Shaping Digital Well-being: Developing a Well-being Lens on the Socio-technical Systems Perspective in Information Systems Research

Dissertation

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"Technology is neither good nor bad;
nor is it neutral"

(Kranzberg's First Law of Technology, 1986, p. 545)

Copyright Statement

The following sections are partly comprised of content taken from research papers included in this dissertation. To improve the text's readability, I have omitted the standard labeling of citations at these points.

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Abstract

Digital technologies continue to radically transform our lives, often in ways previously thought unimaginable. While innovations such as artificial intelligence and telemedicine have brought about significant advancements, they also raise critical concerns regarding their potential negative impacts on human well-being. This dissertation explores the complex relationships between digital technologies and well-being, addressing the pressing question: *Given these technological advancements, why are we not happier?* Despite a growing body of information systems research examining the 'dark side' of technology, we have lacked a well-defined conceptualization of well-being in digital societies, i.e., digital well-being. Accordingly, the research objective of this cumulative doctoral dissertation is: *Shape digital well-being by developing a well-being lens on the socio-technical systems perspective in the IS research.*

In this dissertation, I seek to bridge this gap by pursuing three primary research goals: (1) gain a comprehensive understanding of well-being in digital societies, (2) establish a research framework to structure digital well-being for the information systems research, and (3) contribute to the conceptualization of digital well-being from an IS perspective. To achieve its objectives, this cumulative dissertation adopts a multidisciplinary approach, drawing on insights from information systems, philosophy, psychology, and public policy. It comprises eight research papers that examine *how* digital technologies shape specific dimensions and components of well-being in digital societies.

Papers 1 and 2 explore how social media influence the formation of social connections in digital societies, highlighting both positive and negative implications. Paper 3 underscores the transformative role of generative artificial intelligence in reshaping higher education, emphasizing the need to understand its effects on learning, teaching, and personal development. Papers 4 to 8 focus on how digital technologies impact on health, both in private and occupational settings, shedding light on emerging technologies' key roles in maintaining and enhancing individual and societal well-being at the personal and organizational levels.

Collectively, the eight research papers underscore that digital social connections, digital education, and digital (occupational) health are fundamental pillars of human well-being, which should be evaluated across subjective, objective, and contextual dimensions of human experience. By synthesizing these findings, this dissertation introduces a cohesive working definition of digital well-being, enriching the information systems research and providing a unified framework to examine the complex interactions between *people*, *tasks*, and *systems* in digital societies. Ultimately, it highlights the imperative for information systems research to not only address the challenges posed by emerging technologies, but also to actively enhance human well-being in an increasingly digital world.

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Abbreviations and Initializations

AI	artificial intelligence
ANCOVA	analysis of covariance
CG	control group
DR	digital responsibility
DWB	digital well-being
EU	the European Union
GDP	gross domestic product
GDPR	General Data Protection Regulation
GenAI	generative artificial intelligence
HCD	human-centered design
HCI(s)	human-computer interaction(s)
ICT(s)	information and communication technology/ies
IS	information system(s)
LLM(s)	large language model(s)
mHealth	mobile health
MM(s)	maturity model(s)
OECD	the Organization for Economic Co-operation and Development
OHM	occupational health management
PA(s)	physical activity/ies
PCT	privacy calculus theory
PHA(s)	public health authority/ies
PHAMM	the Public Health Agency Maturity Model
PLS-SEM	Partial Least Squares Structural Equation Modeling
RCT	randomized control trial
RG(s)	research goal(s)
RO(s)	research objective(s)
RQ(s)	research question
SD	standard deviation
SDG(s)	the United Nations' Sustainable Development Goal(s)
SLR	systematic literature review
SNS(s)	social networking site(s)
SWB	subjective well-being
TAM	the Technology Acceptance Model
TG(s)	treatment group(s)
TPB	the Theory of Planned Behavior
UNECE	the United Nations Economic Commission for Europe
UTAUT	Unified Theory of Acceptance and Use of Technology
WHO	the World Health Organization

1 Introduction

1.1 Motivation

Digital technologies have already fundamentally transformed our lives in ways that were unimaginable just a decade ago. For instance, few would have anticipated that artificial intelligence (AI) would achieve top scores on prestigious MBA exams (Terwiesch, 2023), or that telemedicine would enable patients to receive medical consultations, diagnoses, and treatment plans without leaving their homes (Miller, 2024). These scenarios have become realities, highlighting digital progress's profound and often unforeseen impacts on various aspects of our lives.

While digital technologies have brought about many positive changes to our quality of life, such as improved communication, greater access to information, and advancements in healthcare, they also raise important questions about their potential negative impacts, often referred to as the 'dark side' (D'Arcy et al., 2014). The gravity of these concerns was underscored during a 2022 Senate hearing, where Mark Zuckerberg, co-founder and CEO of Meta[1], faced accusations of having "blood on [his] hands" owing to the perceived detrimental effects of his platform on societal well-being (Gibson, 2024).

For instance, while social media platforms are connecting people across the globe, they have also been linked to issues such as the spread of misinformation (e.g., Weismueller et al., 2024), online ostracism (e.g., Schneider et al., 2017), and lower user mental well-being (e.g., Shakya & Christakis, 2017). Similarly, while AI technologies have improved processes and increased efficiency in various life domains, they have led to concerns about job displacement (e.g., Rawashdeh, 2023), questions about who bears responsibility in AI decision-making (e.g., Benbya et al., 2021), and issues of discrimination (e.g., Z. Chen, 2023). These examples highlight the double-edged nature of technological progress, prompting the information systems (IS) research to carefully consider both the benefits (e.g., Calvo & Peters, 2014; Hunter et al., 2023) and the potential drawbacks (e.g., D'Arcy et al., 2014; Tarafdar et al., 2020) as we increasingly integrate emerging technologies into today's digital society.

As we reflect on transformational processes in our society, the conversation inevitably broadens to include a thorough examination of how technologies affect human well-being. This dialogue involves researchers (Meythaler et al., 2023; Spiekermann et al., 2022), governmental

[1] Launched as Facemash in 2003, it became TheFacebook on February 4, 2004, before changing its name to Facebook in August 2005 and then rebranding as Meta on October 28, 2021.

bodies (European Union, 2019), platform developers (Zuckerberg, 2018), and society (Calvo et al., 2016). In this dialogue, a growing question has emerged: *Now that we have all this new technology, why are we not happier?* (Calvo et al., 2016).

This question gains even more weight, considering the 2024 *World Happiness Report*, which revealed a concerning decline in the well-being of 15- to 24-year-olds across North America, Western Europe, the Middle East, and North Africa, and South Asia since 2019 (World Happiness Report, 2024). This decline is particularly concerning, given the ongoing rapid technological advancements highlighted by the Organization for Economic Co-operation and Development (OECD) in 2024 (OECD, 2024), which are often assumed to positively impact on this digitally native age group, sometimes called Generation Z (Turner, 2015).

However, questions about the relationships between technologies and well-being have emerged not only from outside the IS field but are also debated in established IS journals such as the *Journal of Information Technology*. Early in 2012, Walsham (2012) asked: "Are we making a better world with information and communication technologies?" (p. 87). This question remains highly relevant today, particularly given the challenges posed by emerging technologies in the past few years. In its recent Wake-Up Call on Digital Democracy in *Business & Information Systems Engineering*, IS researchers asked whether they can continue to ignore digital technologies' potentially problematic roles in democracies (Weinhardt et al., 2024). There is a growing consensus that IS researchers should seek to fundamentally enhance human experience and design for well-being (Shen et al., 2022; Spiekermann et al., 2022). But what does *design for well-being* mean, and how can researchers contribute to it?

1.2 Research Aims and Structure of my Dissertation

Our interest in happiness and well-being spans thousands of years, ranging from indigenous beliefs (Yadeun-Antuñano, 2018) to the ancient Greeks (Angner, 2011). Today, this interest remains central across research disciplines, as many scholars across most social science disciplines, at least from a publishing perspective, are taking a well-being-oriented lens on their field and discipline (Jarden & Roache, 2023). This is unsurprising, given that our grasp of well-being significantly shapes human practices, including governance, education, healthcare, employment, and technology design (Shen et al., 2022), as they all seek to change human lives for the better and therefore require a clear understanding of what 'better' means (Ryan & Deci, 2001, p. 142).

Given the deep integration of digital technologies into our daily lives (Shen et al., 2022), it is desirable that IS researchers strongly enhance human well-being. In this context, technologies' impacts on national productivity have been studied extensively, particularly in terms of

economic output (Dewan & Kraemer, 2000; Pohjola, 2001). However, it is well established that digital progress influences more than just economic performance; it also affects a broader range of well-being dimensions, including enhanced education, access to healthcare, social capital, and social equality (Hatem & Ker, 2021). The International Network for Government Science Advice, a global network dedicated to enhancing the uses of scientific evidence in policymaking, emphasizes that, "to understand well-being in the 21st century requires an understanding of transformative digital technologies as drivers of change not just in human material circumstances, but also in human values and organizational systems that support well-being" (Gluckman & Allen, 2018, p. 10). The ongoing digital transformation of society requires the critical examination of how emerging technologies have reshaped our understanding and conceptualization of well-being (Spiekermann et al., 2022).

However, in the IS research field, we have lacked a well-defined conceptualization of well-being in digital societies (*digital well-being / DWB*). Although a substantial body of research has focused on the 'dark side of technology uses and their harmful effects on individuals (e.g., D'Arcy et al., 2014), these studies have often overlooked existing well-being theories and paradigms, thereby failing to actively contribute to human flourishing in digital societies (Nisafani et al., 2020; Salo et al., 2022; Silic & Back, 2016). Further, studies that emphasize the positive impacts or designs of technologies often neglect to consider how these technologies interact with and affect various aspects of users' lives in their broader socio-technical context (K. Hall, Richter, et al., 2022; Villalobos-Zúñiga & Cherubini, 2020).

Since IS are socio-technical systems that combine technical IT applications with their use (Schütte et al., 2022, p. 532), it is important to take a socio-technical approach to address challenges that come with technological progress. This perspective helps position the IS research within interdisciplinary efforts and contributes to the design, management, and use of digital services, platforms, and emerging technologies that prioritize human well-being (Schütte et al., 2022). Accordingly, this dissertation seeks to address this need through its overarching research objective (RO):

RO: Shape digital well-being by developing a well-being lens on the socio-technical systems perspective in the IS research.

However, shaping DWB remains challenging. Spiekermann et al. (2022) argued that the IS research aimed at enhancing well-being must first articulate and deconstruct the broad concept of well-being into specific, measurable constructs to clarify its nomological network. This dissertation adopts a *knowledge-* and *design-oriented approach* to effectively shape DWB. Thus, in step one, it is necessary to start by understanding what dimensions well-being

encompasses and how they are shaped by digital technologies *(a knowledge-oriented approach*). Thus, I pose the following research goal (RG):

RG1: Gain a comprehensive understanding of well-being in digital societies by (a) systematically deconstructing this broad concept into dimensions and measurable constructs and (b) examining how various dimensions and constructs of well-being are shaped by digital technologies.

To achieve RG1, Chapter 2 first examines the theoretical foundations and varying dimensions of human well-being from various disciplinary perspectives, reviews current research streams on IS for human well-being, and provides an overview over how *digital well-being* has been used and conceptualized in the literature. Building on this generated knowledge, this cumulative dissertation proposes a research agenda that seeks to gain an in-depth understanding of how technologies reshape different dimensions of well-being and the concept of 'the good' in digital societies.

Finally, Chapter 3 comprises eight empirical research papers that generate deeper insights into *how* different dimensions of human well-being are affected by the digital information age (*Main Results*). Two research papers examine how social media platforms have fundamentally reshaped how we interact and form relationships, altering the dynamics of communication and social bonding in the digital age (Diel et al., 2021; K. Hall, Buck, & Diel, 2024). One paper focuses on how technology is reshaping learning environments in higher education by examining the rapid adoption of ChatGPT and its implications for transforming higher education practices now and in the future (Gimpel et al., 2024). Finally, five papers explore how digital technologies alter the ways in which individuals exercise and maintain their health in both private and occupational settings (Doctor et al., 2023; K. Hall, Helmus, & Eymann, 2024; K. Hall, Oesterle, et al., 2024; K. Hall, Oesterle, et al., 2022; K. Hall, Richter, et al., 2022).

As socio-technical systems are often complex and represent *wicked* problems that may be impossible to solve, developing "theories for analyzing" in the form of conceptual models is a hallmark of IS research (Schütte et al., 2022). Drawing on the socio-technical systems perspective in the IS research (Heinrich et al., 2004), Chapter 4 (*Discussion*) synthesizes the generated knowledge from Chapters 2 and 3 to develop a holistic framework of the interrelationships between human well-being, human practices, and the increasing pervasiveness of technologies (*a design-oriented approach*). Specifically, by developing a well-being lens on the socio-technical systems perspective, this chapter proposes a unified

framework for examining how *people*, *tasks*, and *systems* interact in digital societies in a way that is 'good' for humans. Thus:

RG2: Develop a research framework to structure IS for human well-being by developing a well-being lens on the socio-technical systems perspective in the IS research.

Further, to strengthen the interdisciplinary discourse in the field, my dissertation provides a working definition of DWB. While several disciplines such as media research or digital ethics, have engaged more deeply with the concept, they have defined DWB from their own perspectives and within their specific research domains (e.g., Almourad et al., 2021; Burr & Floridi, 2020; Vanden Abeele, 2021). However, a socio-technical perspective that considers the reciprocal interplay between individuals, digital technologies, and societal structures is largely missing from these discussions. By synthesizing insights from the eight research papers with theoretical foundations of human well-being, my dissertation complements existing definitions by offering a broader, interdisciplinary perspective (Chapter 5.1). Thus:

RG3: Contribute to the interdisciplinary concept of DWB by enriching existing definitions with an IS perspective.

The remainder of this dissertation is structured as follows: Chapter 2.1 delves into the theoretical foundations of human well-being, drawing on various research disciplines. Chapter 2.2 reviews both historical and contemporary developments in the IS research and contextualizes the dissertation in the broader context of the field. Chapter 2.3 proposes a research agenda aimed at achieving a more cohesive integration of well-being considerations into IS. Chapter 3 presents the primary findings of the dissertation, offering a comprehensive overview of the results and developing a nuanced understanding of the core issues. In Chapter 4, the results of the theoretical analysis and empirical research contributions are synthesized into a socio-technical systems perspective, incorporating a well-being lens. Chapters 5 and 6 address the dissertation's overall contributions, discuss its limitations, and suggest directions for future research. Finally, Chapter 7 concludes.

