-Yong-Oliveira et al., 2018), wherefore study participants may see the positive aspects of digital transformation in particular. In line with this, currently the most ubiquitous threat that evolves from digital transformation is jobs becoming obsolete due to increasing automation resulting in no need for human workers anymore (Sirola & Pitesa, 2017). However, study participants mainly perform cognitive work in offices requiring the ability to think for oneself, wherefore they likely perceive automation as less threatening than a production site worker would. Also, one can assume according to their age that many study participants have children, appreciating and making use of the spatial and temporal flexibility without core hours and increasing home-office arrangements, which is again an important factor in how the changes in work design owed to digital transformation are perceived.

Finally, especially the experts that were interviewed may have been rather reluctant to name negative aspects resulting from digital transformation for their work owed to the increasing expectations of employers that employees are digitally fluent and feel at home at a digital workplace. Although presumably people are generally often more willing to share their knowledge on negative than on positive things (Tugend, 2012), elaborating on negative effects or changes from digital transformation would have possibly unconsciously given them the feeling of not fitting into the contemporary workplace.

Following from this, one must again acknowledge the subjectivity of this study. Other, in particular older participants with different occupations may have provided a more nuanced, likely more negative view on how digital transformation changes work design today. Nevertheless, because future generations will increasingly grow up with digital technologies and very likely feel naturally at home at the digital workplace (Baxendale, 2019), this rather positive view on the effects of digital transformation on work and its design may be valid for the contemporary society overall already today. This is supported by the fact that a study conducted by Harvard Business Review (2016) revealed that 98% of digital

leaders and 70% of followers in Europe expect their organization to achieve positive business outcomes as a result of its use of digital technologies in the next two years.

5.2 Similarities and differences between literature and empirical findings

Following from the primary data collection, it is interesting to examine the extent to which the findings coincide with the literature considered for this study and where differences occur. Overall, the data collected in the context of this thesis largely overlaps with the reviewed literature, partly more (e.g. 'Flexible work arrangements') and partly less (e.g. 'Virtual teams') apart from 'Changes in performance measurement', which evolved as a new change dimension.

Figure 4 below summarizes the change dimensions in work design owed to digital transformation as represented in the literature and the empirical data respectively. Change dimensions most frequently emerging in the literature are named accordingly and depicted in ascending order from left to right, evolving as red circles. Underneath, the blue circles represent the findings from both the online qualitative expert survey and the semi-structured interviews. The size of the circles was determined in two successive steps: First exclusively the countings of the qualitative online expert survey were considered. Subsequently, the size of the circles was revised and adapted based on the importance of the topics discussed in the semi-structured interviews as explained in *section 3.6.4*. The line 'related dimensions' describes which overarching dimension evolving from the primary data relates to the overarching dimensions as defined in the reviewed literature as shown in the first line of the entire table. Generally and applicable for both literature as well as primary data, the larger the circle, the more intensely the topic was discussed. The first category 'Performance measurement' evolved as a new change dimension in the empirical findings, wherefore no circle is drawn in the column for the literature reviewed prior to the study. For clarification, two examples are given: 1) Column 'Automation': The reviewed literature addresses the topic, but not very extensively. Contrary, in the empirical data it is the second most discussed topic. 2) Column 'Virtual teams': The reviewed literature deals very intensively with the topic, while it was only briefly mentioned in the primary data collection.

