IADIS International Journal on Computer Science and Information Systems
Vol. 19, No. 1, pp. 81-95
ISSN: 1646-3692

THE INFLUENCE OF DIGITAL TRANSFORMATION ON WELL-BEING – ANALYSIS OF LIFE STAGES AND BUSINESS SECTORS

Maximilian Helms, Audris Umel, Julia Bosbach, Pia Gebbing
and Christoph Lattemann
Constructor University Bremen, Campus Ring 1, 28759 Bremen, Deutschland

ABSTRACT

Digital transformation (DT) is changing work contexts and conditions at large. Employees must adapt to new work modes and organizational structures, while learning novel tools and skills. Such changes are impacting employees' well-being, which in turn affects company success. However, how DT changes the workplace and employee well-being depends on the characteristics of the work, e.g. knowledge/office work versus field/task work. Additionally, perceptions on how DT affects well-being, particularly physical health and psychological needs, differ among employees depending on socio-demographic factors like age and parental status. Hence, this study investigates the impact of DT on well-being on two levels of analysis: industry and employee. Using self-determination theory and a qualitative approach, this study applied surveys and focus groups with 36 experts from craftsmanship and from consulting. Results show different effects on various dimensions of well-being in the two industries. Further, the effects depend on the life stages of employees and their work domains. This research offers insights for further exploration of DT impacts and strategies for practical implementation.

KEYWORDS

Well-Being, Digital Transformation, Life Stages, Psychological Needs, Craftsmanship, Consulting

1. INTRODUCTION

Digital transformation (DT) is significantly influencing the nature and environment of work (Burr et al., 2020; Gagné et al., 2022). Driven by the COVID-19 pandemic, businesses and organizations were compelled to make major changes in work settings, such as adapting virtual meetings and remote work wherever feasible. These digitalized work practices have brought multiple benefits. For instance, remote work has unlocked additional capacities by eliminating

travel times and has facilitated a greater sense of autonomy by allowing employees to choose when and where they work (van Zoonen et al., 2023). However, there are also drawbacks from digitalization, such as increased fatigue syndromes and fear of job losses (Kim et al., 2023; Alieva and Powell, 2023). Such negative impacts have become significant enough in just a few years' time that the World Health Organization (WHO) considers DT as one of the key factors affecting well-being (WHO, 2021).

Researchers and professionals have yet to offer a comprehensive response regarding the interconnection of well-being amidst DT (Ghislieri et al., 2018). Well-being has become an indispensable determinant for businesses as it is positively correlated to performance, productivity, lower turnover rates, and long-term business success (Akerele, 2023; Bonekamp and Sure, 2015; Harter et al., 2003). In this context, Lyngstadaas and Berg (2022) emphasize that companies should aim to foster employee well-being by nurturing individual psychological needs. Nevertheless, fostering well-being is not an easy task as various aspects of the work environment affect well-being (Briner, 2000).

In this study, we focus on better understanding the influence of DT, which are an important enabler for promoting well-being (Scholze and Hecker, 2023), in various work contexts. Specifically, we highlight the distinction between field/task work and knowledge/office work – or physically- and cognitively-dominated work, respectively – as the adoption of digital technologies can have different impact on these varying domains and eventually on individual employees' health and well-being (Gagné et al., 2022; Scholze and Hecker, 2023). For the purposes of this paper, we consider craft or skilled trades as representing field and task work and consultancy as representing an industry characterized by knowledge and office work.

This paper further considers well-being as a result of a psychological process of the interaction between the individual and the environment (Latham and Pinder, 2005). Well-being is perceived differently by people, as it reflects personal values and is influenced by individual events (Diener, 2006). In the context of an aging population, generation-specific needs are becoming more important to promote employee well-being effectively (AON, 2023). As such, examining employee's well-being needs based on their individual life stages is highly relevant for understanding the influence of DT.

To understand the impact of DT on well-being in an in-depth and comprehensive way, we analyze two levels: the industry level (i.e., craftmanship and consultancy) and the individual level (i.e., different life stages of employees). This study treats well-being as significantly influenced by physical health and three psychological needs based on self-determination theory (SDT): autonomy, relatedness, and competence (Ryan and Deci, 2017).

Our study aims at answering the following research questions: First, what influence does DT have on employees' well-being comparing two different work environments (field/task work and knowledge/office work)? Second, how does the impact of DT on well-being vary across different life stages in the two work environments?

To answer these research questions, focus groups with a preceding survey were conducted with 36 experts from German SMEs from craftsmanship (N=20) and consulting (N=16) industries. The next section discusses the study's theoretical foundations, followed by the research framework that draws from SDT and a life stage perspective. The methodological section presents the study's interactive qualitative approach to explore how DT impacts the described psychological needs and physical health, as identified by the interviewed experts. Subsequently, the findings and their implications are presented and evaluated in the concluding sections.

2. LITERATURE REVIEW

DT in the organizational landscape pertains to the meaningful socio-cultural shift towards a comprehensive and integrative adoption of digital technologies in many aspects of work (Scholze and Hecker, 2023). This study follows strands of research that focus on the influence of DT in differing work domains (i.e., knowledge/office work versus field/task work) and on employee well-being, particularly on basic psychological needs and physical health (e.g. Burr et al., 2020; Gagné et al., 2022; Sahai and Mahapatra, 2020). Subsequent sections hence elaborate on the significance of work contexts on DT, well-being as psychological needs and physical health, and the relevance of life stages.