2 Theoretical Background

2.1 Foundations of Human Well-being

Chapter 2.1 explores the theoretical foundations of human well-being from the perspectives of various disciplines, including psychology, philosophy, and public policy to provide a thorough understanding of how well-being is conceptualized, measured, and addressed in these fields, creating a robust foundation for research on well-being in digital societies.

2.1.1 Understanding the Term *Well-being*

Several scientific disciplines and researchers have engaged with the concept of well-being, including economics, psychology, philosophy, and public policy (Burr & Floridi, 2020). However, there has been no clear and useful definition and conceptualization of well-being (Jarden & Roache, 2023), as "there is general agreement that well-being is a multi-dimensional concept, that is where the consensus ends" (Hone et al., 2016, p. 98). According to Hone et al. (2016), the most widespread definition of well-being is likely this: "well-being can be understood as how people feel and how they function both on a personal and social level, and how they evaluate their lives as a whole" (Michaelson et al., 2012, p. 6). However, researchers argue that there is a significant disparity between how ordinary people use *well-being* and how it is conceptualized across research disciplines (Jarden & Roache, 2023). This gap becomes apparent with the formulation of the United Nations' Sustainable Development Goals (SDGs).

The SDGs, part of the 2030 Agenda for Sustainable Development adopted by all United Nations' Member States, consist of 17 interconnected objectives (SDG1 – SDG17) aimed at addressing global challenges such as ending poverty, protecting the planet, and ensuring prosperity and well-being for all. These goals seek to improve the quality of life for people worldwide by promoting social inclusion, economic development, and environmental sustainability (UN, 2024). In the context of this dissertation, SDG3 stands out as it specifically aims to "ensure healthy lives and promote well-being for all at all ages" (UN, 2024).

However, while health and well-being are considered together and often used interchangeably in the context of the SDGs, the academic literature reveals significant disparities in how these concepts are understood, conceptualized, assessed, and interrelated (e.g., Diener et al., 1998). Even Aristotle clearly distinguished between health (*halos*) and well-being. He viewed *health* primarily as a biological function, and *well-being* as *eudaimonia*, which can be translated as flourishing, blessedness, or prosperity, reflecting a more comprehensive conception of human fulfillment and thriving beyond mere physical health (Mehmet, 2012).

Despite significant contemporary interest, the definitions and implications of *health* and *well-being* remain debated in academia. In 1948, the World Health Organization (WHO) defined health as "complete state of physical, social and mental well-being, and not just the absence of disease or infirmity" (WHO, 2020, p. 1), establishing a close relationship between the two concepts. While the definition has undergone minimal changes over the past decades, it has been subject to constant criticism, which has intensified in the last 15 years (Huber et al., 2011). The primary criticism revolves around the term *complete state*, as chronic illnesses and life expectancy evolved over the years, for instance owing to improvements in medical treatment

(Catillon et al., 2018). Researchers have argued that, as emerging digital technologies enable the detection of abnormalities that may not necessarily lead to illness, and as companies develop treatments for conditions previously not considered health problems, the notion of achieving *complete health* appears increasingly elusive (Huber et al., 2011). The 1948 WHO definition has changed, from emphasizing "complete physical, mental, and social well-being" to prioritizing the ability to adapt and self-manage in the face of various challenges (Huber et al., 2011). The ability to adapt can further be assessed at the physiological, emotional, cognitive, and behavioral levels (Heinen et al., 2022).

In contrast, *psychological well-being* is often characterized as *human flourishing* and the holistic *wellness of both body and mind* (Ryff & Singer, 1998). It is often conceptualized as a feeling or a psychological construct, focusing on the subjective experience commonly termed *subjective well-being* (SWB) (Diener et al., 1998; Diener et al., 1999). Mc Naught (2012) argued that health is only one component of well-being, defining *well-being* as a "macro concept concerned with the objective and subjective assessment of how human beings survive, thrive and function" (p. 11). According to the OECD's *How's Life?* Report (2020), a comprehensive statistical publication released every two to three years that documents a broad range of well-being outcomes across OECD member countries[2], health is considered one essential aspects of life, alongside factors such as education, employment, and overall living conditions. I will delve into this further in Chapter 2.1.3. In this sense, researchers argue that all SDGs support health and well-being (i.e., Weeks et al., 2023), as the WHO describes the social determinants of health as "the conditions in which people are born, grow, work, live and age, and the wider set of forces and systems shaping the conditions of daily life" (WHO, 2023).

Given the complexities in defining and measuring well-being, one must delve into the theoretical paradigms that underpin these concepts (Spiekermann et al., 2022). In the next chapter, I will explore the various theoretical frameworks of human well-being, providing a comprehensive understanding of how well-being is conceptualized across academic disciplines and its implications for policy and practice. This exploration will illuminate diverse perspectives on well-being, facilitating a deeper appreciation of the multifacetedness of this crucial aspect of our lives.

[2] For a list of OECD member countries, see the OECD's website.

2.1.2 Theories of Well-being

2.1.2.1 Philosophy

To understand why technology has not led to a more profound increase in human happiness, as outlined in the introduction section, it is crucial to delve into the theories of well-being that form the philosophical foundation of happiness. By exploring these theories, this dissertation provides insights into what constitutes a truly 'good' life and how the concept of well-being is scientifically derived. Philosophical theories of well-being are generally divided into three categories (Fletcher, 2013):

- Hedonistic
- Desire fulfilment
- Objective list theories.

These three traditions are built on differing perspectives on human nature and of what constitutes 'a good society.' Although the tripartite classification is common but not universal (Woodard, 2013), it represents a simplified typology of well-being strategies that aligns well with this dissertation's objectives. In this chapter, I will briefly address each of these perspectives.

Hedonistic theories

Hedonism, the belief that well-being is fundamentally tied to happiness or the pursuit of pleasure, has been a prominent perspective throughout history (Ryan & Deci, 2001). Greek philosophers from the fourth century B.C. advocated that the objective of life is to maximize pleasure and that happiness comprises the sum of one's hedonic experiences (Ryan & Deci, 2001). Hedonistic theories posit that human well-being is primarily determined by pleasure and the avoidance of pain, constituting subjective happiness. Psychologists who embrace this perspective typically adopt a comprehensive view of hedonism as encompassing the preferences and pleasures of both the mind and the body (Kubovy, 1999). According to Kahneman and Tversky (1979), hedonic psychology explores the factors that contribute to both pleasant and unpleasant experiences in life, with the aim of maximizing human happiness. While various methods exist to assess the pleasure/pain continuum in human experience, most of the hedonic psychology research has focused on evaluating SWB (Ryan & Deci, 2001). SWB as a construct has three components: frequent positive affect, infrequent negative affect, and an evaluation of the subject's overall "satisfaction with life" (Diener et al., 1998). Further, researchers argue that well-being is not only about the immediate experience of pleasure or pain, but also about how individuals mentally anticipate and interpret these experiences (Ryan

& Deci, 2001). Thus, hedonic views closely intersect with behavioral and cognitive theories of reward and punishment.

Despite the widespread popularity of hedonistic views, researchers have criticized hedonic theories of well-being for their tendency to oversimplify the complexity of human happiness and well-being, while overlooking other key factors such as self-realization and fulfillment. Further, a primary criticism of this view of well-being is that, while an action may bring about short-term pleasure, it may be detrimental or harmful to an individual or society in the long term. Hedonism theories view happiness as the sole basic welfare good, and suffering as the only basic welfare bad (Fletcher, 2013). However, Nozick's *experience machine* thought experiment challenged this notion by suggesting that individuals value more than just pleasure; they also prioritize authenticity, autonomy, and genuine experiences (Feldman, 2011). To demonstrate that happiness is not the sole contributor to human well-being, in 1974, Nozick introduced a thought experiment, asking individuals to consider the possibility of plugging into an *experience machine* that would provide exclusively pleasurable experiences. Nozick suggested that individuals would decline this offer because they desire a life that is "in contact with reality" rather than an artificial existence (Nozick, 1974). Indeed, several related studies have shown that participants tend to reject the option to live in an artificially simulated reality (Hindriks & Douven, 2018; Weijers, 2014). The experiment's findings imply that happiness alone may not serve as the only determinant of well-being, highlighting the need for a more comprehensive understanding of human well-being.

Desire fulfillment theories

Desire fulfillment theories propose that the intrinsic good for individuals and other subjects of well-being resides in achieving their desires or having their needs fulfilled (Heathwood, 2015). Conversely, what is inherently bad for them is failing to attain their desires or experiencing the thwarting of their needs (Fletcher, 2013). In accordance with hedonistic theories, desire fulfillment theories exhibit subjectivism regarding well-being, as they suggest that leading a good life is determined by individuals' attitudes. The primary argument in support of desire fulfillment theory over hedonism is rooted in the observation that many individuals' self-interested concerns extend beyond mere pleasure and pain, encompassing a broader range of desires and aspirations (Chappell & Meissner, 2023). As articulated by Nozick (1974), individuals often prioritize more than just their immediate gratification; they also value pursuits such as understanding the truth, particularly concerning the fulfillment of their other desires (Hooker, 2015). Critics of desire fulfillment theories argue that not everything individuals desire necessarily translates into a benefit for them (Hooker, 2015).

Objective list theories

Objective list theories, the third category of well-being, posit that individuals can benefit not only from pleasure or the fulfillment of certain needs but also from other aspects, often referred to as 'goods' (Fletcher, 2013). In contrast to desire fulfillment theories and hedonic theories, objective list theories focus not on subjective attitudes but on the notion that well-being is determined by a predefined list of goods that hold intrinsic value, regardless of an individual's personal attitudes to them (Burr & Floridi, 2020). According to Fletcher (2016), the goods on the list of non-instrumental goods may have little in common and could encompass diverse items such as achievement, friendship, pleasure, autonomy, knowledge, or virtue. Hooker (2015) suggested a systematic approach to discern whether a candidate good belongs to the objective list of well-being. By comparing two very similar lives, except for the presence or absence of the candidate good, one can evaluate whether the life with more of that good has objectively benefited more; if yes, further analysis is necessary to understand why it enhances well-being.

According to Fletcher (2013), theories of well-being can be further divided into *enumerative* and *explanatory* categories. This distinction helps one understand not only what constitutes 'a good life,' but also the underlying reasons that contribute to it. Fletcher (2013) aptly classifies the terms as follows: "Enumerative theories of well-being specify which things enhance well-being. Explanatory theories aim to explain why something enhances well-being" (p. 206). Relying on the tripartite classification of well-being, hedonism and objective list theories are categorized as *enumerative*, while desire-fulfillment theories fall under *explanatory*. Desire fulfillment theories not only identify what contributes to a good life (such as pleasure, virtue, and autonomy), but also explain why they are beneficial, namely because we desire them (Burr & Floridi, 2020). A useful taxonomy is presented in Figure 1.

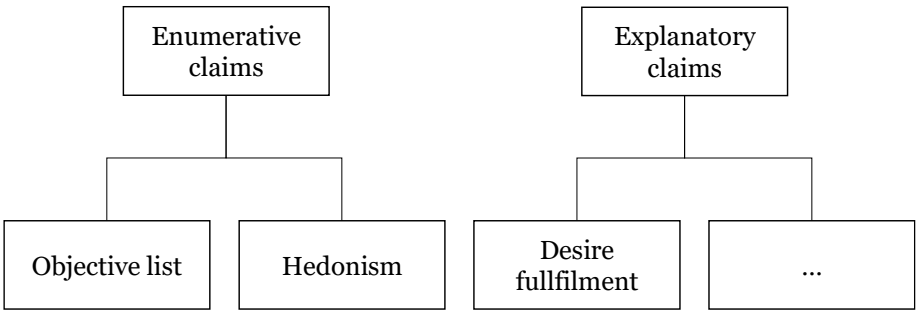


Figure 1. Taxonomy of Well-being Theories (adapted from Fletcher, 2013, p. 209)

2.1.2.2 Positive psychology

In contrast to philosophy, the behavioral and cognitive sciences (including psychology) focus less on determining whether certain goods are inherently valuable and more on understanding the factors that influence their fluctuations and identifying optimal measurement methods.

In the initial years of the 21st century, positive psychology emerged as a prominent research branch to understanding human well-being. Nonetheless, its roots extend far back, encompassing seminal works such as William James's discourse on "healthy mindedness" in 1902 (William, 1985), Allport's exploration of "personal growth" in 1961 (Allport, 1976), Maslow's advocacy for prioritizing the study of healthy individuals over the sick in 1968 (Maslow, 1968), and Cowan's research into resilience among children and adolescents (Cowen et al., 1996). The term *positive psychology* was first introduced by Abraham Maslow in the title of the final chapter of his 1954 book *Motivation and Personality*, titled *Towards a Positive Psychology*, which focuses on positive human attributes and resources (Maslow, 1987).

In contrast to traditional psychology, which often concentrated on diagnosing and treating mental illness until the second half of the 20th century, positive psychology explores the factors that contribute to a fulfilling and meaningful life. In January 2000, when Seligman and Csikszentmihalyi edited a special issue of *American Psychologist* focused on positive psychology, they asserted that psychology was lacking in generating sufficient "knowledge of what makes life worth living" (p. 5). This was because psychology has made significant progress in identifying issues in individuals and groups, such as implicit biases, low self-esteem (e.g., Josephs et al., 2003), and the negative effects of environmental stressors (e.g., Dickerson & Kemeny, 2004), as well as biases and misperceptions inherent in our judgments (e.g., Gilovich et al., 1985). However, prior to this, the research and insights into human strengths and virtues were sparse (Gable & Haidt, 2005). Gable and Haidt (2005), attribute this scarcity to several factors, including the prioritization of research funding for mental illness and assisting returning veterans; they also argue that human nature plays a role, as it has been proven that potential threats are recognized more readily than potential rewards.

Despite these factors, positive psychology – which Gable and Haidt (2005) defined as "the study of the conditions and processes that contribute to the flourishing or optimal functioning of people, groups, and institutions" (p.103) – continued to emerge as a significant research stream at the start of the 21st century. According to a bibliometric analysis of studies in the positive psychology domain by Wang et al. (2023), there has been a consistent increase in publications on positive psychology from 1999 to 2021. Researchers have recognized that comprehending human strengths and flourishing can aid in disease prevention, stress management, and the mitigation of mental disorders (Gable & Haidt, 2005).