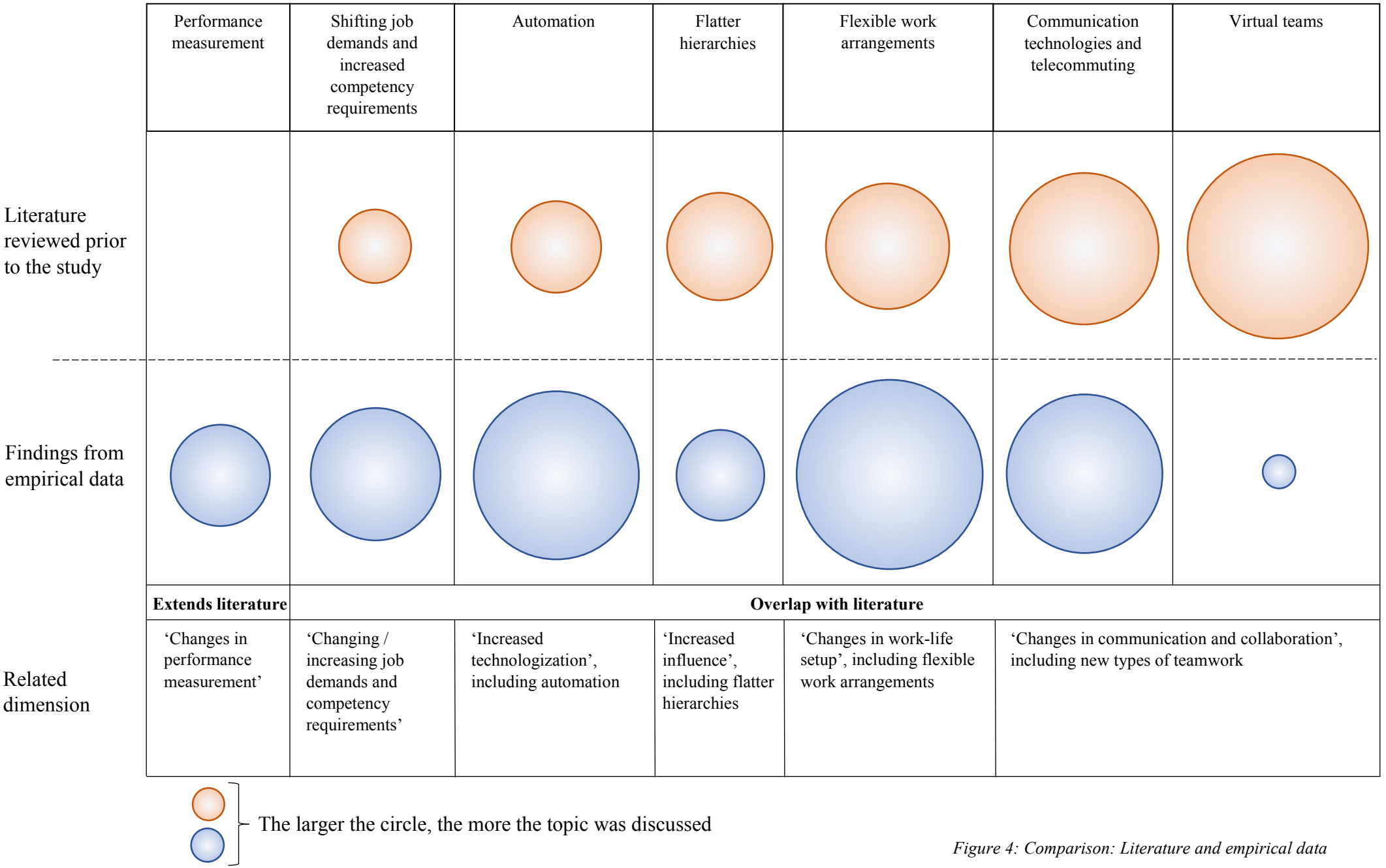


Figure 4: Comparison: Literature and empirical data

The following sections provide a detailed analysis of the change dimensions visually represented in *figure 4* above regarding their overlaps and differences with the literature, as well as regarding particularly positively or negatively represented insights from the empirical data. Therefore, the change dimensions discussed may vary in length. 'Network society, shifting ideas of work and sharing economy' as well as 'Digital inequality' are not taken into account in the visual representation because they evolve as more general changes and perceptions in work design owed to digital transformation as described in *section 2.3*. Nevertheless, they are discussed in the following as more general points leading naturally to more specific change dimensions because participants touched upon those points. 'Changes in leadership' as another topic evolving from the empirical data that had not been reviewed in the literature does not directly influence on how digital transformation changes work design, wherefore it was not considered in *figure 4* either, but is nonetheless discussed in this section.

5.2.1 Overlaps of empirical data and reviewed literature

Networked society and sharing economy

Networked society and sharing economy are both in the literature as well as by the study participants perceived as an essential part of digital transformation in relation to work. In the empirical data, this is expressed above all by increased accessibility of knowledge, data and information, and the interconnectedness of individuals and organizations. Although the networked society and sharing economy emerged as a result of the advancement of technology representing more general changes and perceptions in today's world, parts of the literature go one step further and argue that the networked society leads, among other things, to fragmentation of skilled jobs so that companies can do more with fewer workers (Howcroft & Taylor, 2014). It seems that the participants of the survey as well as participants of the semi-structured interviews see the connection of the increased efficiency perspective more with automation rather than with networked society. In combination with the former, participants discuss simplifications in terms of work being done easier and faster through digital tools. Probably, automation is the most present and most common reason for increased efficiency, as it is actively and consciously used in organizations to, for instance, reduce

cycle times while increasing productivity. Networked society and sharing economy, on the other hand, seem to be perceived more as a vibrant source of information that can be accessed at any time. Presumably, the meaning of the two terms is for the participants strongly related to the internet and corresponding platforms where specific insights can be gained.

Higher job demands, increasing competency requirements, changing job profiles and their relation with automation

Higher job demands, increasing competency requirements and changing job profiles are all reflected in both the empirical data and the literature reviewed prior to the study. Increased speed, complexity, workload and stress as a result of the three are the main points experienced by the participants leading to higher job demands, while the need for 'digital fluency' is the main argument in literature (Colbert et al., 2016). While the latter partly argues that 'knowledge-based' organisations do not really exist (Alvesson & Spicer, 2016), the participants in the online qualitative expert survey as well as the semi-structured interviews both experience the contrary, that knowledge work is gaining importance in relation to increasing competency requirements. Study participants believe that new jobs are created, existing jobs profiles change and new jobs emerge that demand creativity, people skills and the willingness to operate transparently. This is reflected in the literature focusing on increasing automation, arguing that many standardized jobs are eliminated while new ones are created; however, leaving an increasing number of workers worse off than before (Alvesson & Spicer, 2016). This injustice in turn is only taken up by one interviewee, stating that automation takes jobs from 'ordinary' people, while it is not addressed at all in the survey. This might be due to the fact, that none of the survey study participants are affected by this, or at least think that they are not (yet) affected, since they mainly do cognitive work. Another reason, why participants perceive that knowledge work is becoming more important than ever could be caused by the increasing complexity of tasks. Handling multiple tasks at the same time in combination with an increased speed rather than one after the other is challenging and requires cognitive ability.

Automation in general is one of the areas that is presented particularly positive in the empirical data of this study. It seems, that participants of both qualitative data collection methods see automation mainly as a possibility to streamline processes to make them more

efficient. For them, it seems, automation is an enabler which supports and simplifies everyday work. But is that the entire picture? Many companies today are likely to be pushed to automate different business areas to be faster and at the same time save costs in the long run with the overall goal of being more competitive. Looking at manufacturing industries that have to produce and sell high volumes due to small margins, there is probably no way around automating production processes. This might even make sense especially in areas where these activities are currently carried out under adverse conditions in low-wage countries, where children may still be working. On the other hand, it should not be forgotten that people may lose their job and ultimately their income resulting from increasing automation, which also has an impact on their families and future. Parents may therefore not be able to send their children to school in certain countries or move to an area with internet access, which ultimately leads to digital inequality. Nevertheless, if companies do not automate (part of) their processes, all employees of the company may be affected, as the organization no longer survives on the market.

The foregoing paragraph is a drastic representation and probably only touches upon a fraction of the points and challenges associated with automation. Nevertheless, automation is often a double-edged sword, as it is essential for some organizations to survive and secure jobs, but at the expense of the future of other people and their families.