2.1 Work Domains and Digital Transformation

DT's impact in the workplace can differ depending on the work design and environment, such as the kind of demands and resources specific to a job or industry (Scholze and Hecker, 2023). Hence, this study distinguishes between knowledge/office work and field/task work contexts. In this paper, we consider knowledge occupations such as consulting as cognitively-dominated work domains that are characterized by a high degree of analysis, abstract thinking, problem-solving, strategic brokering, and mediating skills, among others (Fincham, 2006; Reinhardt et al., 2011). Consulting as knowledge work especially involves close client collaboration but also intense competition and fast-paced functioning; allows for technically location-independent operations that are constantly evolving due to new technologies; and is (ideally) quickly responsive to the emergence of disruptive technology-driven newcomers (Treichler, 2019). Alternatively, field/task work such as craftmanship and skilled trades are considered physically dominated work contexts that are characterized more by "tacit knowledge-in-practice" (Kragulj, 2017), handiwork, or labor-intensive tasks. Craftsmanship, in particular, involves specific sets of skills, like creativity, aesthetic design, manual dexterity, or technical know-how to create objects or deliver services by hand (Kroezen et al., 2021).

Big consulting companies are integrating innovative technologies such as artificial intelligence (AI), big data analytical applications, or chatbots that aim to increase employee autonomy and productivity, e.g. by automating simple tasks and basic client support (Nissen, 2018). Although digitalization in the crafts industry is lagging (Thonipara et al., 2020), similar new technologies are driving efficiency improvements (Proeger et al., 2020). However, all these novel tools require huge new sets of skills from the consultants (Nissen, 2018) and craftsmen (Reiman et al., 2021) that can unfortunately intensify already demanding workloads and thus cause increased work pressure and stress (Bonekamp and Sure, 2015; Scholze and Hecker, 2023). In such contexts, organizations providing continuous support and training (Bonekamp and Sure, 2015), applying appropriate change models and best practices (Bosbach et al., 2024), and thus addressing employee needs vis-à-vis work demands and resources (Lyngstadaas and Berg, 2022; Scholze and Hecker, 2023) can help to successfully manage the transformation.

2.2 Well-Being, Psychological Needs, and Physical Health

Employee well-being is a multi-faceted concept (Sahai and Mahapatra, 2020; Zheng et al., 2015) and has been defined as employees' feelings, perceptions, and psychological experiences of satisfaction and health at work (Li et al., 2021; Zheng et al., 2015). Many studies have

emphasized well-being's influence on employees' work motivation and productivity, making the concept an established driver for organizational commitment, job involvement, and job performance (Huang et al., 2016; Kundi et al., 2020; Page and Vella-Brodrick, 2009; Putra et al., 2020).

The present study applies the self-determination theory or SDT (Ryan and Deci, 2017, 2022) as it is an established theoretical lens for understanding the motivational bases for effective organizational behaviour and for investigating influences on needs in the workplace (Gagné and Deci, 2005). SDT states that humans have three basic psychological needs – autonomy, competence, and relatedness – that are fundamental to nurturing people's well-being and vitality. Autonomy entails acting independently and assuming responsibility for one's actions. Relatedness pertains to the desire for social bonding or integration. Competence involves mastering challenges and feeling capable to do (Ryan and Deci, 2020).

Several studies demonstrate that the satisfaction of these core psychological needs is a prerequisite for well-being in the workplace as it is in everyday life (e.g., Van den Broeck et al., 2010; Gomez-Baya and Lucia-Casademunt, 2018; Ryan and Deci, 2022). A comprehensive systematic review of sixty meta-analyses by Ryan et al. (2022) revealed that the fulfilment of these basic psychological needs is strongly associated with wellness and work outcomes. These work-related need satisfactions were especially linked to enhanced job performance, organizational commitment, less strain and burnout, and reduced turnover intentions (Van den Broeck et al., 2010). Some studies state that autonomy most positively influences well-being (Meske, 2019; Brunelle and Fortin, 2021), while others identify competence as the most influencing dimension on well-being (Lechler and Huemann, 2023).

Joshanloo and Jovanović (2018) argue that factors influencing well-being – such as psychological dimensions based on SDT – should be considered in relation to physical health. In the context of DT, the increased use of innovative technologies are changing work design, processes, and practices that impact both psychological needs and physical health (Gagné et al., 2022). For instance, increased computer usage is associated with visual (e.g. eye strain and headaches) and musculoskeletal (e.g. neck, shoulders, back) problems (Deepa, 2016), while work from home is related to perceived job stress, which impacts physical health (Lange and Kayser, 2022). Alternatively, digital technologies have positively affected autonomy, especially by enabling remote work (Gagné et al., 2022). Yet, working virtually has also increased uncertainty and cognitive overload, e.g. exposure to "more stressful and effortful" screen interactions as employees "decipher and synchronize non-verbal behaviour" (Gagné et al., 2022, p. 384). Similarly, remote work may lead to feelings of loneliness and isolation, potentially damaging social bonds with colleagues (Tapani et al., 2022). Other research suggest otherwise, asserting that remote work does not diminish the need for relatedness as social ties in the personal sphere compensate for it (Brunelle and Fortin, 2021). Additionally, employees can handle more complex work as AI increasingly take over simple tasks (Gagné et al., 2022). Yet, while AI-assisted work may positively impact competence, the increased speed and volume of tasks (Scholze and Hecker, 2023) and the pressure to learn such new technologies could result to stress and overall negative effect on well-being (Bonekamp and Sure, 2015; Scholze and Hecker, 2023). Overall, these examples demonstrate that psychological needs and physical health are closely intertwined, increasingly so as organizations digitalize. Hence, considering both psychological needs and physical health is necessary to examine the effects of DT on employee well-being.