Since its inception, positive psychology has profoundly influenced the research across domains and levels of human existence, focusing on positive aspects of human life such as capacity for love and vocation, courage, interpersonal skills, forgiveness, citizenship, responsibility, tolerance, or work ethic (Seligman & Csikszentmihalyi, 2000). However, despite the exponential growth of positive psychology research, it has not been immune to criticism from both inside (e.g., Wong, 2011) and outside (e.g., Held, 2004) the field. These criticisms have catalyzed what some scholars refer to as a *second wave* in positive psychology (Lomas & Ivtzan, 2016), "which is above all characterized by appreciation of the dialectical nature of well-being" (Lomas & Ivtzan, 2016, p. 1765).

In its first wave, positive psychology focused primarily on exploring "the bright side" of human nature (Linley & Joseph, 2004, p. 4). However, the emergence of the second wave brought about a shift toward a more holistic perspective on human functioning. This acknowledgment encompassed not only positive aspects, but also the consideration of negative facets. Critics of the positive psychology view on human functioning acknowledged that 'positive' could, in certain circumstances, be counterproductive or even unrealistic. For instance, unrealistic optimism has been associated with the underestimation of risks, leading to unhealthy behaviors such as smoking (Weinstein et al., 2005). Conversely, negative states such as anger have been posited as potentially beneficial for flourishing. For instance, authors such as Tavris (1989) have argued that anger can serve as a motivating force to address and resolve harmful situations that impede individual well-being. In sum, the second wave in positive psychology is characterized by a more nuanced approach to both positive and negative aspects of living a good life.

2.1.3 Well-being in Contemporary Societies

2.1.3.1 Well-being in democratic societies

While philosophy offers the theoretical and ethical foundation for understanding well-being and psychology emphasizes individual experiences and mental states to assess well-being, public policy pragmatically applies these concepts to improve societal conditions through specific well-being frameworks and metrics that guide decision-making and resource allocation in societies.

Especially in democratic societies, measuring well-being is a fundamental concern. Following Allin and Barclay (2021) that well-being should serve as the foundation for all government actions in democratic societies, and that progress inherently entails improvements in well-being, well-being "should lie at the heart of policymaking that simultaneously pursues economic, social and environmental goals" (German Federal Government, 2016). Thus,

understanding and measuring well-being is crucial for governments to design and implement policies that genuinely respond to their citizens' needs and aspirations. Both governments and individuals should integrate well-being metrics into their daily decision-making processes, ensuring that policies and actions are aligned with the objective of enhancing overall societal welfare (O'Donnell et al., 2014). However, there is general agreement that improving societies and measuring human well-being require appropriate evaluative frameworks and a clear understanding of what constitutes a good life (J. Hall et al., 2010). From this perspective, it is important to reconsider how democratic societies approach societal progress and thus human well-being.

Since the end of World War II, maximizing gross domestic product (GDP) per capita has been the primary policy goal of almost every country to improve national well-being (Cavalletti & Corsi, 2018). GDP is the total value of all goods and services produced in a country within a specific timeframe. However, it does not consider factors relating to well-being, such as quality of life, health, infant mortality, or life expectancy, although they are likely highly correlated (Miladinov, 2020; J. Zhang et al., 2023). In recent years, concerns have emerged regarding the fact that macro-economic statistics such as GDP do not provide a sufficiently detailed picture of the living conditions of ordinary people, justifying the need for a *beyond GDP* approach (Constanza et al., 2009; Stiglitz et al., 2010). Early in 1968, the U.S. Senator Robert F. Kennedy delivered a speech that emphasized the limitations of using income measures as indicators of national well-being. He noted that GDP "measures everything, in short, except that which makes life worthwhile" (Kennedy, 1968). From the 1970s, notable economists similarly questioned the correlation between income, consumption, and well-being (Diener, 2000; Welsch, 2009). Doubts have emerged regarding GDP-increasing policies' impacts on well-being (Cavalletti & Corsi, 2018; Diener et al., 2013). As a result of these doubts, policymakers such as the European Union (EU) have established initiatives to develop additional measures that provide a comprehensive picture of how well off a country's citizens are, using social (e.g., education, work), individual (e.g., subjective well-being, life satisfaction), and environmental indicators (e.g., human health) (Eurofound, 2017).

While there is broad consensus that measuring well-being extends beyond GDP, understanding and assessing well-being remains a complex and multifaceted challenge. This complexity is reflected in the numerous frameworks developed to evaluate societal progress or well-being across countries, each shaped by distinct core values, languages, conceptualizations, and operationalizations (J. Hall et al., 2010). However, although existing national frameworks and measurement tools differ in their designs, a review by Hatem and Ker (2021) for the OECD revealed that health, education, social connections, and work

consistently represent key dimensions of human well-being across OECD member countries and frameworks.[3] Each dimension highlights the duality of human well-being, comprising both individual and social outcomes (Figure 2). Individual well-being includes personal attributes such as individual health conditions and knowledge that are unique to each person. In contrast, societal well-being involves shared attributes such as the quality of relationships or equal access to educational opportunities, reflecting the collective aspects of well-being (J. Hall et al., 2010).

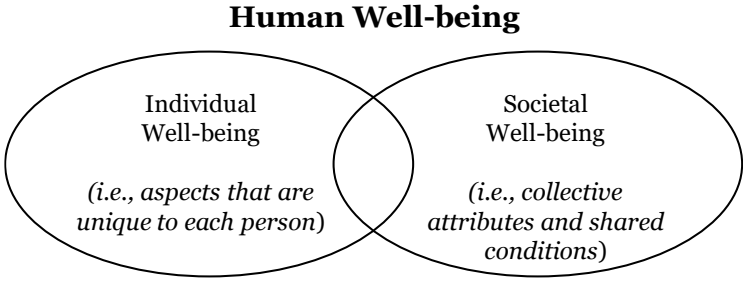


Figure 2. The Duality of Human Well-being (own representation)

In addition to structuring human well-being, robust measurement instruments have crucial roles in deriving policy recommendations. Existing frameworks often rely on robust indicators to assess various aspects of well-being, ensuring that policies and interventions can be effectively tailored to improve quality of life at both the individual and societal levels. The measurement of human well-being traditionally encompass *subjective* and *objective* indicators that are structured around prevailing life dimensions (e.g., Noll, 2004). While objective measures objectify tangible and quantitative indicators are considered prerequisites for people to live well (e.g., students' cognitive skills, employees' working hours, life expectancy), subjective measures are closely tied to individual well-being, as they reflect personal evaluations of overall life satisfaction, encompassing factors such as happiness, personal achievements, and how people feel in their daily lives (Hatem & Ker, 2021). Drawing on positive psychology principles, subjective measures vary according to their philosophical underpinnings, predominantly divided into hedonic (e.g., quantifying negative and positive affect), evaluative (e.g., measuring overall life satisfaction), and eudemonic approaches (e.g., assessing personal growth, meaning, fulfillment) (Hatem & Ker, 2021). Measuring subjective well-being offers several advantages. It provides individuals with opportunities to express their own assessments of their well-being, allowing for a more personalized and nuanced understanding that may not be captured by objective measures alone. According to J. Hall et

[3] For an overview over existing national and regional well-being frameworks and their dimensions, see Hatem et al. (2021).

al. (2010), for instance, assessing individuals' feelings and fears about crime may be a much better indicator and more influential in shaping behaviors than objective indicators such as de facto crime rates.

According to J. Hall et al. (2010), Hicks et al. (2013), and Hatem and Ker (2021), human well-being is shaped not only by subjective and objective indicators that directly impact on it, but also by complex interplays with supporting domains such as culture, economy, and governance in which individuals are embedded. For instance, although the quality of public health services may not have immediate effects on citizens' well-being, it can enhance healthcare outcomes and can expand access to health information (Doctor et al., 2023). Improved healthcare conditions can subsequently influence objective aspects of well-being, such as a citizen's individual health status as well as a person's overall self-assessment of their life quality. The interplays between subjective, objective, and contextual levels of well-being are displayed in Figure 3.

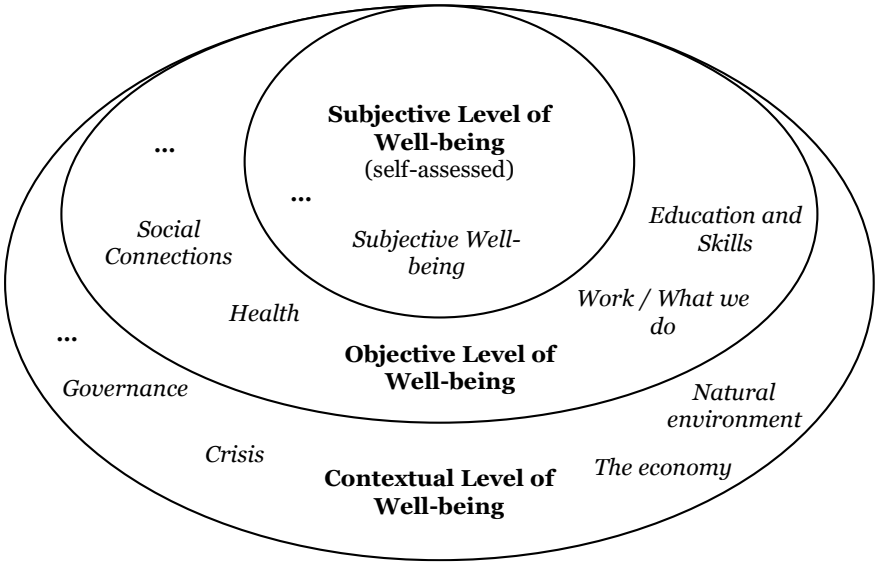


Figure 3. Different Well-being Levels (adapted and modified from Hicks et al., 2013)

2.1.3.2 Well-being in digital societies

Today, the widespread influence of digital transformation, driven by advancements in information and communication technologies (ICTs) and other emerging digital technologies, is increasingly recognized for its profound impacts on individuals, communities, and societies. This ongoing shift is reshaping daily life, while also catalyzing significant social and economic changes on a global scale, heralding the era of *a digital society*. In line with Lengsfeld (2019), in this dissertation I understand digital society as the collective of individuals living in a specific social, political, and economic structure that is significantly and comprehensively shaped by the unique conditions of the digital information age.

However, experts hold differing views on whether this transformation has a predominantly positive or negative impact on our lives, with some emphasizing its potential to enhance well-being and others warning of its risks and unintended consequences, as demonstrated by Pew Research Center's 2018 assessment of *The Future of Well-being in a Tech-Saturated World* (Pew Research Center, 2018). Surprisingly, while many experts believe (47%) that digital life will expand opportunities and bring more benefits than harm in the coming decade, at least 32% caution that it could negatively affect our health, mental well-being, and happiness (Pew Research Center, 2018).

For this reason, various institutions – such as the OECD (e.g., OECD, 2019), the European Commission (e.g., Vuorikari et al., 2022), or the United Nations Department of Economic and Social Affairs (e.g., UN DESA, 2024) – are working to create a shared understanding and developing robust measures to assess digital transformation's impacts on well-being. As noted by the Bureau of the Conference of European Statisticians in 2020, this transformation's economic and social implications are deeply interconnected and often overlap in complex ways (UNECE, 2020). For instance, while process automation can enhance productivity and can improve personal finances, it also raises concerns about the social dimensions of well-being, such as job satisfaction and work-life balance, which are equally significant (UNECE, 2020). Despite the economic benefits of digitalization, this dissertation goes beyond these aspects, focusing instead on the broader social and psychological challenges that arise in the context of well-being in digital societies.

In digital societies, evaluating the effects of digital transformation on well-being is inherently complex owing to the diverse range of technologies in play and the multiple dimensions of well-being that must be addressed. However, understanding these dynamics is crucial for identifying the technologies that can enhance our quality of life and addressing the potential risks associated with their implementation. The OECD's publication *How's Life in the Digital Age* provides a practical tool to assess well-being, by developing the Digital Well-being Wheel with 33 indicators (20 to detect digital opportunities and 13 to identify digital risks) of digital transformation's impacts. The opportunity indicators include *using online social networks*, *expressing opinions online*, *individuals interacting with public authorities online*, and *the availability of digital resources at school*. Potential risks to well-being include *job stress associated with computer-intense jobs*, *extreme Internet use among children*, and *children experiencing cyberbullying* (OECD, 2019).

Existing measurement instruments such as the Digital Well-being Wheel are a good starting point to assess digital technologies' impacts on well-being. However, as highlighted by the Bureau of the Conference of European Statisticians in 2020, National Statistical Offices

encounter a multitude of data demands and challenging decisions about which data to be collected to best measure well-being in digital societies (UNECE, 2020). Current indicators and frameworks for assessing digital transformation's impacts on well-being may not be sufficiently comprehensive (Gluckman & Allen, 2018). For instance, Gluckman and Allen (2018) showed that certain life domains – including personal security, social inclusion, and mental health – are significantly affected by digital transformation but have largely been overlooked in existing well-being frameworks. Further, there is a considerable gap in subjective measures that investigate the relationship between well-being and digital transformation (UNECE, 2020).

To bridge this gap, strengthening collaboration with the IS research can be a pivotal strategy for National Statistical Offices to prioritize and focus on relevant statistics (UNECE, 2020). According to UNECE (2020), robust empirical research into technologies' effects on well-being-related indicators – such as sleep quality (e.g., Carter et al., 2016), depression and anxiety (e.g., Shensa et al., 2017), perceived social isolation (e.g., Primack et al., 2017), and physical activity (PA) levels (e.g., Lepp et al., 2013) – provides the essential empirical foundation needed for developing effective well-being metrics and indicators that can enrich existing well-being frameworks. I will now delve into the IS research's roles in advancing our understanding of well-being in the context of digital transformation.

2.2 Information Systems for Human Well-being: Quo Vadis?

In their discussion paper *Quo Vadis Information Systems Research in Times of Digitalization*, published in *Business & Information Systems Engineering,* Schütte et al. (2022) emphasized the need to regularly reflect on "the heart of a discipline from time to time and to observe if the focus is shifting in a specific direction or to require that it should be doing so" (p. 532). In this sense, and following Schütte et al. (2022), In this dissertation I interpret *quo vadis* as both "where IS research is going" and "where it should be going" to address the drawbacks and huge potentials of digital technology usage relating to human well-being.