Work-life setup and its relation with spatial and temporal flexibility

In addition, changes in work-life setup as a result of digital transformation can be determined from the empirical data. In the latter, as well as in the literature inter alia by Allen and Shockley (2009), negative and positive aspects are mentioned. While mobile work is sometimes associated with increased availability, distraction, overwork and lack of boundaries between work and private life, others value the spatial and temporal flexibility, which is ultimately also influenced by self-management respectively self-discipline and by clear regulations on the part of the company (Rump & Eilers, 2017). Particularly in the semi-structured interviews, the negative aspects like permanent accessibility and the thereof resulting unpaid work were addressed. One reason for this could be that the experts in the semi-structured interviews either hold a upper management position or are self-employed. In other words, they have a certain responsibility to live up to. Therefore, they may see it as

their duty to be constantly available if problems or questions arise which in turn heavily impacts their private life in a negative sense. The question is, however, why is this not reflected in the online qualitative expert survey? A possible explanation is, that participants wanted to express it, but could not make themselves clear which, in contrast, could be followed up and clarified in the interviews. Furthermore, since nearly half of the respondents to the online qualitative expert survey stated that they were either employees or in lower management, they may not feel obliged or the pressure to be available at all time but appreciate the spatial and temporal flexibility and thus present it in a more positive way. Perhaps the participants also felt that the researchers behind the survey were expecting positive results and ultimately wanted to contribute rather than express critical opinions. This could be encouraged by the fact that many participants are from the researchers' personal network and wanted to do them a favour by stating the positive.

As one can read between the lines, work-life setup is one of the areas that is presented quite negative in the empirical data of this study compared to the other topics. Permanent accessibility as well as distorted boundaries between work and private life was particularly in the semi-structured interviews discussed in-depth in a rather negative sense, which led the researchers to take a closer look at the topic of changes in work-life setup. Digital transformation brings temporal and spatial flexibility to the classic nine to five office workplace and offers many opportunities for employees to better reconcile their private lives and work; however, finding the right balance between using and being used by the flexibility is a tightrope walk. With smartphones, laptops and appropriate software, organizations pave the way for employees to work more independently and autonomously, but often do not set clear rules or restrictions (Rump & Eilers, 2017). One possibility to introduce such rules may be to measure and restrict the time an employee can log in to the work interface. Herewith, organizations would not only be able to comply with the legal working time regulations but also to protect the employee from overwork, regardless of where the employee is located. Currently, much depends on the self-management of the employee (Rump & Eilers, 2017), not to work constantly putting the phone away from time to time. If this self-discipline to lay down the work is not given, it may lead to private life mixing with work resulting in constant availability which may in turn result in the feeling of working for free, as mentioned by an interviewee. Furthermore, employees may also have the feeling that they need to be constantly available to draw attention to themselves as they see this as the only way to

advance their career. Similarly, they may feel that constant availability is demanded from their position and its related responsibility. Hence, in summary, digital transformation and especially mobile work is often associated with constant accessibility and blurring boundaries between work and private life instead of with an increasing work-life balance.

Information and communication technologies

Flexible work arrangements are enabled, among other things, by communication technologies, which ensure a constant connection to work regardless of time and place (Boswell & Olson-Buchanan, 2007), which can be seen as both, positive and negative. In addition to an increase in virtual communication which was mentioned in both qualitative data collection methods, especially participants of the online qualitative expert survey experienced new types of interaction with customers, suppliers and stakeholders resulting from an increase in information and communication technologies. Overall, new types of teamwork emerge inter alia by means of virtual teams confronting employees with new structures and conditions. While virtual teams were only briefly mentioned in the primary data, in literature it is one of the most studied phenomenon in terms of digital transformation and work design. This could be due to the fact that participants of the study might be working in smaller organizations, where all involved parties are still at the same location, or at least the teams are formed according to the pattern. Another possible reason could be that working in virtual teams is already taken for granted today, so it does not seem worth mentioning as a change to work design resulting from digital technology. Furthermore, nowadays there is more virtual contact with family and friends via digital tools like Skype, WhatsApp or FaceTime video calls than ever, making it part of everyday normality, wherefore it may not be seen as an evident change anymore when it comes to work design.

Flatter hierarchies

Team-based structures and flatter hierarchies give more responsibility to the employees further down (Morgeson & Campion, 2003) allowing for agility and innovation at the expense of decreasing personal attention because leaders are responsible for an increasing number of more employees. This in turn makes motivation more difficult resulting in

promotions becoming less frequent (Mayhew, 2018). The findings of the empirical data, which is especially reflected in the findings of the online qualitative expert survey, again show that the positive effects of the decreased power distance are mentioned above all. Increased participation through the bottom-up approach with supervisors as mentors, increased autonomy and more agile processes are the subjects mentioned the most. This might be explained by the fact that nearly half of the respondents of the online qualitative expert survey stated that they are either employees or in lower management, wherefore the positive impact may be most evident for them as they can now participate more actively. In addition, it could play a role that 60% of respondents in the survey are employed in Germany, a country merely focusing on traditional hierarchical organizational structures (Jensen & Saadat Behesht, 2012), where the shift towards flatter hierarchies is likely to have a noticeable impact on those involved. In contrast, since the interviewees are already operating in higher management positions or are self-employed, the topic was not given much attention.

5.2.2 Differences of empirical data and reviewed literature

Digital inequality

A topic, which was only addressed in the literature but not in the empirical data is 'Digital inequality'. This may be due to the overall reasons for a more positive perception of digital transformation and its effects on work design as outlined in *section 5.1*. Furthermore, as 'Digital inequality' describes differences in access to and use of ICT between economies or different population groups (Stiakakis et al., 2010), it is probably not that present at the workplace. Therefore, it does not directly fall into the sought-after area of how digital transformation changes work design. In addition, study participants all have access to ICT and actively use it in their everyday lives, wherefore digital inequality is not present for them. However, inequality has been mentioned in so far that there are fewer permanent and secure jobs and more people are hired and fired on demand. Globalization and digital transformation have made organizational world more complicated and more insecure in the sense that competition and the elimination of certain low-skilled jobs are on the rise (Sweeney, 2015).

Changes in performance measurement

A point that emerged as a change dimension from the study but is not significantly discussed in literature reviewed prior to the study is 'Changes in performance measurement'. The latter emerged mainly from the online qualitative expert survey and results from a higher perceived output orientation and performance transparency. The performance of employees can be easier and better evaluated as well as controlled due to digital transformation and consequently moves more into the focus - in other words, performance (output) gains importance. Here again the argument is valid that almost half of the participants in the survey are regular employees or work in lower management, which means that they are assessed with regard to their performance, but presumably do not evaluate themselves on a regular basis. In contrast, the interviewees are most likely the ones measuring and controlling the performance of their employees because they all hold management positions. Additionally, flatter hierarchies resulting from digital transformation and the associated increased influence and responsibility of employees in the lower levels of the organization could lead to them being evaluated more intensively according to their performance.