2.3 Life Stages and Well-Being

Physical and psychological aspects of employees change with their transition into new life stages (Nilsson, 2020). Thus, a life stage perspective can provide valuable insights into the dynamics and outcomes of employee life stage transitions, including the mechanisms linked to changes in health and well-being (Kim and Moen, 2002; Steptoe et al., 2015).

Life stage models typically divide the human lifespan into several phases from young to old age. Each age period is further associated with specific psychological tasks that need to be addressed (Zacher and Froidevaux, 2021), trends in physical activity and capacities (Hyde et al., 2013), and certain life demands and experiences (Panchal et al., 2017) that influence well-being. For instance, adulthood (20s to early 60s) is marked by decreased levels of physical activity, as individuals enter the work force and establish daily routines with less leisure time and increased responsibilities (Hyde et al., 2013). People cope with job demands and stress differently as they age (Shultz et alm. 2010), and priorities shift from relationships to career to more family-oriented goals - transitions that relate to specific kinds of stressors (e.g., social to financial pressures). Nevertheless, adulthood also consists of rewarding experiences (e.g., joy of having a kid or satisfaction from a thriving career) that impact health and wellness (Panchal et al., 2017). Thus, adulthood is generally characterized by increased well-being, especially in terms of positive affect associated with emotional maturity (Hyde et al., 2013).

However, such well-being patterns may not be universal and can vary at different age brackets of adulthood (Steptoe et al., 2015). Life stage research concerning workers and families also identified a mismatch in terms of increasing time demands, limited temporal resources, and outdated work-hour constraints (Moen, 2011; Roehling et al., 2001) that may have improved or worsened after the Corona pandemic when DT in industries intensified. Hence, this study highlights parenthood as representing one of the factors that define the life stages of a working adult. Additionally, the ongoing demographic change in many high-income countries such as Germany beckons a targeted examination of the needs of different working age groups (Zacher and Froidevaux, 2021) amidst DT.

Overall, a life stage perspective offers a novel and complementary lens to SDT in examining the effects of DT on employee well-being. Research has proven its utility to understand the effects of technologies (Chan, 2018) and to explore stressors and derive coping strategies (Panchal et al., 2017).

3. METHODOLOGY

Due to the explorative nature of our topic, we applied a qualitative methodology. We followed a five-step approach, including surveys, focus groups, and personas (see Table 1).

Table 1. Five-step approach

#	Step	Short description
1	Selection of work context	A) task and field work B) knowledge and office work
2	Workshops	Workshop for each industry with experts: I. Survey (Microsoft Forms) to define the relevant life stages II. Focus group interviews for each life stage: a. Creation of personas b. Discussion of the impact of DT III. Presentation and discussion of the results
3	Measurement	Coding and evaluation of the impact (positive, negative, neutral) on autonomy, competence, relatedness, and physical health
4	Peer review	Peer review of codings
5	Data evaluation	Comparison of the results for both industries

Combining surveys with focus groups offer the possibility of identifying the most relevant research foci from a stakeholder perspective, in case multiple foci are possible (Morgan, 1996). To analyze the impact of DT on employee well-being in different industries, seven groups with two different foci were defined. 16 experts (6 female and 14 male managers) from the consultancy industries represent the focus on knowledge and office work. 20 experts (6 female and 10 male workers and business owners) from craftmanship represent the focus on task and field work. The experts were between 26 and 60 years old and had work experiences of 3 to 20 years. Data were gathered in two separate workshops conducted in July 2023.

Each workshop began with a brief survey that asked about participants' demographic profiles. They were also asked which life stages (<20, 20-29, 30-39, 40-49, 50-59, and 60+ years) and parental statuses (with or without children) they would like to work on in the workshops. Based on the survey results, participants were divided into small groups of 5 to 6 people.

Personas were defined for selected life stage groups. The concept of personas enables the extraction of behavior of typical employees (Blomkvist 2002). With this approach, the workshop participants can immerse in situations and circumstances of typical employees and can gain a deeper understanding of their motivational drivers, fears of DT, and moments that matter. Impacts of DT on their daily work, tasks, skills, and working environment were identified by the participants (see Figure 1).