In doing so, in Chapter 2.2, I first offer an in-depth review of the key research streams that have shaped the IS field in recent years, focusing specifically on *human factors in IS*, *positive computing*, and *digital responsibility*, as these are most relevant the exploration of human well-being and therefore to this dissertation (Figure 4). Examining these streams[4] provides deeper insights into the complex relationships between digital technologies and human well-

[4] Although terms such as 'concepts', 'sub-fields', and 'design paradigms' are commonly used in the literature, I consistently refer to them as 'streams' in this dissertation to denote the broader, ongoing research trajectories within the field

being in digital societies, highlighting how these topics have been addressed in the IS research to date.

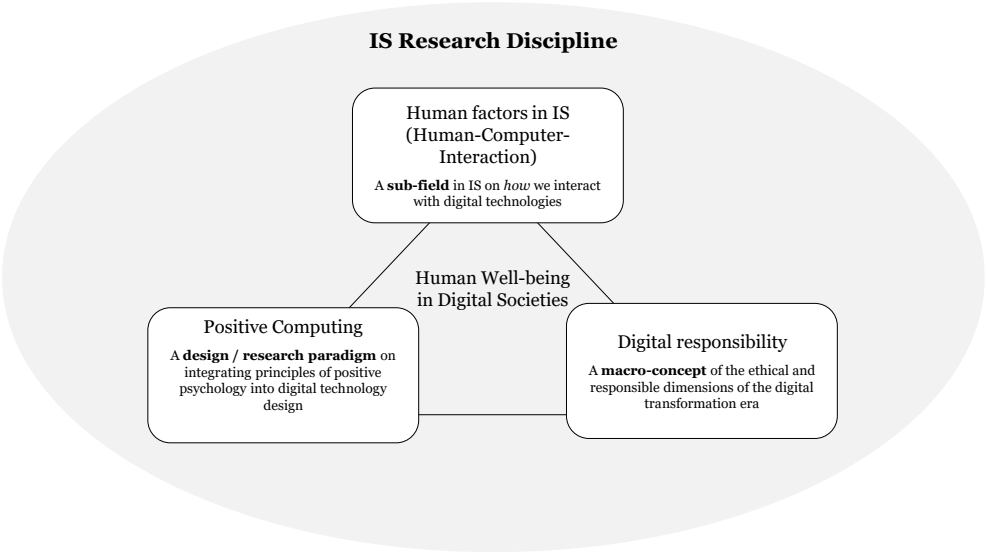


Figure 4. Overview over Key IS Research Streams regarding Human Well-being (own representation)

Finally, Chapter 2.2.4 represents an interim discussion that derives key limitations from existing concepts and approaches to addressing digital technologies' impacts on human well-being. It highlights the fragmentedness of the current understandings of the relationships between digital technologies and human well-being in the IS research, emphasizing the lack of a unified theoretical framework and cohesive understanding.

2.2.1 Human Factors in Information Systems

While well-being represents a well-discussed topic in psychology, public policy, and philosophy (as outlined in Chapter 2.1), it has also increasingly become a subject of scientific inquiry in the IS research. It is now widely acknowledged that IS represents a socio-technical system involving *people*, *tasks*, and *systems* (see Figure 5) (Heinrich et al., 2004; Schütte et al., 2022). Thus, humans are recognized as a crucial component of IS (Snodgrass & Szewczaj, 2002). However, the perspective on how this socio-technical system is viewed has evolved significantly over time.

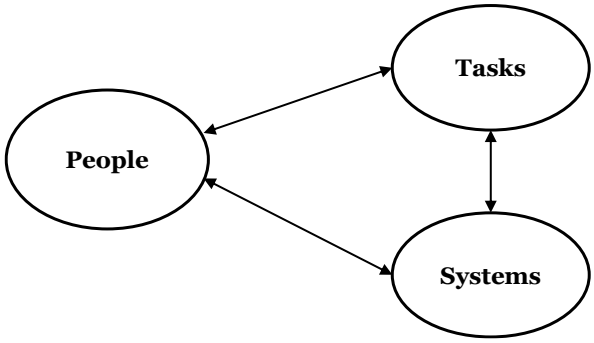


Figure 5. Structures of Information Systems (adapted from Heinrich et al., 2004, p. 8)

At the first International Conference on Information Systems, Keen (1980) defined IS as the "effective design, delivery, and use of information systems in organizations" (p. 12). Initially, employees (*people*) were required to perform specific tasks (*tasks*) using an ICT (*systems*). Thus, IS's primary focus was on optimizing system development and implementation to improve organizational efficiency and effectiveness. This perspective broadened over time. As technologies became increasingly pervasive (Lyytinen & Yoo, 2002; Yoo, 2010), it has evolved to have a central role not only in task fulfillment, but also in fostering meaningful social relationships (Schneider et al., 2017; Shen et al., 2022), managing our health (K. Hall, Helmus, & Eymann, 2024; K. Hall, Oesterle, et al., 2022), and transforming how we engage with the world in ways that positively influence well-being (Diel et al., 2021). In 2002, Baskerville and Myers (2002) expanded the definition of IS to include "the development, use, and application of information systems by individuals, organizations, and society as whole" (p. 11).

Reflecting this broader view, leading scientific journals in the IS domain – such as *Information Systems Research* – emphasize that IS's scope includes "theory, research, and intellectual development for information systems in organizations, institutions, the economy, and society" (Information Systems Research, 2024). This shift indicates an expansion beyond the business context, recognizing the IS research's broader societal and individual implications.

With the shift from a business context to a societal context, IS's focus has also evolved from purely functional requirements to the integration of human factors. Bostrom and Heinen (1977) recognized early on that IS failures often stemmed from "faulty design choices" (p. 17) owing to insufficient emphasis on system use's human and social aspects. Gerlach and Kuo (1991) later argued that software designers should focus not only on functional requirements but should also consider users' behavioral needs. According to P. Zhang et al. (2005), technology acceptance research has shown that human factors such as *perceived usefulness* and *ease-of-use* (Davis, 1989; Venkatesh et al., 2003) are critical factors for user acceptance and technology adoption. However, as Gasson (2003) acknowledged, the IS research has

predominantly centered around usability in system development, often overlooking the broader social contexts in which these systems operate.

In the 1970s, human-computer interaction (HCI), also known as human factors studies, emerged as a significant subfield in IS and quickly gained substantial attention (Zhang & Li, 2004). HCI emerged as an interdisciplinary field studied by researchers from various disciplines, including computer science, psychology, human factors engineering, and IS. In the IS domain, HCI research focuses on how humans interact with IT, particularly in business, managerial, organizational, and cultural contexts (P. Zhang et al., 2002). P. Zhang et al. (2005) emphasized that research into ICT for human use has focused on two primary aspects: the design, evaluation, and implementation of IT systems (*design-oriented approach*), as well as their uses and impacts in social and organizational contexts (*behavioral-oriented approach*).

However, early in 1988, Bjorn-Andersen criticized the narrow definition of HCI, which limited "human" to mere physical interactions, such as finger or eye movements. The author argued that IS research is underutilizing technologies' potentials, as many human factors trends do not significantly enhance human potential (Bjorn-Andersen, 1988). In response, human-centered design (HCD) approaches emerged to address concerns that traditional design methods were diminishing users' skills and, in some cases, reducing the quality of their (working) lives (Gill, 1991; Scarbrough & Corbett, 1992). Gill (1991) described human-centeredness as a technological approach that prioritizes human needs, skills, creativity, and potential as the core focus in technological systems. HCD considers individuals' diverse experiences, desires, needs, interests, and lifestyles, making them central to every stage of the design process (Auernhammer, 2020). To date, the IS field has progressed to a point where researchers view socio-technical systems as essential frameworks in which individuals engage with technologies in specific social contexts, recognizing the importance of both instrumental outcomes, such as enhanced performance, and humanistic outcomes, such as improved well-being (Schütte et al., 2022).

However, despite the growing interest in human factors within IS, Calvo and Peters (2014) argued that, even with significant technological advancements and the widespread proliferation of devices, there is no evidence to suggest that digital tools have made us psychologically healthier or happier than we were 20 years ago (Calvo & Peters, 2014). While measures of welfare – as exemplified by GDP – have shown increases alongside technological progress (Dewan & Kraemer, 2000; Pohjola, 2001), happiness levels have remained fairly stable over time, especially in Western societies (Orben & Przybylski, 2019; World Happiness Report, 2024). Scientific researchers from the IS community have rightfully asked whether IS can be developed to actively support the unfolding of human potentials while creating positive

impacts for all stakeholders in the future (Pawlowski et al., 2015). The rise of AI systems has increased interest in ethical design approaches that integrate human values into technology development (Spiekermann, 2023; Spiekermann et al., 2022). While there is a long tradition of aligning human values with technologies (Hirschheim & Klein, 1994), the advent of AI has intensified this focus, as key issues such as biases, fairness, and transparency have become critical in technology design and deployment (Spiekermann et al., 2022).

In response, the IS field has broadened its focus to include positive design approaches, integrating concepts such as positive computing (Pawlowski et al., 2015) and placing a greater emphasis on the ethical dimensions of technology management, often referred to by experts as digital responsibility (DR) (Trier et al., 2023). This shift acknowledges that the relationships between humans and technologies are more than just a matter of technical implementation; they require a holistic approach that considers ethical, psychological, and social dimensions, to ensure that technologies genuinely enhance human well-being and address the broader implications of digital progress. Further, the coexistence of both approaches highlights that well-being in digital societies is largely influenced by the *design* and the *responsible management* of IS.

In the next two chapters, I will delve deeper into the two research streams, as they have drawn significant attention in the IS research field, making them catchwords in the leading IS journals (Pawlowski et al., 2015; Trier et al., 2023).

2.2.2 Positive Computing for Enhanced Well-being

In 2014, Calvo and Peters argued that digital technologies were not actively supporting well-being, simply because engineers and computer scientists had not yet considered this in their design cycles. In response, *positive design* methods emerged, focusing actively on users' long-term well-being (Calvo & Peters, 2014; Diefenbach, 2018). These streams align with positive psychology, which emphasizes making the vision of 'a good life' tangible and actionable through technological development (Yoon & Kim, 2024).

This shift has sparked the emergence of the promising research area of positive computing (Calvo & Peters, 2014), which was promoted as a new trend in IS in 2015 (Pawlowski et al., 2015). Inspired by positive psychology as "the study of the conditions and processes that contribute to the flourishing or optimal functioning of people, groups, and institutions" (Gable & Haidt, 2005, p. 104), positive computing seeks to integrate principles of well-being (i.e., positive psychology) into the design of interactive systems. However, as Pawlowski et al. (2015) pointed out, positive computing's scope extends beyond HCI and should be viewed as both a research and an action paradigm. Thus, studies in the positive computing paradigm seek to

actively integrate well-being as a primary objective in every stage of the technology development process (Shen et al., 2022). This design method represents a shift from the previously negative paradigm in the IS research, which assumed that certain barriers needed to be overcome for technologies to be successfully adopted (Pawlowski et al., 2015). Instead, positive computing is concerned with the design and development of technologies that promote and enhance psychological, emotional, and social well-being (Shen et al., 2022).

To structure the design of technologies for human well-being, Calvo and Peters (2014) proposed a comprehensive framework that outlines key areas and principles to consider. Grounded in psychological well-being research and in multidisciplinary foundations, the authors identified several determining factors of well-being that can be mediated by technology to enhance human flourishing. These design factors can be further classified into three categories, based on their relationships to an individual (Calvo & Peters, 2014):

- *Self:* Factors that relate to the intrapersonal phenomenon, independent of the presence of others.
- *Social:* Factors that relate to other individuals who depend on interpersonal interactions.
- *Transcendent:* Factors that relate to a greater good and for humans beyond those we know personally.

Table 1 represents a common yet not exhaustive list of well-being factors that can be classified into these three categories (Calvo & Peters, 2014). The significant advantage of positive computing is that, in their conceptualization, Calvo and Peters (2014) proposed theories, metrics, and measurement instruments that allow for the evaluation of well-being factors in technology designs.

To bring these factors into practice, Calvo and Peters (2014) proposed a basic set of four design approaches to integrate well-being into technology design: (1) well-being is not systematically integrated into technology design; (2) barriers or negative impacts on well-being are addressed as issues to be avoided or corrected (*a preventive approach*); (3) technologies are intentionally crafted to promote aspects of well-being or human potential, even if their primary functions serve another purpose (*an active approach*); and (4) some technologies are specifically created for the sole purpose of enhancing well-being or human potential (*a dedicated approach*).

Table 1. Well-being Design Factors according to Positive Computing (adapted from Calvo & Peters, 2014, pp. 85–86)

Category	Design Factors (theory)
Self (intrapersonal)	Motivation and engagement (e.g., self-determination theory) (Ryan & Deci, 2017) Self-awareness (e.g., cognitive behavioral therapy) (Beck & Beck, 2020) Mindfulness (e.g., mindfulness-based stress reduction) (Kabat-Zinn, 1994) …
Social (interpersonal)	Gratitude (e.g., a psychology of gratitude) (Emmons & McCullough, 2004) Empathy (e.g., emotional intelligence) (Salovey & Mayer, 1990) …
Transcendent (extra-personal)	Compassion (e.g., compassion-focused therapy) (Gilbert, 2013) Altruism (e.g., psychology of altruism) (Batson, 2014) …

Since its initial conceptualization in 2014, the positive computing paradigm has attracted substantial attention in the IS research (e.g., Pawlowski et al., 2015), expanding beyond the traditional business context and technical enhancements that prioritize efficiency and effectiveness from an employer perspective. It now has a broader focus on how technologies can actively support well-being and human flourishing. For instance, positive computing applications are being used in education to create engaging and supportive learning environments, helping learners increase motivation and learning outcomes (e.g., Gupta & Goyal, 2022; Karra et al., 2019). In health prevention and promotion, technologies are often designed with gamification elements to better support users in achieving their fitness goals (K. Hall, Richter, et al., 2022; e.g., Haque et al., 2020). These tools can address key psychological needs such as competence, autonomy, and relatedness, enhancing user engagement and motivation through interactive and rewarding experiences (e.g., Haque et al., 2020). Further, in community settings, platforms that foster social connections and civic engagement contribute to a sense of belonging and community well-being (Pang, 2020; e.g., Skoric et al., 2016).