To summarize both section *5.2.1* and *5.2.2*, it can be said that most of the findings of the primary data collection overlap with the points from the reviewed literature prior to the study, albeit partly by other reasons than illustrated. Further, 'Changes in performance measurement' was taken up as new dimension, which extends the current picture on how digital transformation changes work design.

5.2.3 Surprising insights from the empirical data

In addition to the comprehensive insights gained in the primary data collection, there are also areas that were surprisingly taken up for the researchers of this study, and areas that were expected but have not been discussed at all. Both 'health management' and 'need for lifelong learning' as described in the following were expected by both researchers due to a combination of several factors: The literature reviewed prior to and during the study, the German media, which greatly focuses on how to cope with the ageing German society in general, where both health management and professional development play a role, as well as personal perceptions.

Health management is one area that was expected to come up but has not been mentioned by any of the participants. Being constantly available and therefore never really free of work can possibly lead to stress, overwork or even to burnout (Loebbecke & Picot, 2015). Consequently, there should be clear rules from organizations defining the expectations they hold on their employees on how flexible work should be used avoiding work overload. But even such rules cannot guarantee that employees are not negatively affected by being constantly linked to work, which is often the case nowadays. Therefore, the researchers of this study expected that the topic of health management would arise in relation to overarching dimensions like work-life or higher job and increasing competency requirements and evolve as a negative effect of digital transformation on work design.

Another topic that was expected but did not come up is the **need for lifelong learning**. In the view of the researchers of this study, this is closely linked to the areas of agile and rapidly changing environments and the need for employees to constantly adapt. New technologies and methods which determine the everyday working life are continuously developing and therefore require constant learning (Friedman, 2013). Furthermore, due to the constant change, the half-life of skills has also altered and is today only about five years, whereas it used to be much longer (Garmer, 2016). Consequently, in order to keep up with the transition, lifelong learning seems indispensable, affects everyone and was therefore also expected in the responses of the participants.

Next to that, **changes in performance measurement** which was mentioned in the online qualitative expert survey and complements the reviewed literature was a surprising, yet very interesting insight. This is, because unlike changes in work-life setup or automation, which more logically follow from changes in work design owed to digital transformation, to outsiders less familiar with the subject matter, changes in performance measurement are more difficult to identify as effects of digital transformation. Nevertheless, since employees are more and more involved in organizational processes and decision-making following from increasing bottom-up approaches, they are likely also more strictly controlled and evaluated. Their performance seems to count even more nowadays, at least if one gives credit to statements of interview and survey participants of this study, overall leading to greater significance for feedback and improvements resulting thereof.

5.3 Digital transformation: A caterpillar or a butterfly?

Aiming to detect how study participants connect an abstract, technical phenomenon with more tangible characteristics, attributes, strengths and weaknesses, they were asked to describe digital transformation as an animal. Two out of three interviewees illustrated digital transformation as a butterfly with its exponential development stages from larva to a beautiful animal, largely showcasing the positive effects of digital transformation. The third candidate referred to digital transformation as a five-headed dragon, referring to its negative and dangerous sides, though ending their description with an emphasis on its positive sides, enabling protection, providing them with new business opportunities, particularly featuring its comprehensive power.

All three descriptions are indicative of the interviewees' worldview, which overall grately seems to relate to the theory of technological determinism. The latter evolves around the belief that technology in any given society defines its nature; hence, technology is the driving source of culture in a society, thereby inevitably changing society itself (Adler, 2006). That all three interviewees rather lean towards technological determinism can be derived from statements like "digital technologies and robots can diminish child labour significantly" [E42], "people spread their wings and become digital artists as a result of digital transformation" [E40] or "digital transformation provides me with new business opportunities" [E41]. Accordingly, participants believe that technology 'does something' with them or with society. However, that the latter is universally true is doubtable because technology does not utterly force itself on members of the society; rather, one could argue that man creates technologies, chooses to use them and experiences its effects in turn (Adler, 2006).

Following from the belief of technology as an enabler, two out of three interviewees referred to a butterfly when describing digital transformation. Likely, the initial thought behind this is that the more digital materials one can apply to their ecosystem, the quicker one can transform it into a beautiful new creature: "When everybody is embracing it, digital transformation will be a beautiful thing" [E40]. One may however cast doubt on this thought. First, even if we assume that everybody will benefit from digital media uses to some extent, the implications thereof are dissimilar depending on the level of benefit by different groups

across society (Hargittai & Hsieh, 2013). As a consequence, the assumption that everyone benefits from digital transformation can simply not be deemed true (Buente & Robbin, 2008). Second, transformation does not necessarily mean changing for the better like one of the interviewees recognized, too: "Sometimes, increasing technologization can lead to jobs becoming obsolete, though they are needed to feed a family" [E42]. Hence, only if an organization realizes their caterpillar-like shortcomings eating from the same old leaf and being too slow, they can engage in and actively choose to become more digital like a quick butterfly. Otherwise, all they may have is a really fast caterpillar.

In line with this, both interviewees who mentioned a butterfly as a synonym for digital transformation did not engage in a discussion on how much effort digital transformation may take for some organizations today. Though digital advancements may result in new abilities like being able to pick out the best suppliers and customers, it is oftentimes a resource-intensive process that requires tremendous change: The World Economic Forum revealed that 70% of initiatives in big data, AI and other advanced digital technologies fail (Hitch, 2018). Similarly, some organizations seem not even to know why they want to be part of Industry 4.0, using the excuse 'because everyone else does' (Hitch, 2018). Hence, whatever workers and equipment contribute to digital transformation, it should add value to the respective organization. Butterflies do not have strikingly colourful wings just to look pretty; rather they communicate with their vibrant hues and ornate patterns something to potential predators and mates. Therefore, joining the digital transformation should ultimately provide more efficient processes and competitive advantage (Hitch, 2018). If it does not, organizations may see the caterpillar hatching, but never transforming into a butterfly.