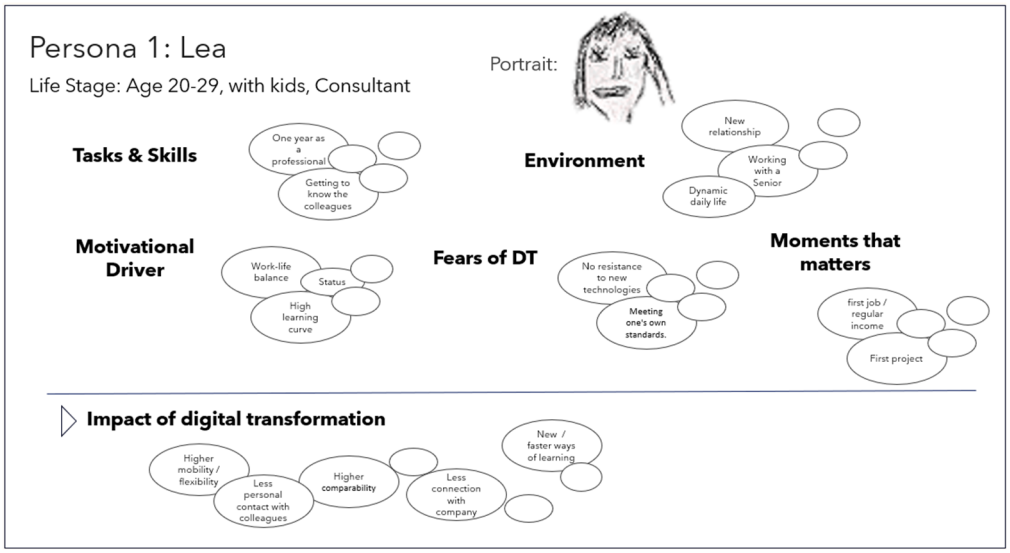

Figure 1. Examples of a persona

After the workshops, the identified impacts of DT on employees' daily work, tasks, skills, and working environment were independently coded by three researchers according to their impact on dimensions of well-being (autonomy, competence, relatedness, and physical health) and rated according to positive, negative, or neutral impact. To do so, we applied the research framework from Helms et al. (2024 a, b), which describes a two-dimensional matrix. The rows describe the dimensions of well-being. The columns describe the socio-demographic factors: life stages and parenthood (see Figure 2).

Consulting (knowledge & office workers)	< 20 Year		20-29 Year		…..		60+ Year	
	with Child	without Child	with Child	without Child	with Child	without Child	with Child	without Child
Autonomy								
Relatedness								
Competence								
physical Health								

Craftsmanship (task & field workers)	< 20 Year		20-29 Year		…..		60+ Year	
	with Child	without Child	with Child	without Child	with Child	without Child	with Child	without Child
Autonomy								
Relatedness	← Well-Being →							
Competence								
physical Health								

Figure 2. Research Framework (Helms et al. 2024 a,b)

4. ANALYSIS AND RESULTS

4.1 Life Stages and Personas

The consultants worked on four personas with age groups and parental statuses 20-29 (no children), 30-39 (no children/children), and 40-49 (children). Experts from crafts business selected three personas for the age groups and parental statuses 20-29 (no children), 30-39 (children), and 40-49 (children).

In total 51 statements describing the influence of DT on daily work of the personas were identified. After the workshops, three researchers independently coded these statements according to their impact on dimensions of well-being (autonomy, competence, relatedness, and physical health) and rated them according to positive, negative, or neutral impact. A total of 88 codings were derived (see Figure 3). The robustness of the evaluation was confirmed using Cohen's Kappa ($\kappa = 0.75$) (Landis and Koch, 1977).

In the following paragraphs, positive codings are annotated as +X, e.g. +8 refers to 8 positive codings. Correspondingly, negative codings are annotated as –Y, e.g. –2 refers to 2 negative codings. Neutral effects were not considered in the analysis.

Consulting (cognitiv dominated work)		< 20 Year	20-29 Year				30-39 Year						40-49 Year			50-59 Year	60+ Year
			without Child			with Child	without Child			with Child			without Child	with Child			
	∑		positive	negative	neutral		positive	negative	neutral	positive	negative	neutral		positive	negative	neutral		
Autonomy	11		1	0	1		1	1	1	1	0	0		2	2	1		
Relatedness	8		0	2	0		1	1	1	0	1	0		1	0	1		
Competence	8		1	0	0		1	1	1	0	2	0		2	0	0		
physical Health	7		0	0	0		2	0	0	0	2	0		1	2	0		
∑	34		2	2	1		5	3	3	1	5	0		6	4	2		

No comparison possible

Craftsmanship (physical dominated work)		< 20 Jahre	20-29 Jahre				30-39 Jahre						40-49 Jahre			50-59 Jahre	60+ Jahre
			without Child			with Child	without Child			with Child			without Child	with Child			
	∑		positiv	negativ	neutral					positiv	negativ	neutral		positiv	negativ	neutral		
Autonomy	13		1	1	1					2	1	0		2	4	1		
Relatedness	6		2	0	0					0	0	0		0	4	0		
Competence	24		10	0	2					4	0	0		3	5	0		
physical Health	11		2	2	0					2	0	0		1	4	0		
∑	54		15	3	3					8	1	0		6	17	1		
overall	88		17	5	4		5	3	3	9	6	0		12	21	3		

Figure 1. Evaluation in detail (Helms et al. 2024 a,b)

4.2 Differentiated Results for Dimensions of Well-Being

The 88 codings indicate that DT strongly influences employee well-being. However, the well-being dimensions autonomy, relatedness, competence, and physical health are affected differently. The workshop results indicate that DT affects the well-being dimension competence the most (32), followed by autonomy (24), physical health (18) and relatedness (14).

Overall, the workshop participants expressed that DT positively affects employees' competence with 21 positive (+21) and 8 negative codings (–8). The positive influence can particularly be observed for personas with children (+12, –1).

In general, DT has a rather balanced effect on autonomy (+10, –9) and physical health (+8, –10). However, the impact of DT on autonomy changes across the life stages. For younger employees (20-29) the impact is balanced and least strong (+2, –1). For older employees (40–49) autonomy is impacted in a negative way (+2, –6).

The needs for relatedness and physical health are perceived to be slightly negatively influenced in both industries.