2.2.3 Well-being in the Context of Digital Responsibility

Despite the positive computing paradigm's suggestion that technology design can directly enhance human flourishing, real-world examples often reveal instances where technology fails to achieve this goal, especially on a broader societal scale. Negative phenomena such as filter bubbles, the spread of misinformation and fake news, problems with AI decision-making, and the loss of privacy are just few examples that highlight the complex ethical issues that accompany technical progress in digital societies (Neidhardt et al., 2022; Spiekermann et al., 2022).

Initiatives such as the Vienna Manifesto on Digital Humanism (Werthner et al., 2022), or the more recent Wake-Up Call on Digital Democracy in the IS community (Weinhardt et al., 2024) show that there is a growing recognition of the imperative to ensure that digital advancements support rather than undermine humanity and democratic structures. Thus, it is necessary to reflect more deeply on the relationships between humans and machines and to influence their development to improve living conditions and society (Werthner et al., 2022). Unavoidably, questions arise about whether software developers can (practically) and should (ethically) address the adverse effects of the technologies they create (Reisach, 2021).

Critics are increasingly voicing concerns, arguing that "technology cannot be merely a matter of expecting developers to create technology that leads to certain desirable outcomes" (Susan Winter & Butler, 2022, p. 273). Responsible design requires capabilities that exceed the limits of any human designer (Susan Winter & Butler, 2022). Instead, the comprehensive digital transformation process should be managed responsibly at the personal, corporate, and societal levels (Trier et al., 2023). In response to the widespread use of digital technologies, which "are not merely aids to human activity, but also powerful forces acting to reshape that activity and its meaning" (Winner, 1988), IS researchers are recognizing their obligation to help manage these technologies in responsible ways and from different perspectives.

In response, the DR concept has gained significant attention among IS researchers (see Trier et al., 2023), as it extends beyond mere technology design, embracing a broader, less technology-centric perspective that emphasizes digital technologies' ethical, social, and organizational impacts (Trier et al., 2023). DR evolved as an emerging concept in the IS field, reflecting the growing recognition of the need for ethical and responsible approaches to technology management. According to Trier et al. (2023), DR is understood as "efforts of stakeholders such as individuals, corporations or public institutions to contribute to a sustainable, more inclusive, fair, and value-based digital society (or digitalization in general) beyond the legal minimum" (p. 463). While DR intersects with concepts such as "corporate social responsibility" (e.g., Fatima & Elbanna, 2023), "corporate digital responsibility", and "digital ethics" (e.g., Öhman & Watson, 2019), it extends beyond ethical guidelines and corporate actions to include a comprehensive range of factors related to the societal impact, sustainability, and inclusive development of digital technologies (Trier et al., 2023).

According to Trier et al. (2023), conceptualizing DR from an IS perspective helps clarify the roles of different stakeholders – such as individuals, society, and organizations – in responsible digitalization (Trier et al., 2023). To guide the digital transformation at the individual, corporate, and societal levels, Trier et al. (2023) proposed a framework that contains a set of principles, described as "fundamental and value-based normative requirements that motivate

actors to achieve responsible digital transformation" (Trier et al., 2023, p. 464) that support human well-being. These principles are drawn from previous work in digital ethics (e.g., Jobin et al., 2019) and corporate digital responsibility (e.g., Cheng & Zhang, 2023), incorporating key values such as sustainability, participation, functionality, and data privacy, among others.

The importance of responsible management across different levels and actors is exemplified by the value of data privacy. The COVID-19 pandemic underscored the urgent need to uphold data privacy principles at every level, as technology played a pivotal role in infection containment through measures such as physical distancing, remote work, and contact tracing (Adam et al., 2024; Reith et al., 2021). During the pandemic, it became evident that ensuring data privacy cannot be accomplished by a single actor, such as a software developer, working in isolation. Effective data protection requires a holistic approach, involving all relevant stakeholders, developers, organizations, regulatory bodies, and individuals, each playing a crucial role in the collective effort to safeguard privacy on the *tasks*, *systems*, and *people* sides of the socio-technical system (K. Hall, Helmus, & Eymann, 2024; Trier et al., 2023). For instance, on the *people* side, individuals must carefully consider whether their data should be treated as private or public (Trier et al., 2023). This can be challenging, as highlighted by Neidhardt et al. (2022), who noted that while many individuals expressed significant reservations about using contact tracing apps during COVID-19, the same persons often shared their vaccination appointments for instance in Facebook status posts. This inconsistency underscores the complexity of personal data privacy decisions and underlines the need for additional regulatory mechanisms on the *tasks* side. Thus, on the broader societal level, political institutions developed legal frameworks to preserve data privacy. The General Data Protection Regulation[5] (GDPR) implemented by the EU exemplifies how societal values, such as privacy and individual rights, are embedded into legislation to promote the importance of privacy across both public and private sectors in digital societies (Trier et al., 2023). Further, it is essential that organizations implement clear guidelines to ensure responsible data collection and processing in pandemic management. By integrating privacy-conscious practices into their operations, organizations can safeguard individual privacy and enhance public acceptance of such measures.

Data privacy is just one example, showing that DR extends beyond the sole responsibility of software developers on the *systems* side of the socio-technical system. In fact, the digital

[5] The GDPR lays down rules relating to the protection of natural persons regarding the processing of personal data and rules relating to the free movement of personal data. The regulation was put into effect by the EU on May 25, 2018.

transformation process requires collective effort from various actors, including policymakers, public institutions, businesses, and civil society.

2.2.4 Outlining Challenges in the Information Systems Research

Reflecting on why technological advancements have not automatically resulted in greater happiness, several key challenges emerge when evaluating existing IS research streams. Table 2 summarizes the main determinants of each research stream according to human well-being, while also demonstrating that we still lack a holistic understanding of DWB in the IS literature. The extracted challenges are briefly discussed in this subchapter.

Table 2. Key Determinants of IS Research Streams (own representation)

Determinants	Human factors in IS (HCI)	Positive computing	Digital responsibility
Focus	Traditional focus on usability, ergonomics, and system efficiency; focuses on optimizing user interactions and minimizing frustration	Focus on emotional and psychological well-being of individual users through positive technology design	Focus on ethical and responsible uses of technologies by various stakeholders, achieved through the recognition of value-based normative requirements
Relation To Well-being *(Indirect vs. Direct)*	*Indirect:* Primarily a focus on optimizing usability and efficiency, leading to for instance less stress, but does not directly target human potential	*Direct:* Focus on improving individual well-being by designing technologies that actively support positive psychological outcomes	*Indirect:* Focus on human values, indirectly promoting well-being by fostering trust, fairness, and justice within digital systems, thereby enhancing both social and individual well-being
Design Objective On Well-being *(High vs. Medium vs. Low)*	*Medium:* Technology design is important, but is centered around usability, user behaviors, and interactions	*High:* Directly influences technology design to improve users' well-being	*Low:* Focus on the governance, policies, and ethical frameworks that surround a technology rather than the design itself
Well-being Scope *(Individual vs. Societal)*	*Individual:* Focused on enhancing an individual's interactions with technologies, but may overlook broader societal factors	*Individual:* Focus on improving personal user experiences and psychological well-being	*Societal:* Primarily concerned with societal well-being, ethical standards, and broader social impacts
Complexity of Evaluating Well-being *(High vs. Medium vs. Low)*	*Low:* Well-established methods for usability testing, ergonomics assessments, and further performance metrics	*Medium:* Depends on the underlying well-being paradigm, but typically involves self-reported questionnaires	*High:* Values are highly context-dependent constructs that are sometimes hard to quantify and assess consistently

Initially, HCI's traditional focus was on the design, evaluation, and implementation of interactive computing systems for human use, with a primary emphasis on functionality, ergonomics, and usability. However, in recent years, there has been a noticeable shift, with

HCI expanding its scope to consider not only these traditional aspects, but also the broader contexts in which interactive technologies are embedded (Bdker, 2006).

While positive computing as design paradigm actively centers on designing technologies to enhance individual well-being, it often overlooks broader societal implications, particularly with emerging technologies such as AI systems. A good example in this context is the *filter bubble effect* of social media: While personalized content can support short-term individual well-being by reducing information overload and enabling informed decision-making (e.g., Burr & Floridi, 2020), it also creates ideologically narrow environments that may isolate users and may increase societal polarization (Figà Talamanca & Arfini, 2022). Thus, at the broader societal level, filter bubbles in web-based platforms can have serious consequences for democracy and societal well-being (Figà Talamanca & Arfini, 2022; Spiekermann et al., 2022). Phenomena such as the filter bubble effect are therefore more complex than what positive computing as a design principle can fully address, particularly as users' individual short-term well-being may involve a trade-off with broader societal well-being (Russell–Bennett et al., 2020). And even if software developers could resolve this conflict, would they? As most social platforms' business models rely on advertising revenue, their primary focus is often on maximizing user engagement and time spent on a platform rather than enhancing user well-being. Thus, Spiekermann et al. (2022) acknowledged that "true value creation is not a matter of technology design alone but also of strategy, corporate culture, and companies' willingness to forgo some profit for the sake of community, integrity, and accountability" (p. 250).

Addressing such complex issues inevitably shifts the focus to a wider ethical perspective and further value-based normative requirements among different actors (Trier et al., 2023), such as transparency, fairness, and explainability in technology management (Spiekermann et al., 2022). Ethics in technology design and management become crucial, positioning frameworks such as DR as a valuable starting point for enhancing quality of life (Trier et al., 2023). However, while some advocate for shaping and managing digital technologies in accordance with human values and needs to address critical issues in current technological development and management (Schiaffonati, 2022; Spiekermann, 2023; Spiekermann et al., 2022), critics argue that ethics alone may not be the ultimate solution to shape technologies that are "good for human beings" (Österle, 2022). Although DR offers a framework for guiding ethical digital transformation, some researchers argue that it lacks essential prerequisites for significantly contributing to human well-being:

First, ethics does not define what constitutes quality of life or well-being (Österle, 2022). Second, values such as fairness, transparency, and accountability are not end-goals, but rather involve enhancing overall well-being (Harris, 2010). Third, ethics based on values are only

relevant to people if these values meet individuals' needs and thus trigger positive or negative feelings (Österle, 2022). Fourth, as outlined by Spiekermann and Winkler (2020), it is hard to integrate values into systems design, because values are context-dependent and not always measurable, making it difficult to assess whether an intended value proposition has been achieved by the end of a project.

In sum, while *well-being* and *digital technologies* are recognized as critical study areas in IS, emerging research streams currently lack a shared understanding and cohesive framework for addressing DWB. Although the IS research has shifted focus towards positive design approaches in HCI and a broader ethical perspective that goes beyond system design (i.e., DR), it isolates individual determinants of human well-being (see Table 2), rather than exploring the interconnectedness of these factors. This fragmented approach to DWB could lead to a disjointed understanding of how digital technologies shape our understanding of well-being, hindering the development of comprehensive strategies and solutions that address the complex, multifaceted nature of well-being in digital societies.

To address the blind spots within current IS research streams, Chapter 2.3 adopts an interdisciplinary approach to the concept of DWB emphasizing the importance of learning from adjacent disciplines to gain a deeper and more nuanced understanding of how digital technologies shape human well-being.

2.3 Understanding Digital Well-being

Chapter 2.3 starts expands on the need for an interdisciplinary perspective by turning to the concept of DWB, a topic that has been the subject of ongoing debate in the scientific community. This chapter clarifies how DWB has been defined and conceptualized to date across research disciplines, establishing a foundation for understanding its relevance not only to human well-being in the digital age but also to the IS research. Building on this foundation, the dissertation aims to deepen the understanding of DWB from an IS perspective by presenting a research agenda designed to provide more comprehensive insights into.

2.3.1 Multidisciplinary Interpretations of Digital Well-being

As I have outlined in the previous chapters, the interest in the relationships between well-being and technologies is not new in academic discourse. Alongside the development of the positive computing paradigm, which focuses on the design and development of digital technologies to support psychological well-being and human potentials (Calvo & Peters, 2017), DWB has gained increasing prominence across research disciplines (Figure 6).

This increased prominence is evidenced not only by the steadily rising annual publication

rates, particularly in comparison to 2014 but also in the organization of scientific conferences that focus explicitly on DWB, such as *The Future of Digital Well-Being Conference* organized by the Eindhoven University of Technology in February 2024 (Dennis, 2024).

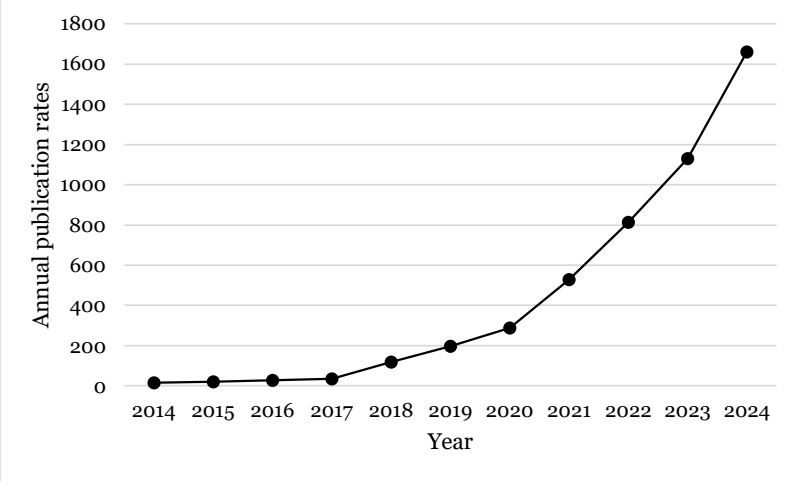


Figure 6. Number of Articles Using *Digital Well-being* Retrieved from Google Scholar

While the academic literature has presented DWB as a new concept (e.g., Ghai et al., 2023), a closer look reveals that it consists mainly of loosely defined definitions. To date, the DWB concept is accused of lacking a single definition as well as a clear operationalization (Al-Mansoori et al., 2023). Further, at least from an IS perspective, it is unclear whether the DWB concept differs from other HCD approaches, such as positive computing, and thus whether it adds additional value to both the IS and HCI communities.

A brief look at both the academic and the non-academic literatures reveals that DWB has been shaped and defined by the emergence of a new industry of DWB interventions, which arose in response to the drawbacks associated with technology uses (Beattie & Daubs, 2020). Dominant technology firms such as Apple and Google have both integrated DWB features into their devices, ranging from screen time restrictions, time management features, productivity enhancement, to the incorporation of parental control features (Almourad et al., 2021). These so-called DWB applications are predominantly designed to help users "regulate their digital usage, better their relationship with technology and combat such negative interactions to achieve DWB" (Almourad et al., 2021, p. 2). Thus, the prevailing definitions of DWB seem to be rooted in the science of behavioral addictions, expressing apprehensions regarding self-control in the context of "addictive" information technologies (Dadischeck, 2021; Monge Roffarello & Russis, 2019; Schmuck, 2020).