The third participant mentioned a five-headed dragon as synonym for digital transformation, likely due to its agile abilities, thrive, even in disruptive times, and long-term success due to its dominating power. However, the argument that "it can protect you if you feed it, pet it..." [E41] must be taken with a pinch of salt because though digital transformations may be full of high concept and call to actions, they are far from trivial to undertake. Often, they require both culture and infrastructure change in an organization, may lead in particular middle-managers to recognize that it will result in them having less control rather than more, and require an updated view of data and information within one's purview (Bauert et al., 2015). Otherwise, likely misconceptions about what creating a fully digitally

transformed company looks like may occur, resulting in initiatives to fail. Accordingly, one must rather try to tame the dragon and understand it with all its positive sides as well as dangerousness to be able to make the digital landscape one's competitive advantage. Even if one succeeds with the latter, the dragon may still breathe fire from time to time, because in the digital age, the moment ones leaves their own space, hence operates in a system not owned by themselves, traceability is gone and privacy issues may occur (Bauer et al., 2015). Similarly, though digital transformation may oftentimes result in new business opportunities, the participant's statement that "it is so strong that it can basically beat everyone else" [E41] may not entirely be true. Advancements that are evolving as a result of digital transformation are often equally available to everyone and may be used by people with even more knowledge and experience in the area in a better interest than a non-professional. Next to that, digital transformation can be considered a moving target, leading to new advancements and opportunities in no time, wherefore business opportunities that may seem attractive today, may be already obsolete tomorrow.

5.4 Changes in leadership owed to digital transformation

Following from the empirical data and the answers of the semi-structured interviews in particular, one may assume that digital transformation changes leadership in a similar way than it changes work design. Although interviewees were not invited to comment on the impacts that digital transformation has on leadership, all three of them naturally segued into the topic, wherefore it seems important to be seized on in this study. Owing to the fact that literature on changes in leadership as a result of digital transformation had not been reviewed prior to the study, this section is built from empirical data in combination with newly reviewed sources to underpin the findings.

As employees receive more and more influence today, **leader's influence over their followers changes** as well. Experts in this study pointed out that leaders will need to lead in a more participatory way actively incorporating employees and their ideas into decision-making, collectively coming to a solution. The static hierarchical structure becomes less important, and flatter structures evolve, resulting in leaders distributing leadership functions across their team, giving more autonomy to employees: "Instead of supervising in the traditional way, leaders will need to provide adequate resources and develop employees

through feedback, only intervening in conflict situations in a coaching manner" [E41]. Hence, leaders are not controllers and commanders anymore but rather outline goals empowering employees to come to a decision on how they will be reached (Patterson et al., 2005). Unlike effective managers, machines have not yet learned to inspire people at every organizational level. While machines can often grasp many detailed pieces of information, they cannot (yet) assemble the big picture. Hence, human synthesis is nevertheless often vital to problem solving functioning as the glue that holds the company together and may always be in demand in the form of transformational and inspirational leadership (Cascio & Montealegre, 2016). Therefore, for leaders, motivating, inspiring and trusting followers while tolerating ambiguity to increase the employee's motivation to contribute are becoming more crucial leadership skills in today's digital landscape (Cascio & Montealegre, 2016).

In line with this, experts pointed out that tomorrow's leaders will increasingly need to be **relationship oriented**. In particular, experts mentioned that leaders will engage in more collaborating, mentoring partnerships with their employees, which in turn asks for increasing empathy and the willingness to operate transparently (Barondess, 1997; Fries-Britt & Snider, 2015). Because employees are more encouraged to solve tasks independently, leaders will take the role of a mentor or coach. Investing in personal relationships becomes more important than ever for leaders because the social embeddedness that organizations usually create is widely abandoned through virtual communication and globally spread teams: "Leaders will need to invest in personal relationships inter alia to be able to organize competencies for a given task in the most efficient way" [E41]. Hence, leaders will need alternative principles that allow for them to create collective commitment and intimacy although the work environment is dispersed (Holton, 2001). Accordingly, effective team building gains importance and increasingly is a leadership challenge, because personal bonds are less likely to evolve in dynamic, multidisciplinary and remote teams (Avolio et al., 2014). Finally, leaders will also have to consider the individual employee more and more, following up on their respective needs, leading each of them made to measure (Khan, 2016).

Following from the above points, experts identified **higher competency requirements** as the most significant change in leadership owed to digital transformation. Because new technologies will increasingly dominate leadership just like employee tasks in the future, digital fluency is a competency that is more and more required by today's leaders: "Just like employees, leaders will need more IT competencies to stay ahead of the game"

[E42]. Moreover, higher social competence and emotional intelligence are required when leading dynamically changing self-organized teams from a distance. Because leaders cannot provide guidance through spatial presence anymore they will need behavioral patterns that allow for effectively emotionally appealing reach anyways (Chang et al., 2011; Mukherjee et al., 2012). Similarly, though not pointed out by experts in this study, language and intercultural competencies are likely needed more than ever because increased technologization allows for global operations that make it inevitable for leaders to cope with diverse cultural backgrounds (Chutnik & Grzesik, 2009). As literature and experts in this study have further identified, technological advances overall contribute to more knowledge-based organizations (Sinha & Van de Ven, 2005) and especially routine work is automated (Van Knippenberg et al., 2015), wherefore skilled leaders will be the ones succeeding (Brynjolfsson & Hitt, 2000): "I also believe that leaders who are really really good at several things will succeed, because the risk of being replaced by a machine is far smaller" [E40]. Competencies that further seem to matter are problem solving (Parker et al., 2001), creativity, efficiently dealing with large amounts of information (Van Knippenberg et al., 2015), social skills (Frey & Osborne, 2013) and fast decision making (Perlow et al., 2002).

Following from this, one may conclude that **increasing job demands** constitute another change in leadership. Experts identified that leaders might more often have to make multiple decisions at the same time while evaluating and deciding more quickly under conditions of information overload while they need to be increasingly available, resulting in stress. Similarly, today's leaders need to be able to deal with uncertainty and fast-paced environments, hence handling and initiating change in their organization (Crossan et al., 2008; Lovelace et al., 2007).