4.3 Differentiated Results for Industries

The workshop results indicate that DT has a stronger impact for task and field workers (i.e., craftsmen) than for knowledge and office workers (i.e., consultants). 54 codings were derived from the workshop among craftsmen, while only 34 were derived from the consultants.

Figure 3 shows that the overall influence of DT in the consultancy industry is balanced (+14, –14), whereas DT has more positive effects on well-being within the crafts and skilled trades sector (+29, –21). Autonomy is differently affected in consultancy and crafts business. Whereas autonomy is more positively affected in consultancy (+5, –3), the effects are slightly negatively in craft business (+5, –6). DT impacts competence in field work very positively (+17, –5). However, competence in knowledge work is rather affected in a balanced way (+4, –3). For knowledge workers, DT mostly increases autonomy; for field workers, competence is affected the most and in a positive way.

4.4 Differentiated Results for Different Life Stages

For employees in the *life stage of 20-29 with no kids,* the influence of DT on autonomy, relatedness, competence, and physical health is balanced in consultancy (–2, +2) and strongly positive in craftsmanship (+15, –3). However, effects of DT on some well-being dimensions are evaluated in different ways. On the one hand, digital modes of communication and digital services have a positive impact on the need for relatedness of field/task workers, particularly social bonding. In knowledge/office work, the impact of digital communication methods and services is perceived in a negative way due to reduced personal contacts with colleagues and bonding with and within the company. On the other hand, DT improves flexibility and thus autonomy in knowledge work, which was not an argument for field/task workers. The opposite is the case for DT's impact on physical health: field workers considered it as having slightly positive effect while knowledge workers did not mention it at all.

For employees in the *life stage 30-39 with kids*, DT positively impacts needs for autonomy in both industries, although for different reasons. In consultancy, flexibility is the driver for autonomy. In crafts business, automation and digitalization of documentation increase autonomy. Physical health is positively influenced in crafts business (+2, –0) due to increased safety opportunities, but is negatively perceived in consultancy due to increased stress (+0,–2). Furthermore, competence is affected differently for employees at this life stage. In both industries, there is pressure to "keep up" with new technologies and changes at large. In craftmanship, however, learning seems to become easier due to new ways to present and access information (e.g. via RFID chips), new online teaching material, forms of communication and documentation, and self-explanatory services and products (+14,–0). In consultancy, skepticism was expressed about more complex workflows, fear of making mistakes and increased possibilities for performance evaluation by the employer (+0,–2).

The effects of DT on well-being are perceived differently for e*mployees between 40-49 with kids* in the two industries. In craftmanship, DT is perceived as having negative effects, whereas in consulting, positive outcomes have been expressed for all well-being dimensions except physical health. DT influences employee need for autonomy in both industries, but for varied reasons. In craftmanship, increased flexibility satisfies the need for autonomy due to improvements in appointment scheduling. However, fear of being overwhelmed by new technologies and higher work demands reduce the perceived autonomy. Knowledge workers value new technologies as they help save time (e.g. reduced travel time due to online meetings), but such technologies can also be a hindrance as they blur the boundary between work and leisure time. In both work contexts, negative effects on physical health are perceived due to increased anxiety and stress.

5. DISCUSSION

Through a creative and collaborative qualitative approach, this study explores how DT disrupts the way people work and accordingly influences different well-being needs. Specifically, our findings demonstrate that the impact of this DT disruption on employee well-being differs depending on work environments (field/task work vs. knowledge/office work) and on employees' life stages.

Our analysis of both work domains consolidates existing research that DT has a generally strong influence on well-being (Gagné et al., 2022). Yet, it is more positively apparent for those employed in field/task jobs (e.g., craftmanship) than for those in knowledge/office occupations (e.g., consultancy). Furthermore, although our findings confirm that DT positively impacts the need for employee competence the most (Lechler and Huemann, 2023), we also found that this effect is more pronounced for field/task workers. Additionally, our findings corroborate previous studies on DT and its positive influence on employees' need autonomy (Meske, 2019). However, we also found this impact on autonomy to be higher for knowledge/office workers.

Our findings therefore emphasize that the characteristics of work domains matter. Variations on DT's impact on different well-being dimensions can be traced to the nature and organization of tasks in a certain occupation (Gagné et al., 2022) or the job expectations and available resources as an organization integrates new technologies (Scholze and Hecker, 2023). For instance, while craft work tends to rely foremost on individuals' physical strength and refined skills rather than on the internet or computer-mediated tools (Kroezen et al., 2021), the analytical and strategic tasks of knowledge workers like consultants involve IT or statistical support (Reinhardt et al., 2011). The need to bridge such gap in technological competence produces increased pressure and stress on employees (Bonekamp and Sure, 2015; Gagné et al., 2022) - a situation also expressed by the interviewed craft experts, especially older workers.

Alternatively, field/task workers' awareness for technological competence also stimulates appreciation towards the benefits of DT in honing their craft. Such finding supports research about craft work as an 'attitude' more than just an occupation (Kroezen et al., 2021) and encourages further research on DT's impact on well-being and the relevance of inherent work attitudes and ethics in different work domains.

Similarly, the competitive, fast-paced, and computer-assisted nature of consultancy work may explain how greater flexibility made possible by digitalization increases the satisfaction of knowledge workers' need for autonomy. Yet the same autonomy-fulfilling flexibility can lead to employees' constant availability, which can easily increase stress (Scholze and Hecker, 2023) and harm work-life balance (Gagné et al,. 2022; Sahai and Mahapatra, 2020). Greater efficiency brought by DT also contributes to satisfying consultants' autonomy needs but this impact also paves way to stress - and anxiety - inducing perceptions of increased performance evaluations, complex workflows, and dependence on digital technologies, especially AI.