Particularly in the media research, a growing number of articles are dealing with *mobile disconnection*'s effects on well-being, using interrelated concepts such as *digital detox* (Radtke

et al., 2022), *smartphone disengagement* (Matthes et al., 2022), and *digital self-control* (Monge Roffarello & Russis, 2019). However, researchers such as Vanden Abeele and Nguyen (2022) are asking whether DWB and digital disconnection are truly two sides of the same coin. Limiting the conceptualization of DWB to a mere cause-and-effect relationship with digital disconnection and users' well-being inadequately captures the concept's complexity. This challenge is evident in empirical studies that failed to find a significant negative correlation between screen time and subjective well-being (e.g., Orben & Przybylski, 2019).

According to Vanden Abeele (2021), DWB is perceived as "an experiential state of optimal balance between connectivity and dysconnectivity that is contingent upon a constellation of person-, device- and context-specific factors" (Vanden Abeele, 2021, p. 938), with a primary focus on mobile technologies. The authors further highlight that DWB is reflected in experiencing pleasure and autonomy when using technologies. This definition is also reflected in the HCI literature, where the focus is on fostering 'balanced' and 'safe' interactions with technologies. This definition highlights the importance of personal skills and values as key elements in cultivating positive relationships between humans and technologies (i.e., Allers et al., 2021; Chambers & Sandford, 2019).

Further, Al-Mansoori et al. (2023) reported that a large proportion of HCI articles used the basic psychological needs and self-determination theory (Ryan & Deci, 2017) to define DWB. According to self-determination theory, DWB is achieved when users' psychological needs for autonomy, relatedness, and competence are satisfied in relation to technology usage (Passey, 2021; Peters & Ahmadpour, 2021). Thus, articles in this category focus on motivation and engagement design factors at the interpersonal level, drawing on insights from positive computing (cf. Calvo & Peters, 2014). These factors emphasize creating technologies that support users' autonomy, foster meaningful connections, and enhance their sense of competence, aligning with self-determination theory principles to promote overall DWB.

Büchi (2021) provided a comprehensive definition of DWB, defining it as the subjective well-being experienced in an environment where digital media is perpetually omnipresent. This definition aligns with the hedonic view of well-being, focusing on individuals' emotional experiences and life satisfaction in a digitally saturated environment.

In sum, most definitions have highlighted how individuals perceive and experience well-being when interacting with technologies. However, we still lack a holistic conceptualization of DWB in the IS research, as existing definitions were often applied only to specific components of well-being (i.e., subjective well-being, need satisfaction), and failed to account for digital transformation in its entirety. This selective focus can lead to a fragmented understanding of

DWB, contributing to the absence of a cohesive and universally accepted framework. To date, the most widespread and probably most promising definition of DWB is rooted in digital ethics and describes DWB as:

> … the project of studying the impact that digital technologies, such as social media, smartphones, and AI, have had on our well-being and our self-understanding of what it means to live a life that is good for us in an increasingly digital world (Burr & Floridi, 2020, p. 2).

Although Burr and Floridi (2020) offered a valuable definition, it leaves open key questions that are critical to the IS research. These unanswered questions highlight important areas that require further exploration, such as the multidimensionality of well-being and the roles of technology design and ethical considerations in shaping digital experiences.

One key issue is how *well-being* is conceptualized and operationalized in digital societies, particularly considering how digital technologies are reshaping traditional notions of 'the good life' in various theoretical frameworks. Another significant concern is the specific impacts of different digital technologies – such as social media, smartphones, and AI – on various dimensions of well-being. We must further explore how these technologies influence our behaviors, educational practices, and social connections.

Further, by recognizing the importance of emerging IS research streams, it is worth considering whether DWB could extend beyond merely examining digital technologies' effects on specific aspects of well-being. Positive computing and DR can significantly expand the understanding of DWB by addressing the broader ethical, social, and design-related dimensions of technologies. By integrating these frameworks, DWB can evolve into a multidimensional concept that encompasses both the *ethical responsibilities* of digital technology management and technology design's *positive potential* to improve human life.

From a socio-technical systems perspective, the IS research may benefit from a broader understanding of how DWB can be applied to guide the evolution of digital societies toward enhanced human well-being. This suggests the need for a more integrative approach to exploring the interactions between technologies, individuals, and societal structures, building on existing frameworks to address the emerging challenges. However, more research is needed to explore how digital technologies are used across different life dimensions and how they influence well-being in these diverse contexts.

2.3.2 Deriving an Interdisciplinary Research Agenda

Building on the identified challenges in researching and conceptualizing DWB, this dissertation deepens the understanding of well-being in digital societies from an interdisciplinary perspective by integrating insights from the literature with empirical research findings of this cumulative dissertation.

Building on RG1 – *gain a comprehensive understanding of well-being in digital societies by examining how various dimensions and constructs of well-being are shaped by digital technologies* – this dissertation has three subgoals (RG1.1 to RG1.3) that address well-being across different levels and dimensions. These subgoals delve into key dimensions of human life in digital societies, including social connections, health, work, and education, which are essential for promoting human well-being. This dissertation seeks to contribute to each of these areas and to strengthen the comprehensive perspective of well-being in digital societies from subjective, objective, and contextual perspectives.

According to Hatem and Ker (2021), and as outlined in Chapter 2.1.3, this dissertation defines the *subjective level* as individuals' perceptions of specific phenomena or trends arising from digital transformation that will likely impact on individual well-being (i.e., feelings of ostracism, subjective well-being, perceived privacy). The *objective level* refers to the measurable effects of digital transformation on various aspects of well-being (i.e., conformity level, activity level, educational opportunities). The *contextual level* considers the broader environment in which humans and technologies coexist, indirectly influencing well-being in a digital society (e.g., the digital maturity of public health authorities, crisis). Notably, these perspectives are not entirely distinct and often overlap in practice. The papers in this dissertation often address multiple perspectives simultaneously, though the categorization used here is based on each article's dominant focus. The structure of my empirical research agenda is illustrated in Figure 7, providing a framework that guides the course of this dissertation.

In the remainder of this chapter, I will explore each of the individual sub-goals in greater detail, providing a comprehensive analysis of their specific aspects. This will include a critical examination of the current state of research, highlighting existing gaps and challenges that remain unaddressed.

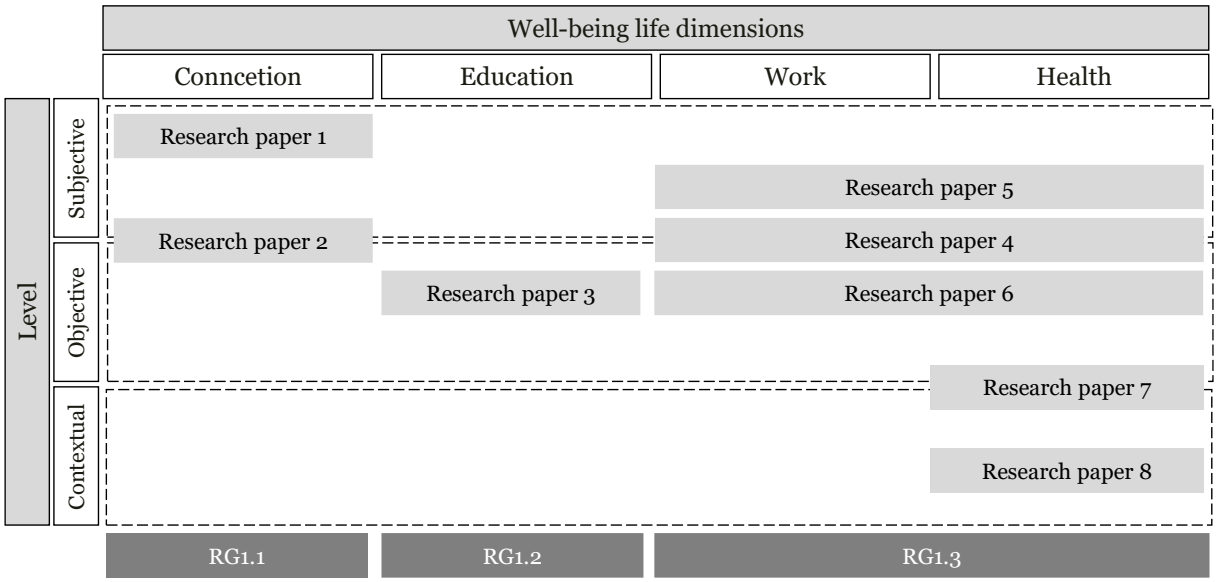


Figure 7. Summary of the Interdisciplinary Research Agenda

RG1.1: Deepening the understanding of well-being in digital social connections

As we are inherently social creatures with a fundamental need to build strong relationships (Baumeister & Leary, 1995), social connections are tied to human well-being. Given the widespread consensus in both the national and the international discourse that "strong connections enhance everyone's well-being" (WHO, 2024), social connections have emerged as a foundational dimension in many national well-being frameworks (cf. Hatem & Ker, 2021). Given the omnipresence of digital technologies today, it is crucial to understand how they are reshaping our understanding of social relationships in an increasingly digital society (K. Hall, Buck, & Diel, 2024; Schneider et al., 2017). Further, more insights are needed into how digital technologies influence our experiences of social relationships, both in terms of subjective perceptions and objective aspects of human interactions.

Since the early 2000s, online services have increasingly promoted unlimited social interactions (Weinhardt et al., 2024). Social media platforms such as Facebook, Instagram, and X (formerly Twitter[6]) cater to individuals' need to belong (Parent, 2023), with more than four billion users spending an average of 2.5 hours daily on these platforms (WeAreSocial, 2022). These widespread uses have amplified social media's impacts on personal lives and societal issues, making them central to academic and public debates. While social media offer positive unlimited interconnectivity, they also contribute to harmful phenomena such as hate speech, disinformation, and filter bubbles (Kitchens et al., 2020; Schneider et al., 2017; Zheng & Lee,

[6] In July 2023, Elon Musk rebranded Twitter as X.

2016), which negatively affect democracy and societal well-being (Weinhardt et al., 2024). Thus, policymakers, platform developers, and the public should understand how platform features influence individual decisions and public opinion in digital societies (Luca & Bazerman, 2021). More knowledge is therefore needed on how certain design features of social media shape user interactions and consequently human well-being. In Chapter 3.1., research papers 1 and 2 are summarized under *Well-being in Digital Connections*.

RG1.2: Deepening the understanding of well-being in digital education

Well-being in digital education gained significant attention among policymakers. According to the EU, well-being in digital education is understood "as a feeling of physical, cognitive, social and emotional contentment that enables all individuals to engage positively in all digital learning environments including through digital education and training tools and methods, maximize their potential and self-realization and helps them to act safely online and supports their empowerment in online environments" (Council of the European Union, 2022).

Digital skills, resources, and learning tools have become key determinants of both national and individual well-being (OECD, 2020). In response to the recent COVID-19 pandemic, the OECD has highlighted the integration of technologies into teaching and learning as a strategic priority for almost all its member countries (OECD, 2023). However, the transition toward a digital educational landscape presents both opportunities and challenges for the well-being of learners and educators (European Union, 2022). To effectively lever digital technologies' potentials in education, it is essential for both educators and students to develop specific digital skills. (Mokhtari, 2023). Basilotta-Gómez-Pablos et al. (2022) emphasized that digital competence is a critical skill that citizens, especially educators, must possess to thrive in the society of the future. In this context, digital literacy – as the mastery of software and hardware, as well as the ability to create, analyze, and engage with digital content (Chetty et al., 2018) – has emerged as a crucial indicator of well-being in digital societies (OECD, 2020).

The rise of generative AI (GenAI), particularly deep generative and large language models, is disrupting the higher educational landscape (Denny et al., 2024). Since OpenAI released their Chat Generative Pre-Trained Transformer (ChatGPT) in November 2022, GenAI has had significant impacts on the education industry and has spurred the development of numerous other GenAI tools. However, in the higher education field, GenAI has caused concerns regarding its impacts on students' cognitive skills, logic skills, academic competency (İpek et al., 2023), as well as on academic integrity (Bin-Nashwan et al., 2023). For instance, research has shown that ChatGPT has been able to pass exams across several disciplines, including law, medicine, and English (Choi et al., 2023; Fijačko et al., 2023; J. de Winter, 2023). Concerns

have also arisen owing to GenAI's tendency to generate responses that are both inaccurate and overly authoritative (Walczak & Cellary, 2023). Thus, substantial research is necessary to navigate the potential concerns around and benefits of GenAI tools in higher education, emphasizing the necessity to focus on teachers' competence to ensure responsible GenAI use by educators and students. In Chapter 3.2, research paper 3 is presented under *Well-being in Digital Education*.

RG1.3: Deepen the understanding of well-being in digital (occupational) health

Health is a fundamental aspect of life, significantly impacting on both individual well-being and societal prosperity (Spiekermann et al., 2022). According to the OECD, digitalization has the potential to enhance health outcomes, as demonstrated by measurable indicators such as improved communication and increased access to health information (OECD, 2019). However, as Spiekermann et al. (2022) noted, IS can both promote and undermine health, and – subsequently – well-being. Digital technologies may impair psychological and physical health, as highlighted by Gimpel and Schmied (2019), particularly by blurring boundaries between the workplace and private life. Yet digital technologies hold potential to enhance efficiency and effectiveness, offering opportunities to improve both personal and occupational health outcomes (Spiekermann et al., 2022). At the individual level, mobile health (mHealth) apps are a promising approach to track and self-manage individual health outcomes in private (K. Hall, Oesterle, et al., 2024) and occupational settings (K. Hall, Helmus, & Eymann, 2024; K. Hall, Richter, et al., 2022). Further, at the broader organizational and societal levels, digital technologies increase healthcare delivery's efficiency through improved communication with providers and the use of universal health records (OECD, 2020). The COVID-19 pandemic highlighted ICT's critical roles in managing various aspects of the crisis (Spiekermann et al., 2022). Digital technologies facilitated infection control through measures such as physical distancing, remote work, and contact tracing (Adam et al., 2024). They also had key roles in analyzing, modeling, and predicting the pandemic's trajectory, as well as in organizing and managing vaccination campaigns (Klein et al., 2021). These technologies proved indispensable in supporting both public health efforts and societal resilience during an unprecedented global challenge (Doctor et al., 2023).