Though not mentioned in particular in the empirical data collected for this study, the **changes in performance management** that evolve as a result of digital transformation for employees likely also have an impact on leadership in the digital age. Leaders will be able to easier evaluate performance of their followers by means of digital tools (Keppel et al., 2006). Furthermore, because employees are often not physically present in an organization anymore, leaders will have to display higher output orientation and at the same time help their followers to achieve better results, with the goal to develop their competencies in the long-run (Keppel et al., 2006).

Finally, **increased technologization** in general will likely change leadership, too. While machines and information technology can support employees in executing their tasks, they can similarly support leaders in a wide range of their functions, like for example decision-making (Ramey, 2012). Information systems will provide more data to support decision-making in the future so that choices can be made faster and on a more informed basis. Similarly, feedback can be provided more easily to employees and their careers can be managed more easily through digital tools, which in turn ideally allows for more time that can be expended for leadership (Keppel et al., 2006). Also, new media allows for increased and more easy communication that is especially useful for leading dispersed teams (Hansen et al., 2012). Although the changes made possible by today's technology are impressive, and digital innovations will continue in the foreseeable future, technology by itself is not enough. Rather, to fulfill its potential, leaders will be required to recreate the way their organizations operate in a world of digital ubiquity (Cascio & Montealegre, 2016).

Following from the six change dimensions identified in leadership, an interrelation with the change dimensions in work design owed to digital transformation as described in *section 4* of this report is assumed by the researchers of this study. Following from the overlap in the change dimensions evolving in work design owed to digital transformation and the change dimensions in leadership, it can likely be distinguished between at least two different kinds of relationships:

a. ***Reciprocal relationships**, in which changes in work design cause changes in leadership which in turn cause changes in work design;*

For example, increased employee influence resulting from flatter hierarchies seem to influence leaders' influence behaviour directly. If employees gain more influence, leaders may also need to adopt their behaviour, rendering for example greater autonomy to employees, trusting in their abilities and competencies. Similarly, increasing competency requirements for employees may be directly related to how leaders evaluate employees' performance. If competency requirements for employees are increasing, leaders may for example also offer increasing possibilities for development to their employees;

b. ***Concurrent relationships****, in which changes in work design forego changes in leadership or the other way around;*

For example, the technologization of leadership may forego the technologization of work design, because a leader who works intensely with information technology themself may in turn expect their employees to do (be able to do) so as well. Similarly, changing performance measurements for employees may cause leaders to increase their focus on objectives and outcomes achieved.

Presumably, there are many more changes in work design owed to digital transformation that are related to changes in leadership one or the other way. Possibly, there are also more, or different relationships between the two. Moreover, interrelations between changes in both subject areas can likely be summarized in overarching dimensions. However, the level of analysis that would be required to identify and describe the latter exceeds the scope of this Master thesis; hence, provides great potential for future research.

6. Conclusion

This Master Thesis studied how digital transformation changes (office) work design in contemporary societies. Thriving on the image of leading to simplification and optimization of processes, changes in work design owed to digital transformation are overall perceived as very positive. That is because according to their age, experts participating in this study are said to be more connected to technology than any previous generation and are only sparsely affected by jobs becoming obsolete due to increasing automation as they mainly perform cognitive office work. Because future generations will increasingly grow up with digital technologies as these continue to evolve, they may feel naturally at home at the digital, ever-changing workplace, wherefore the positive view on the effects of digital transformation on work and its design may be valid for the contemporary society overall already today.

This positive impression of the changes in work design owed to digital transformation relates to the more tangible characteristics of a butterfly, an animal that respondents associate with digital transformation, because it goes through many different phases in its life but eventually evolves from a partially ugly caterpillar to a beautiful animal. Not even all butterflies are generally beautiful and colourful, and the perception is in the eye of the beholder, but butterflies develop in spring and summer, the time of year when nature and the environment flourish and come to life. Butterflies can therefore also be seen as enablers, just like digital transformation, as they support flowers during pollination and thus contribute to a more prosperous life.

In this study, especially automation is presented as very positive in terms of simplification as well as optimization. Routine tasks, which are often prone to errors due to their monotony, can be carried out more efficiently and with higher quality through automation. This is of great advantage and seen as helpful as employees can in turn concentrate on tasks that require cognitive work. However, there are also more critical statements regarding work-life setup as the flexible work arrangements often lead to stress mainly due to the fact that work increasingly interferes with private life by means of blurred boundaries. Despite all the possibilities that flexible work offers, working indepent from time and space, the feeling of being trapped in work and not getting away from it prevails. Considering the effects digital transformation has on work design, it is surprising that neither

‘health management’ nor the ‘need for lifelong learning’ came up. The latter was expected as a logical consequence of the rapidly changing environment and the constantly evolving technologies employees are exposed to. The same applies to health management, as health in the workplace is an issue that has become increasingly important in recent years and is influenced by digital transformation in the sense of more stress through constant availability as well as more complex tasks and more pressure through greater involvement. In contrast, ‘changes in performance measurement’, a dimension that newly evolved from the empirical findings and therefore extends the reviewed literature, was increasingly discussed as employees, through the increasing use of digital tools are confronted easier and more comprehensively with feedback.

Overall, while research predominantly agrees that digital transformation crucially affects work design, the existing literature on these topics is fragmented. To address this shortcoming, first a comparison of the change dimensions identified in the literature with the change dimensions evolving from the empirical data collection in this study was established as shown in *figure 4* on page 53. The latter outlines crucial transformations in several dimensions: Shifting job demands and increasing competency requirements, automation, flatter hierarchies, flexible work arrangements, communication technologies and telecommuting, and virtual teams, all of which are dimensions from the reviewed literature that are confirmed by the empirical data - albeit to varying degrees, while performance measurements extends the reviewed literature. Following from this, an overarching framework of the changes in work design in the digital age was established based on the empirical data collected, building upon six change dimensions: Performance measurement, higher job demands and increasing competency requirements, increased technologization, increased influence, work-life setup, and communication and collaboration. A visual representation thereof can be found in *figure 5* on the next page.