Alternatively, the dimensions of relatedness and physical health were both slightly negatively impacted in both industries. On the one hand, connectivity enabled by digitalization allows for better team communication and coordination at work despite varied locations. Yet the lack of personal contact and bonding interactions can lead to unsatisfied needs for relatedness, including causing social and professional disconnection (Gagné et al., 2022; Tapani et al., 2022) - a sentiment mentioned by knowledge/office workers. On the other hand, knowledge workers cited digital-based work as causing somatic concerns, which aligns with

studies emphasizing the negative physical health effects of increasing digital-based work (Deepa, 2016; Lange and Kayser, 2022).

Nevertheless, our findings also show that DT's influence on these two needs of relatedness and physical health can vary depending on employees' life stages, suggesting that the interaction of work domains and life stages may be of bigger relevance when considering the influence of DT on these two dimensions. For instance, craft employees consider DT positively facilitating their work and safety, yet it adds to the employees' stress and anxiety, especially older craft employees. Additionally, DT has a general perceived negative impact on relatedness among consultants, while DT's impact on relatedness is perceived positively by younger craft employees but increasingly negative by older craft workers. This suggests that promoting relatedness (e.g. by new and more flexible work models, team events, etc.) and physical health initiatives (e.g. ergonomic interventions and stress coping mechanisms, Schultz et al., 2010) would be particularly beneficial for older employees in craftsmanship.

Finally, in terms of life stages in general, our findings demonstrate that DT generally has an increasing perceived negative effect on well-being as employees progress in age and family commitment. This impact is generally applicable to older adults with kids, particularly craft workers aged 40–49 years old and with children. Such finding corroborates past studies that family or parental status of significant consideration for employee well-being (Moen, 2011; Roehling et al., 2001). It further suggests that creating an integrative and collaboration-oriented corporate culture that also considers the respective family situations is an important factor for the well-being of employees (Lyngstadaas and Berg, 2022) as well as for sustainable business success.

6. CONCLUSION AND OUTLOOK

In conclusion, this study presents a thorough investigation into the diverse effects of digital transformation (DT) on employee well-being throughout various life stages and two different work contexts. By examining three core psychological needs (autonomy, relatedness, and competence) as well as physical health, the study delivers new insights on the complexity and importance of employee well-being.

Driving DT requires motivated and engaged employees. But DT also influences employee well-being. Hence, businesses need understand how these dependencies work. Each stage of an employee's life brings unique challenges, particularly in terms of work-life balance, development, and personal / family responsibilities. The distinct impact of DT at each life stage underscores the importance of comprehending and addressing life stage-specific needs as a fundamental step in promoting well-being.

The comparison of different working contexts in times of DT has revealed that significantly more influencing factors were identified in craftsmanship. This could be attributed to the fact that digitization in this industry is not yet as integrated into the workplace as it is in consulting, and there are noticeably more positive and negative impacts perceived or expected. However, a deeper understanding of employee well-being necessitates a specific examination of the work environment, as the influences on employees vary in both industries examined.

A limitation of this study is its incomplete coverage of life stages and its focus on just two work environments. Additionally, a qualitative investigation of motivational drivers was not conducted and could be considered for a deeper understanding of employee well-being on an

individual level. Nevertheless, differences between industries and across life stages became apparent and such multi-level comparison remains under-employed within the research field of information systems and business. The insights from this study further benefit contemporary businesses and organizations, as the current demographic profile of today's workforce becomes increasingly multi-generational.

Overall, considering employee life stages and their specific work environment during DT is not only essential for understanding the diverse needs of the workforce but also for enabling the targeted promotion of employee well-being, and ultimately driving the success of the DT process.

ACKNOWLEDGEMENT

This research was funded by the German Federal Ministry of Education and Research (BMBF) under the project HAMIZU (Grant#02K20D003).

REFERENCES

Akerele, O. O., 2023. The link between motivation and organizational performance: An exploration of factors influencing employee motivation and its impact on organizational success. *International Journal of Business Ethics and Governance*, Vol. 6, No. 1.

Alieva, J. and Powell, D. J., 2023. The significance of employee behaviours and soft management practices to avoid digital waste during a digital transformation. *International Journal of Lean Six Sigma*, Vol. 14, No. 1, pp. 1-32.

AON. 2023. *2022-2023 Aon Global Wellbeing Survey*, AON. https://www.aon.com/global-wellbeing-survey.

Blomkvist S., 2002. Persona – The user as a personality. Using Personas as a tool for design. *Position paper for the course workshop "Theoretical perspectives in Human-Computer Interaction" at IPLab, KTH*, September 3, 2002.

Bonekamp, L. and Sure, M., 2015. Consequences of Industry 4.0 on human labour and work organisation. *Journal of Business and Media Psychology*, Vol. 6, No. 1, pp. 33-40.

Bosbach, J. et al., 2024. Digitale Transformation im Handwerk – Motivatoren, Wünsche und Ängste von Mitarbeiter*innen im Change Prozess. *HMD*, Vol. 61, No. 1, pp. 128-140.

Briner, R. B., 2000. Relationships between work environments, psychological environments and psychological well-being. *Occupational Medicine*, Vol. 50, No. 5, pp. 299-303.