Thus, understanding technologies' impacts on health necessitates an examination of both the individual perspective and the broader context in which technologies and humans are embedded, including both personal and occupational settings. Given the critical importance of health for overall human well-being, it is essential to investigate how digital technologies influence our understanding of health in both private life and work environments, and to assess contextual factors' roles in shaping these relationships. It is crucial to understand these

dynamics if we are to advance our knowledge of DWB, which involves the effective integration of technologies to support and improve overall health outcomes. In Chapter 3.3, I summarize papers 4 to 8 under *Well-being in Digital (Occupational) Health*.

Table 3 provides an overview of the eight papers, including their key details and methodological approaches.

Table 3. Details of the Eight Papers

Paper and publication status	Objectives	Methods and data collection	Publication metrics
Paper 1 The Double-Edged Sword of Social Comparison on Social Networking Sites – Effects on Subjective Well-Being Published in Proceedings of the *29th European Conference on Information Systems, ECIS, 2021*	Examining social media comparison processes' impacts on users' subjective well-being	Literature review; online survey and SEM for data analysis	VHB-24[7]: A IF: - h-index: -
Paper 2 The Echoes of Ostracism and Peer Opinion in Subjective Tasks: Untangling Conformity Dynamics in Social Media through Experimental Exploration Accepted for publication in *AIS Transactions on Human-Computer Interaction*	Examining online ostracism's impacts on users' online conformity behaviors regarding high-interest vs. low-interest themes	Two independent online experiments using a 2x2 between-subjects factorial design	VHB-24: B IF[8]: 3.92 h-Index: 21
Paper 3 Using Generative AI in Higher Education: A Guide for Lecturers Accepted for publication in *Journal of Information Systems Education*	Developing recommendations for integrating ChatGPT into daily practices in higher education	Discussions with lecturers and students; workshops with >50 educators; committee reviews at universities	VHB-24: C IF: 1.40 h-Index: 27
Paper 4 A Literature Review on the Risks and Potentials of Tracking and Monitoring eHealth Technologies in the Context of Occupational Health Management Published in *Proceedings of the 17th International Conference on Wirtschaftsinformatik (WI), 2022*	Exploring the application of tracking and monitoring eHealth technologies in occupational health management by identifying their advantages, potentials, disadvantages, and limitations	SLR; thematic analysis	VHB-24: B IF: - h-index: -
Paper 5 How to Balance Privacy and (Health) Benefits: Privacy Calculus and the Intention to Use Health Tracking at the Workplace Published in *International Journal of Human–Computer Interaction*	Examining organizational measures' effects on employees' perceived privacy, perceived benefits, and thus the intention to use self-tracking in digital workplace health promotion programs	Literature review; scenario-based online experiment using a 2x2 between-subjects factorial design	VHB-24: - / (Top 4 human-computer interaction journals according to Google Scholar's h5-index) IF: 4.5 h-Index: 90

[7] VHB Publication Media Rating 2024.
[8] Impact factor.

Paper 6 How one small step for occupational health management leads to many steps for employees – an experimental field study of incentive designs in a gamified mHealth app Published in *Proceedings of the 30th European Conference on Information Systems, ECIS, 2022*	Examining the effects of a loss-framed vs. gain-framed gamified incentive design in a fitness app on employees' physical activity levels	RCT featuring two experimental conditions and a control group	VBH-24: A IF: - h-Index: -
Paper 7 How Influencing Factors of Smart Wearable Intention to Use Change in Pandemic Times: A Comparison Published in *International Journal of Technology Management*	Examining the influences of personal characteristics and product factors (functional and nonfunctional) that determine the pre-adoption of smart watches before and during COVID-19	Literature review; online survey with two different time points; SEM for data analysis	VHB-24: C h-Index: 66 IF: 1.7
Paper 8 A Maturity Model for Assessing the Digitalization of Public Health Agencies – Development and Evaluation Published in *Business & Information Systems Engineering*	Developing a digital maturity model to guide federally managed public health authorities in navigating crises and advancing digital maturity	Literature review; DSR approach; interviews, diverse qualitative and quantitative evaluation methods	VHB-24: B IF: 7.9 h-Index: 63

3 Main Results

3.1 Well-being in Digital Connections

This chapter presents the findings of two research papers that examine the relationships between digital connections and users' well-being. These studies contribute to a deeper understanding of DWB, emphasizing the crucial and ambivalent roles of social relationships in digital societies.

Paper 1, *The Double-Edged Sword of Social Comparison on Social Networking Sites – Effects on Subjective Well-Being* (Diel et al., 2021), focuses on users' SWB while using social media. Given the mixed findings of previous studies on social media and SWB, it examines the roles of social comparisons processes in this relationship. Social media enable various social interactions, such as chatting and receiving *Likes*, which introduce new dimensions for social comparisons different from offline contexts (Rosenthal-von der Pütten et al., 2019; Wenninger et al., 2019). Since social comparisons can negatively affect self-evaluations such as self-esteem, it is crucial to understand how different comparison types (abilities vs. opinions) impact on SWB.

Paper 2, *The Echoes of Ostracism and Peer Opinion in Subjective Tasks: Untangling Conformity Dynamics in Social Media through Experimental Exploration* (K. Hall, Buck, & Diel, 2024), focuses on the subjective and objective effects of social media uses, such as feelings of ostracism conformity levels, while highlighting how individual experiences can influence broader societal outcomes. While social media uses can satisfy our fundamental need to belong, they can also trigger feelings of ostracism, where individuals feel ignored or excluded owing to minimal social signals such as few *Likes* on a social media post. This is concerning, as ostracism can have profound short-term and long-term impacts on users' mental and emotional health (Bernstein, 2016; Wesselmann et al., 2016), and even subsequent behaviors (i.e., conformity behaviors). The phenomenon of online social conformity, where users align their behaviors with prevailing opinions, has significant implications (Wijenayake, 2020). The evidence suggests that conformity affects behaviors in social media discussions, online quizzes, and visual tasks (Beran et al., 2015; Hullman et al., 2011; Maruyama et al., 2017; Maruyama et al., 2014; Wijenayake, 2020), often with negative outcomes, such as the undermining of learning (Beran et al., 2015) and collective intelligence (Bazazi et al., 2019), or influencing political decisions and spreading misinformation (Colliander, 2019; Garrett et al., 2020; Maruyama et al., 2014). While ostracism's roles in driving conformity behaviors are well-documented in the offline world, there has been little research into this phenomenon in the

online context. Paper 2 turns to online ostracism and its impacts on online conformity behaviors, a topic that has seen limited attention in this area.

3.1.1 The Double-Edged Sword of Social Comparison on Social Networking Sites – Effects on Subjective Well-being

The pervasive and growing presence of social networking sites (SNSs) such as Facebook, Instagram, and X, with more than four billion active users globally spending an average of 2.5 hours per day on these platforms, has made them a significant aspect of daily life. However, this extensive use raises important questions about how these platforms influence individuals' psychological states and subjective well-being. Subjective well-being, defined as an individual's overall assessment of their life satisfaction (Diener et al., 1999), has become increasingly significant for evaluating economic, social, and health progress among researchers, policymakers, and the public (Krueger & Stone, 2014), as discussed in the theoretical framework of this dissertation. The research underscores SNSs' complex effects on well-being, revealing both positive and negative influences. While some studies suggest that these platforms can enhance life satisfaction and can facilitate social interactions (e.g., Apaolaza et al., 2013), others point to potential negative effects, such as decreased self-esteem and increasing feelings of depression and anxiety (e.g., Krasnova et al., 2015; Schmuck et al., 2019; Schneider et al., 2017). This ambiguity in the findings indicates a complex relationship that requires further investigation if we are to gain a deeper understanding of how digital social connections interact with subjective well-being.

One critical aspect of this relationship is social comparison's roles in online environments. SNSs are often designed to emphasize curated and idealized self-presentation, making them fertile ground for social comparison processes (Brandenberg et al., 2019; S. Y. Lee, 2014). Positive or negative self-perceptions can significantly impact on subjective well-being, with favorable self-views enhancing well-being and unfavorable self-views diminishing well-being (Buunk & Gibbons, 2007). SNSs provide numerous opportunities for social comparison processes, such as evaluating abilities through images and profiles or assessing opinions via group discussions and institutional pages (Brandenberg et al., 2019; S. Y. Lee, 2014). It is essential to understand these dynamics, as they shed light on the broader implications for user mental health and societal well-being in an increasingly digital world.

The presented study delves into how different social comparison types – namely, comparisons of abilities and opinions – uniquely impact psychological processes and, therefore, subjective well-being. In constructing a conceptual model, we seek to clarify the connections between social comparison processes on SNSs and SWB. The model proposes that social comparisons

on these platforms are linked to several psychological factors, such as rumination, reflection, identity distress, identity clarity, and self-esteem. In turn, these factors are hypothesized to impact on SWB. Thus:

> **RQ:** How does social comparison of abilities and opinions in the context of SNS use induce self-related processes and concepts – namely rumination, reflection, identity distress, identity clarity, and self-esteem – and impact on subjective well-being?

To answer the question, we developed a conceptual model and collected data using an online survey targeting SNS users. Participants were asked to evaluate the model's constructs, including social comparison of abilities, rumination, identity distress, and SWB. The total sample consisted of 651 participants. To evaluate our measurement model's validity and analyze the structural relationships, we employed Partial Least Squares Structural Equation Modeling (PLS-SEM) and conducted a mediation analysis based on the method proposed by Zhao et al. (2010). Figure 8 summarizes the research model and its findings.

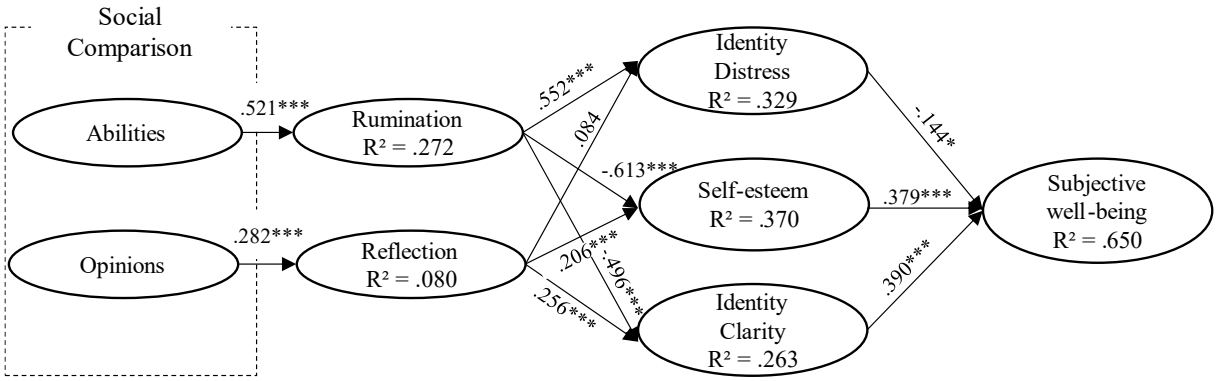


Figure 8. Review of the research model. Significant at ***<.001, **<.01; *<.05 (Diel et al., 2021)

The analysis shows that comparisons of abilities on SNSs negatively impact on SWB through mechanisms such as rumination and identity distress (Liu et al., 2017; Yang et al., 2018). This finding aligns with the research that highlights the negative psychological effects of social comparison, such as depressive symptoms and identity issues (Alfasi, 2019; Brandenberg et al., 2019). Conversely, the comparison of opinions does not directly affect SWB, but has a minor positive effect on self-esteem and identity clarity (Krause et al., 2021). These findings highlight that the negative relationship between SNS use and SWB may be attributed to social comparison of abilities, while the positive relationship is linked to social comparison of opinions. Unexpectedly, the study finds a small positive relationship between reflection and identity distress, which may be owing to information overload from extensive digital content (Fu et al., 2020; Maier et al., 2015).

The results also indicate that comparisons of abilities lower self-esteem through increased

rumination, consistent with earlier findings on SNS uses' negative effects on self-esteem (Krause et al., 2021). In contrast, opinion-based reflections tend to enhance self-esteem indirectly. Social comparisons affect identity clarity by shifting the focus from deep self-reflection to situational factors, as noted in the research (Berzonsky et al., 2013; Yang et al., 2018).

From a theoretical perspective, the findings highlight the role of social comparison processes in shaping the impact of SNSs on SWB. The results demonstrate that social comparisons on SNSs exert a multifaceted influence on SWB, depending on the type of comparison and the underlying psychological mechanisms involved. Further, we found that the comparison of abilities negatively impacts on well-being, mediated by factors such as rumination and identity distress, while the comparison of opinions has a more complex effect. The study also suggests directions for future research, such as longitudinal studies to explore how ongoing SNS use, and evolving comparison processes affect subjective well-being over time. This could help in developing targeted interventions for improving user experiences on SNSs.

3.1.2 The Echoes of Ostracism and Peer Opinion in Subjective Tasks: Untangling Conformity Dynamics in Social Media through Experimental Exploration

The WHO (2010) has identified loneliness as a major public health issue. This problem has been intensified by the growing prevalence of smartphones and social media, which have shifted much of our communication to online platforms (Twenge, 2020). While some studies – such as Cauberghe et al. (2021) – have indicated that social media can help one maintain relationships, other studies have suggested that extensive social media use is associated with deteriorating mental health processes (Gao et al., 2020). Further, Bonsaksen et al. (2021) even linked high social media use to increased feelings of loneliness.

Online communication presents unique challenges, including the issue of online ostracism. In these environments, minimal social signals – such as delayed responses – can make individuals feel ignored (Mai et al., 2015; Reich et al., 2018). Ostracism, the act of being ignored and socially excluded, can not only have severe psychological impacts, including feelings of humiliation and depression (Bernstein, 2016; Wesselmann et al., 2016), but can also affect decision-making, often leading to conformity as individuals seek re-inclusion (Williams, 2007). Conformity, or adjusting one's behavior to align with group norms, (Cialdini & Goldstein, 2004; Deutsch & Gerard, 1955) can strongly impact on society. On social media, these behaviors can reinforce echo chambers, spread misinformation, and shape social norms (Cinelli et al., 2021; Colliander, 2019; McDonald & Crandall, 2015). However, despite online

conformity's significance in a digital society, the empirical research in response to ostracism is limited and inconsistent (Garrett et al., 2020; Hayes et al., 2018).