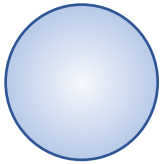
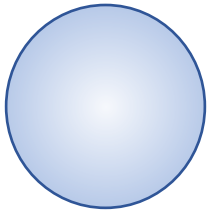
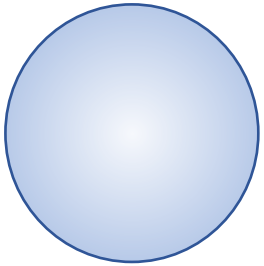
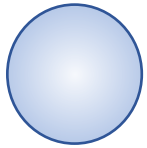
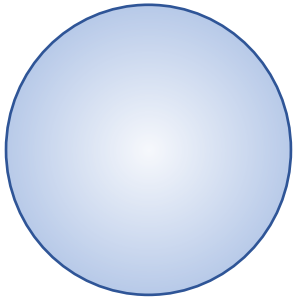
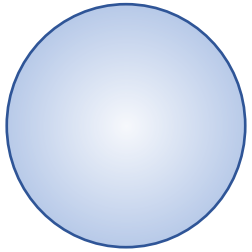
Findings from empirical data	Performance measurement	Higher job demands and competency requirements	Increased technologization	Increased influence	Work-life setup	Communication and collaboration
The larger the circle, the more the topic was discussed						
Related topics*	Higher output and result orientation	Higher workload; Increased complexity; Increased cognitive demands	Automation; Simplification and improvements	Bottom-up approach; Flatter hierarchies	Increasing temporal and spatial flexibility; Increased availability	Increased virtual communication; New types of teamwork;

Figure 5: Changes in work design owed to digital transformation in contemporary societies

*For details see *figure 2* & *figure 3*

Following from this, this study provides an answer as to how digital transformation changes work design in contemporary societies: Digital transformation is changing work design to the extent that standardized, repetitive processes are often automated, resulting in employees having to perform more cognitive tasks. As work and the environment becomes more agile and faster, inter alia through networked society and sharing economy, and more complex tasks with a higher workload emerge, employees are confronted with higher job demands and increasing competency requirements. Flatter hierarchies due to more team-based structures and increasing bottom-up approaches have the effect that employees are increasingly involved, especially in the decision-making process. As a result, their performance is also more strictly evaluated, where digital technologies enable easier performance reviews through digital tools. Information and communication technologies enable work to be carried out in an increasing temporal and spatial flexible manner, which ultimately impacts the work-live setup. Accordingly, the changes from work design owed to digital transformation are often interlinked and influence each other.

This thesis highlights that digital transformation does not only cause changes in work design but also in leadership. Due to the increased influence of employees, a more participatory way actively incorporating employees is requested from leaders, including the distribution of responsibility. Consequently, there is an increased need to motivate and inspire employees making personal relationships more important than ever. Mentoring, empathy and transparent action move into the spotlight in order to create collective commitment and intimacy between dispersed teams. The changing job demands imply higher competency requirements for leaders by means of social skills such as emotional intelligence and intercultural competence. In addition, increased technologization generally influences leadership and can support in various different ways, for example in the increasingly complex decision-making process. Accordingly, one may conclude that digital transformation changes leadership in a similar way than it changes work design and that these changes might be reciprocally related (i.e., they affect each other) or concurrently related (i.e., changes in one domain precede changes in the other).

Finally, despite all the possibilities technology offers, the authors of this Master Thesis believe that the focus should remain on humans and their needs. Although good balance and harmonious interplay between humans and digital technologies is difficult to achieve, it is of great importance in today's interconnected world because humans are

exposed to the technology that is deployed to strive for simplifications and improvements. This is reflected in Melinda Gates' commencement speech at Duke University in 2013:

"Technology is just a tool. It's a powerful tool, but it's just a tool.
Deep human connection is very different. It's not a tool. It's not a means to an end.
It is the end - the purpose and the result of a meaningful life - and it will inspire the most amazing acts of love, generosity, and humanity."

6.1 Future research scenarios

Following from the study's contributions, it offers many scenarios for future research. While this study confirms dimensions previously outlined in the literature such as the automation of jobs or changes in work-life setup, it extends the current picture by adding in a new dimension such as performance measurements and extends existing ones such as increasingly changing and new competency requirements. The latter may be taken up even further in future research, linking it for example to outcome variables such as job performance or satisfaction with the goal to help employees coping with the changes. In line with this, an independent in-depth study solely focusing on competency requirements that leaders and followers need today, may help organizations to more easily to identify the specific skills, characteristics and qualities required during in the digital age providing them with guidelines for personnel selection.

Further, following from the change dimensions identified for work design, this study suggests that changes in leadership and work design owed to digital transformation are closely related and frequently occur simultaneously. Therefore, an in-depth study of the changes in leadership resulting from digital transformation followed by a study that combines the two to identify crucial transformations in dimensions and interrelations between digital work design and leadership may be of great value, shedding light on important dynamics that arise in organizations today.

While this study was conducted in a very short time frame, mirroring the results in a longitudinal study may be beneficial to truly build a theoretical change model, providing even deeper insights on how digital transformation changes work design. Hence, this study provides a great starting point for longitudinal studies identifying change dimensions that

must be taken into account. Similarly, because this study solely focuses on the changes in work design owed to digital transformation in an office setting, a comparable study researching the changes in work design in a factory setting may be interesting. Here the result may lean towards a rather negative perception of how digital transformation changes the work design, as factory jobs are more directly at risk to become obsolete due to automation.

6.2 Research limitations

As the main research limitation of this study one must acknowledge that not only the researchers but also study participants were biased in a certain direction towards the topic. Because the researchers consider the changes in work design owed to digital transformation to be rather positive, not only the selection of appropriate sources, experts, and study participants but also study results might have been biased from the initial setup of this study in this direction.

Further, because technology is commonly considered a 'moving target' quickly evolving over time (Ran, 2013), one may argue that research outcomes may be valuable for the next couple of years but not be a means to predict the entire scope of changes in work design accurately. Nevertheless, because the study does not focus on the effects of one specific technological invention on work design but rather generates a broad picture, it provides theoretical as well as practical contributions as described in *section 3.1* and *3.2* respectively, forming a good basis that can be extended as technology evolves. Hence, this study looks at digital transformation from an abstract perspective, voiding the moving target.