Brunelle, E. and Fortin, J.-A., 2021. Distance makes the heart grow fonder: An examination of teleworkers' and office workers' job satisfaction through the lens of self-determination theory. *SAGE Open*, Vol. 11, No. 1.

Burr, C. et al., 2020. The ethics of digital well-being: A thematic review. *Science and Engineering Ethics*, Vol. 2, No. 4, pp. 2313-2343.

Chan, M., 2018. Digital communications and psychological well-being across the life span: Examining the intervening roles of social capital and civic engagement. *Telematics and Informatics*, Vol. 35, No. 6, pp. 1744-1754.

Deepa, S., 2016. Computer-related health problems among white-collar employees: Communicating a blueprint. *Indian Journal of Science and Technology*, Vol. 9, No. 32.

Diener, E., 2006. Guidelines for national indicators of subjective well-being and ill-being. *Journal of Happiness Studies: An Interdisciplinary Forum on Subjective Well-Being*, Vol. 7, No. 4, pp. 397-404.

Fincham, R., 2006. Knowledge work as occupational strategy: comparing IT and management consulting. *New Technology, Work and Employment*, Vol. 21, No. 1, pp. 16-28.

Gagné, M. and Deci, E. L., 2005. Self-determination theory and work motivation: Self-determination theory and work motivation. *Journal of Organizational Behavior,* Vol. 26, No. 4, pp. 331-362.

Gagné, M. et al., 2022. Understanding and shaping the future of work with self-determination theory. *Nature Reviews Psychology,* Vol. 1, No. 7, pp. 378-392.

Ghislieri, C. et al., 2018. Work and organizational psychology looks at the fourth industrial revolution: How to support workers and organizations? *Frontiers in Psychology,* Vol. 9, 2365.

Gomez-Baya, D. and Lucia-Casademunt, A. M., 2018. A self-determination theory approach to health and well-being in the workplace: Results from the sixth european working conditions survey in Spain. *Journal of Applied Social Psychology*, Vol. 48, No. 5, pp. 269-283.

Harter, J. K. et al., 2003. 'Well-being in the workplace and its relationship to business outcomes: A review of the Gallup studies', in C. L. M. Keyes and J. Haidt (eds.) *Flourishing: Positive Psychology and the Life Well-Lived.* Washington: American Psychological Association, pp. 205-224.

Helms, M. et al., 2024a. Well-being and life stages in digital work environments. *Proceedings of the 17th IADIS International Conference (Information Systems 2024).* Porto, Portugal.

Helms, M. et al., 2024b. Digitale Transformation und Well-being in unterschiedlichen Lebensphasen. *HMD*, Vol. 61, No. 1, pp. 114-127.

Huang, L.-C. et al., 2016. High performance work systems, employee well-being, and job involvement: An empirical study. *Personnel Review*, Vol. 45, No. 2, pp. 296-314.

Hyde, A. L. et al., 2013. Enhancing our understanding of physical activity and wellbeing with a lifespan perspective. *International Journal of Wellbeing*, Vol. 3, No. 1, pp. 98-115.

Joshanloo, M. and Jovanović, V., 2018. Subjective health in relation to hedonic and eudaimonic wellbeing: Evidence from the Gallup World Poll. *Journal of Health Psychology*, Vol. 26, No. 3, pp. 438-448.

Kim, J. et al., 2023. Antecedents influencing SNS addiction and exhaustion (fatigue syndrome): Focusing on six countries. *Behaviour & Information Technology*, Vol. 42, No. 15, pp. 2601-2625.

Kim, J. E. and Moen, P., 2002. Retirement Transitions, Gender, and Psychological Well-Being: A Life-Course, Ecological Model. *The Journals of Gerontology: Series B*, Vol. 57, No. 3, pp. 212-222.

Kragulj, F., 2017. Characterising human capital in the craft industry. *Proceedings of the 14th International Conference on Intellectual Capital, Knowledge Management & Organisational Learning*. Hong Kong, pp. 145-151.

Kroezen, J. et al., 2021. Configurations of craft: Alternative models for organizing work. *Academy of Management Annals*, Vol. 15, No. 2, pp. 502-536.

Kundi, Y. M. et al., 2020. Employee psychological well-being and job performance: Exploring mediating and moderating mechanisms. *International Journal of Organizational Analysis*, Vol. 29, No. 3, pp. 736-754.

Landis, J. R. and Koch, G. G., 1977. The measurement of observer agreement for categorical data. *Biometrics*, Vol. 33, No. 1, pp. 159-174.

Lange, M. and Kayser, I., 2022. The role of self-efficacy, work-related autonomy and work-family conflict on employee's stress level during home-based remote work in Germany. *International Journal of Environmental Research and Public Health*, Vol. 19, No. 9, 4955.

Latham, G. P. and Pinder, C. C., 2005. Work motivation theory and research at the dawn of the twenty-first century. *Annual Review of Psychology,* Vol. 56, No. 1, pp. 485-516.

Lechler, R. C. and Huemann, M., 2023. Motivation of young project professionals: Their needs for autonomy, competence, relatedness, and purpose. *Project Management Journal*, Vol. 55, No. 1, pp. 50-67.

Li, Z. et al., 2021. Impact of future work self on employee workplace wellbeing: A self-determination perspective. *Frontiers in Psychology,* Vol. 12, 656874.

Lyngstadaas, H. and Berg, T., 2022. Harder, better, faster, stronger: Digitalisation and employee well-being in the operations workforce. *Production Planning & Control*, pp. 1-18.

Meske, C., 2019. Digital workplace transformation – On the role of self-determination in the context of transorming work environments. *Proceedings of the 27th European Conference on Information Systems (ECIS)*. Stockholm & Uppsala, Sweden.

Moen, P., 2011. From 'work–family' to the 'gendered life course' and 'fit': Five challenges to the field. *Community, Work & Family*, Vol. 14, No. 1, pp. 81-96.

Morgan, D., 1996. Focus Groups. *Annual Review of Sociology*, Vol. 22, pp. 129-152.

Nilsson. K., 2020. A sustainable working life for all ages – The swAge-model. *Applied Ergonomics*, Vol. 86.

Nissen. V., 2018. 'Digital transformation of the consulting industry – Introduction and overview', in V. Nissen (ed.) *Digital Transformation of the Consulting Industry: Extending the Traditional Delivery Model*. Cham: Springer International Publishing, pp. 1-58.

Page, K. M. and Vella-Brodrick, D. A., 2009. The 'what', 'why' and 'how' of employee well-being: A new model. *Social Indicators Research*, Vol. 90, No. 3, pp. 441-458.

Panchal, S. et al., 2017. Stress and wellbeing: A life stage model. *International Journal of Stress Prevention and Wellbeing*, Vol. 1, No. 5, pp. 1-3.

Proeger, T. et al., 2020. Mechanismen, Erfolgsfaktoren und Hemmnisse der Digitalisierung im Handwerk. *35, Göttinger Beiträge zur Handwerksforschung*.

Putra, M. R. et al., 2020. Determination of employee motivation and performance: Working environment, organizational culture, and compensation (a study of human resource management literature). *Dinasti International Journal of Education Management and Social Science*, Vol. 1, No. 3, pp. 419-436.

Reiman, A. et al., 2021. Human factors and ergonomics in manufacturing in the industry 4.0 context – A scoping review. *Technology in Society*, Vol. 65, 101572.

Reinhardt, W. et al., 2011. Knowledge worker roles and actions – Results of two empirical studies, *Knowledge and Process Management*, Vol. 18, No. 3, pp. 150-174.

Roehling, P. V. et al., 2001. The relationship between work-life policies and practices and employee loyalty: A life course perspective. *Journal of Family and Economic Issues*, Vol. 22, No. 2, pp. 141-170.

Ryan, R. M. and Deci, E. L., 2017. *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. New York: Guilford Press.

Ryan, R. M. and Deci, E. L., 2020. Intrinsic and extrinsic motivation from a self-determination theory perspective: Definitions, theory, practices, and future directions. *Contemporary Educational Psychology*, Vol. 61, 101860.

Ryan, R. M. and Deci, E. L., 2022. 'Self-determination theory', in F. Maggino (ed.) *Encyclopedia of Quality of Life and Well-Being Research*. Cham: Springer International Publishing, pp. 1-7.

Ryan, R. M. et al., 2022. We know this much is (meta-analytically) true: A meta-review of meta-analytic findings evaluating self-determination theory. *Psychological Bulletin*, Vol. 148, No. 11-12, pp. 813-842.

Sahai, A. and Mahapatra, M., 2020. Subjective well-being at workplace: A review on its implications. *Journal of Critical Reviews*, Vol. 7, No. 11, pp. 807-810.

Scholze, A. and Hecker, A., 2023. Digital job demands and resources: Digitization in the context of the job demands-resources model. *IJERPH*, Vol. 20, No. 16, 6581.

Shultz, K. S. et al., 2010. Age differences in the demand–control model of work stress. *Journal of Applied Gerontology,* Vol. 29, No. 1, pp. 21-47.

Steptoe, A. et al., 2015. Subjective wellbeing, health, and ageing. *The Lancet*, 385, No. 9968, pp. 640-648.

Tapani, A. et al., 2022. Experiences of relatedness during enforced remote work among employees in higher education. *Challenges*, Vol. 13, No. 2, 55.

Thonipara, A. et al., 2020. Digitalisierung im Handwerk - ein Forschungsüberblick. *Göttinger Beiträge zur Handwerksforschung, No. 36.*

Treichler, C., 2019. 'Consulting industry and market trends: A two-sided view', in V. Nissen (ed.) *Advances in Consulting Research. Contributions to Management Science* [Online]. Cham: Springer, pp. 253-272.

van Zoonen, W. et al., 2023. Staying connected and feeling less exhausted: The autonomy benefits of after-hour connectivity. *Journal of Occupational and Organizational Psychology*, Vol. 96, No. 2, pp. 242-263.

Van den Broeck, A. et al., 2010. Capturing autonomy, competence, and relatedness at work: Construction and initial validation of the work-related basic need satisfaction scale. *Journal of Occupational and Organizational Psychology*, Vol. 83, No. 4, pp. 981-1002.

World Health Organization. 2021. Geneva charter for well-being. *10th Global Conference on Health Promotion*. Geneva, Switzerland.

Zacher, H. and Froidevaux, A., 2021. Life stage, lifespan, and life course perspectives on vocational behavior and development: A theoretical framework, review, and research agenda. *Journal of Vocational Behavior*, Vol. 126, 103476.

Zheng, X. et al., 2015. Employee well-being in organizations: Theoretical model, scale development, and cross-cultural validation. *Journal of Organizational Behavior*, Vol. 36, No. 5, pp. 621-644.