In addition, the results of the study, both for the online qualitative expert survey and for the semi-structured interviews, may be somehow distorted by the fact that the data are collected in English, which is not the mother tongue of many of the participants. Hence, the lack of fluency may have lead to unwanted, misleading statements, or simply to participants only giving answers that they were able to express. The linguistic challenge did of course not only affect the respondents, but also the researchers, both of whom have already studied and business experience in English but are not native speakers themselves. Consequently, misunderstandings and misinterpretations of questions and statements might have occured as neither party, the respondents nor the researchers, communicated in their mother tongue.

6.3 Project process evaluation

This Master Thesis provided both researchers with a great learning and growth opportunity, merely because it emphasized on theoretical contributions made to literature by studying the latter in depth and subsequently adding value to it by means of empirical data collection and analysis. Further, this Master Thesis was the first project of comparable size and effort that the researchers conducted in a team effort. By the means of a well-elaborated planning prior to project start that could be followed throughout its duration, the researchers were able finish the project in due time.

Overall, this research project has been a continuous learning journey. In every meeting with either supervisor or examiner, new, sometimes contradictory, yet very valuable insights evolved, resulting in the fact that the initial concept was changed several times and that the researchers had to consider very carefully how and which feedback to incorporate. Further, eight weeks was a very limited time frame to successfully conduct and deliver a research project that is of high quality and thus valuable for both literature and practice. Therefore, close attention towards delivering an answer to the research question, excellent organizing and teamwork skills were of utmost importance. Moreover, the time needed to first establish a close understanding of the research context and the respective processes, to collect and analyse primary data as well as to proofread took longer than expected, wherefore the researchers aim for an even more detailed planning for future research projects.

Generally, the researchers took advantage of working in teams to verify research results, e.g. during the coding process by means of coding independently and then comparing results, to double-check information and to come to even more nuanced, innovative ideas. In line with this, both researchers are equally responsible for the outcomes of this Master Thesis. Jonas was generally more involved in incorporating feedback from supervisor and examiner regarding the Methodology section, while Marike was merely responsible for the literature review. Jonas established code trees and all visualizations needed for this thesis, while Marike produced the majority of the text. The discussion section was developed in a joint effort, again, taking advantage of increased creativity and innovation brining two opinions and lines of thinking together.

Overall, both researchers were time- and thought-wise equally involved in establishing and are very satisfied with the process of this Master Thesis as well as with the quality of this report. The researchers have been able to reach their personal objective: To independently conduct an interesting research project, of which the results can be deemed valuable, insightful, and most importantly, interesting. This project has brought the researchers first research experiences and also enhanced their report writing skills, which increases the capability for future projects.

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Appendices

Appendix A: Time plan

Week	Calendar Week	Date	Student's Tasks
1	14	01.04.-07.04.	Finalize literature review/secondary research Edit proposal according to feedback Send out survey Contact interviewees
2	15	08.04.-14.04.	Hand in progress report 1 Analyse survey data Set Interview dates Edit report according to feedback
3	16	15.04.-21.04	Analyse survey data Prepare & test interview questions Report writing
4	17	22.04.-28.04.	Conduct Interviews Report writing
5	18	29.04.-05.05.	Hand in progress report 2 Analyse data Edit report according to feedback Report writing
6	19	06.05.-12.05.	Analyse data Report writing
7	20	13.05.-19.05.	Report writing Proofreading
8	21	20.05.-26.05.	Hand in final report Prepare defence presentation
9	22	27.05.-02.06..	Defence Editing
10	23	04.04.	Publish Thesis in DIVA

Appendix B: Online qualitative expert survey

Can you tell us about your experience with digitalization?

This survey is conducted in line with a Master Thesis at Linnaeus University Kalmar. All information provided is anonym, and is used for research purposes only. You are able to stop the survey at any time. Your participation is voluntary.

Following, you will be asked some questions about yourself, and finally, about how you think digital transformation changes work design.

Let's go! press ENTER

1 → First, what's your age? *

Type your answer here...

2 → And what's your gender? *

A Male

B Female

C Other

D Prefer not to say

3→ What's your Nationality? *

- A Swedish
- B German
- C Dutch
- D Other

4→ And in which country are you currently employed? *

- A Sweden
- B Germany
- C The Netherlands

5→ In which field are you working? *

- A Private sector
- B Public sector
- C (Research) Institution
- D Other

6→ On which hierarchical level are you currently operating? *

- A CEO
- B Upper Management
- C Middle Management
- D Lower Management
- E Employee
- F Other

7 → For how many employees are you *directly* responsible? *

Type your answer here...

8 → Now, let's talk business. Please name **at least six** specific changes (we're looking for buzzwords!) resulting from digital transformation[1] for work design[2] and give a description of each of them. *

[1]*Digital transformation*: The overarching phenomenon resulting from shifts in society and organizations due to an increasing use of new, computerized digital technologies (social media, mobile, analytics or embedded devices) to enable major business improvements

[2]*Work design*: The way in which employees work in organizations as well as the conditions under which they do so

Example: Buzzword - Explanation

Type your answer here...

SHIFT + **ENTER** to make a line break

9 → Last question! Based on the six changes you have just explained, how intensely does digital transformation affect your current work? *

1	2	3	4	5

Not at all — Quite a lot — A lot

10 → *You're great!* ***Thank you for your time and brain power!***

Before you go, is there something you'd like to add?

Appendix C: Interview Questions

1. Digital transformation is a 'hot topic' but often seems to cause confusion, can you tell us what digital transformation means (to you) in simple terms?

2. In your opinion, is digital transformation important for today's businesses?
    a. What does it really mean for you and your organization in terms of how people work and the conditions under which they do so?

3. Can you please name four general to you most important/evident changes resulting from digital transformation for work design and explain these?

4. In an online based interview questionnaire we also asked the respondents the previous question and the the most frequently mentioned terms were:
    - Simplification - work can be done more easily and faster
    - Mobile working - employees are expected to be available at any time/for longer periods of time
    - Spatial flexibility - work can increasingly be conducted in a spatial flexible manner
    - Automation - work previously conducted by employees is taken over machines/information technology

    What is your opinion on these points? Please elaborate.

5. Looking into the future, in your opinion, how is digital transformation going to have an impact on the design of work in the next 10 to 20 years?

6. If you could change anything in the way digital transformation impacts the way we work, what would it be and why?

7. If you had to describe 'digital transformation' as an animal, what would it be?

8. Is there anything that you would like to add?