To bridge this gap, this paper explores how online ostracism, in connection with conformity pressure, affects online conformity behaviors, particularly in subjective tasks where fact-checking is difficult. Conformity pressure refers to the psychological force that compels us to adjust our attitudes, beliefs, or behaviors to align with group norms or expectations. In the context of online ostracism, this pressure can intensify as individuals strive to be accepted or avoid further exclusion. The Temporal Need Threat Model (Williams, 2009) provides us with a framework for understanding how online ostracism can lead to conformity behaviors on social media. According to this model, ostracism threatens fundamental needs for belonging, self-esteem, control, and meaningful existence. These threats prompt individuals to seek social approval and reaffiliation, often leading them to conform to group norms to re-establish social connections (Williams, 2007, 2009). Thus, we asked:

> **RQ1:** Does ostracism on social media increase conformity behaviors in online environments on subjective tasks (tasks where fact-checking is barely possible)?

Online environments present tasks and activities that range from trivial to highly significant. Social media, for instance, encompasses everything from commenting on humorous content (low importance) to discussing critical issues such as climate policy (high importance). To better understand how task importance influences online conformity, we refined the research question to explore how varying task importance levels affect conformity behaviors on social media platforms.

> **RQ2:** To what extent does context (task importance) influence the relationship between ostracism on social media and online conformity behavior on subjective tasks?

To address the research questions and test the hypotheses, we conducted two independent online experiments using a 2 (ostracism vs. non-ostracism) x 2 (conformity pressure vs. nonconformity pressure) between-subjects factorial design for each experiment. Experiment 1 was conducted in the context of a low-importance task (i.e., preferences for historical power machines), and experiment 2 in a high-importance task (i.e., preferences for climate policy).

To manipulate online ostracism, we used the online ostracism tool developed and validated by Wolf et al. (2015). Conformity was assessed by the amount of virtual money that participants choose to donate, ranging from €0 to €10, and how they distribute this money between two fictional organizations. This distribution allowed to measure conformity by observing whether participants' donation patterns align with the suggested average distribution (= anchor amount) provided under the conformity pressure conditions. The conformity pressure

conditions included anchor amounts that suggest the typical group donation. The experimental procedure for experiment 1 and experiment 2 is shown in Figure 9.

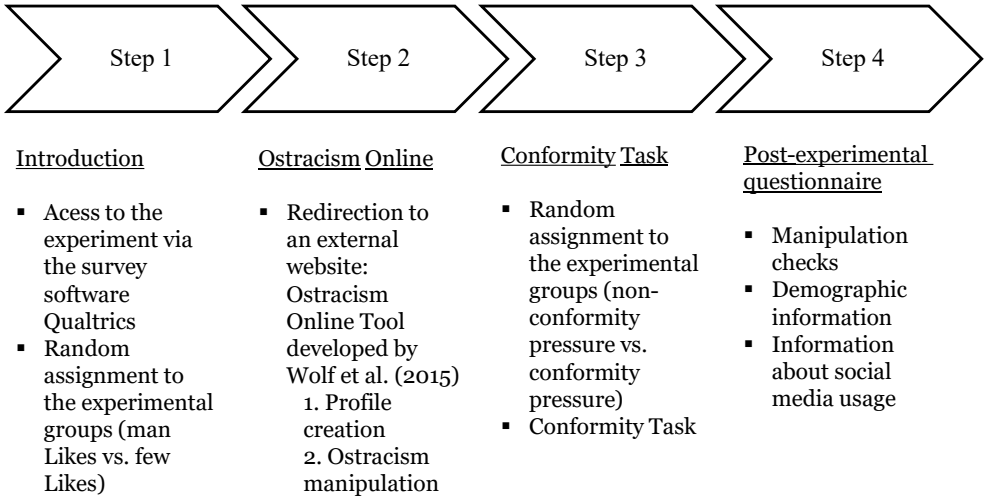


Figure 9. Overview of the Experimental Procedure (K. Hall, Buck, & Diel, 2024)

In total, 120 individuals participated in experiment 1 (51% male, 47% female, 2% nonbinary) and 130 in experiment 2 (58% male, 41% female, 1% nonbinary). On average, participants are 24.86 (SD = 8.80) years old in experiment 1 and 25.28 (SD = 8.88) years old in experiment 2. Of the participants, 42.2% (experiment 1) and 42.3% (experiment 2) have a university degree. The average daily social media consumption is 1.67 hours (SD = 0.93) in experiment 1 and 1.60 hours (SD = 1.04) in experiment 2.

We used ANCOVA to analyze the effects of online ostracism and conformity pressure on donation behaviors, controlling for age and task importance. We measured effect sizes using partial eta squared.

Results indicate that individuals tend to conform to majority behavior in subjective tasks, irrespective of task importance. Specifically, users exhibit stronger conformity in a task of high importance, such as climate policy, compared to low-importance tasks, such as preferences for a technical museum. This demonstrates that social dynamics on social media significantly impact on user behaviors, with conformity being more pronounced in contexts that are perceived as crucial (Asch, 1951; Williams et al., 2000).

Regarding online ostracism, the study reveals mixed results. While online ostracism – indicated by receiving fewer *Likes* – increases conformity in low-importance tasks, this effect is not observed in high-importance contexts. This suggests that ostracism primarily influences conformity in less critical areas, possibly owing to the motivation to reconnect socially (Stephan Winter et al., 2015; Wolf et al., 2015). In contrast, for important issues, conformity

appears driven more by the desire for accuracy and fear of marginalization rather than ostracism alone (Deutsch & Gerard, 1955; Kundu & Cummins, 2013). Our findings are displayed in Figure 10 (a low-importance task) and Figure 11 (a high-importance task).

These findings have several theoretical and practical implications. Given that Asch's conformity experiment already showed that participants often followed a group's wrong answers even when they were clearly wrong (Asch, 1951), we underline that conformity also occurs in subjective tasks that do not allow for a clear distinction between 'right' and 'wrong.' Our results suggest that subjectivity regarding a topic does not per se reduce nonconformity's cost (Levitan & Verhulst, 2016). Further, our results expand the ostracism literature (e.g., Wolf et al., 2015) by demonstrating that online ostracism can facilitate online conformity behaviors, especially in low-importance tasks.

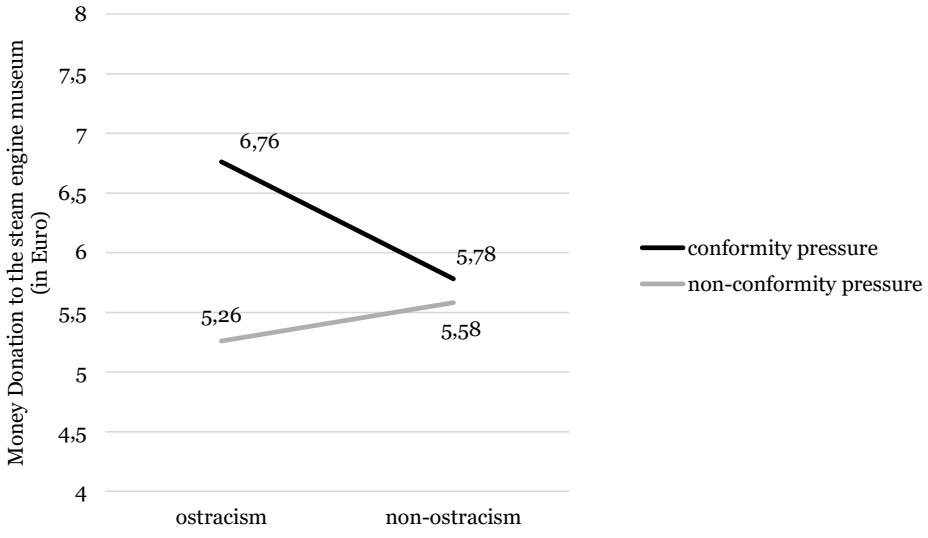


Figure 10. Empirical Findings of Experiment 1 (a low-importance task) (K. Hall, Buck, & Diel, 2024)

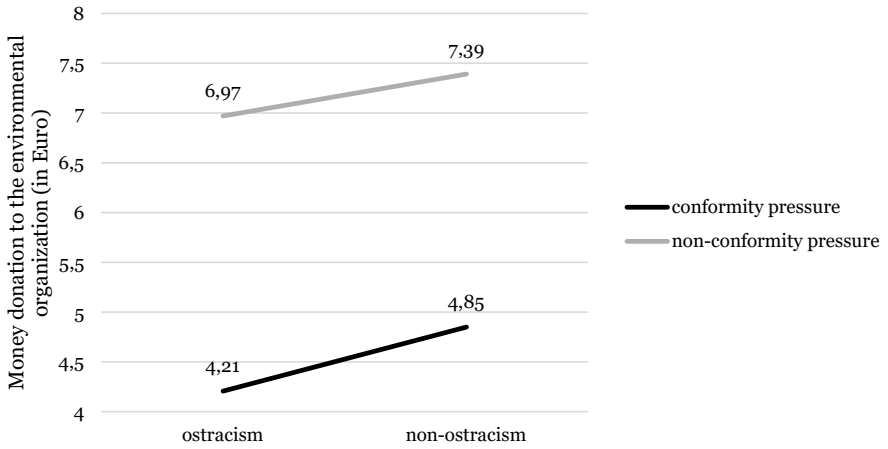


Figure 11. Empirical Findings of Experiment 2 (a high-importance task) (K. Hall, Buck, & Diel, 2024)

For social media platforms, it is crucial to recognize the roles of conformity and ostracism in shaping user behaviors. Features that encourage diverse perspectives and critical thinking can help mitigate the homogenization of ideas and the spread of misinformation (Colliander, 2019; Stöckli & Hofer, 2020). Further, understanding the psychological impacts of social media design can help prevent the negative effects of online ostracism (Williams, 2007).

3.2 Well-being in Digital Education

Paper 3, *Using Generative AI in Higher Education: A Guide for Lecturers* (Gimpel et al., 2024), examines digital literacy, with a focus on the effective and critical use of emerging technologies such as ChatGPT in higher education. It seeks to identify strategies for optimizing educators' engagement with ChatGPT and enhancing their ability to guide students in its use. In doing so, paper 3 strongly contributes to the understanding of DWB by exploring how well-being can be achieved in the realm of digital education at the objective level.

3.2.1 Using Generative AI in Higher Education: A Guide for Lecturers

In early 2023, the question *Could ChatGPT earn a Wharton MBA?* made headlines, sparking concern among universities globally. ChatGPT's debut in November 2022, followed by the enhanced capabilities of GPT-4 in March, 2023, and the subsequent advancements and multimodal features of GPT-4^{o} released in May, 2024, strongly disrupted the higher education landscape.

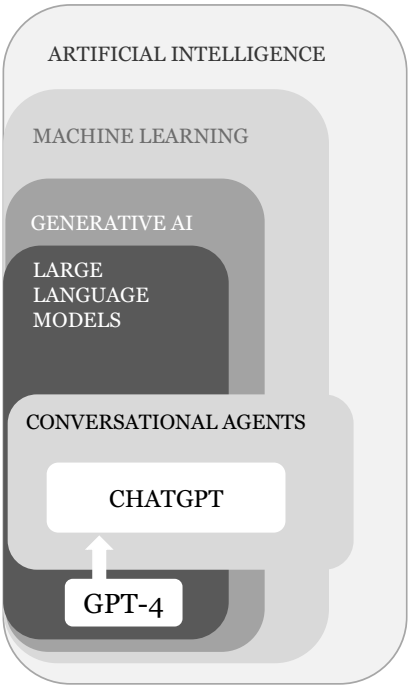


Figure 12. AI and its Subdomains (Gimpel et al., 2024)

ChatGPT is based on AI, specifically levering advancements in machine learning (ML) and large language models (LLMs) (see Figure 12). It exemplifies GenAI by creating and understanding complex text. As a conversational agent developed from GPT-3.5 and GPT-4, ChatGPT facilitates tasks such as writing, summarizing, and translating. Its integration into higher education offers productivity and efficiency benefits but requires careful attention to issues such as data bias and plagiarism.

Opinions in academia about ChatGPT remain divided. Some – such as Prof. Ute Schmid – expressed concerns about the lack of transparency in AI-generated content (Schmid, 2024), while others – such as Decker (2022) – worried about the potential spread of misinformation. Despite these concerns, many scientists agree that AI tools such as ChatGPT hold great potential to transform education by enhancing tasks such as writing, translation, and personalized learning. However, integrating ChatGPT into higher education requires careful thought. Factors such as increased productivity and efficiency, alignment with learning goals, and appropriate teaching methods need to be considered. Ethical concerns – including the effects on jobs and intellectual property – also demand attention. Thus, a balanced, comprehensive approach is crucial for effectively incorporating ChatGPT while addressing these challenges.

This research explored both the significant opportunities and potential drawbacks of GenAI tools in higher education. By examining the interplays between lecturers, students, and technological tools, the paper aims to help lecturers understand and navigate GenAI's impacts on teaching and learning. It also provides recommendations for lecturers to pass on to their students, guiding them in effectively integrating and utilizing these tools in their academic work. The paper also highlights potential applications of LLMs across the student lifecycle and in various administrative and operational areas of higher education.

We took a multifaceted approach to developing the guidelines for lecturers. First, we created a draft by synthesizing the expertise of 14 contributors, including lecturers, program managers, and AI researchers from five universities. We then engaged in active discussions with lecturers and students via social media, e-mail newsletters, and direct communication. We also provided access to open educational resources to encourage their use. Next, we hold workshops at several universities and inter-university networks, involving more than 50 educators and administrators. Their feedback helped to refine the guidelines. We also took these ideas through committee processes at several universities, resulting in some of them being formalized as official guidelines. Finally, we tested the guidelines in our own teaching practice, gathering feedback from hundreds of students to make further improvements.

Based on our research efforts, we finally extract two main areas of GenAI application for teachers and lecturers in more detail: (1) the teaching process and (2) the assessment process.

Regarding the teaching process, ChatGPT offers numerous opportunities across all stages of teaching activities, from planning and implementation to evaluation. We identified six valuable recommendations for lecturers, as summarized in Table 4.

Table 4. Summary of Recommendations for Lecturers regarding Teaching (Gimpel et al., 2024)

Recommendations for lecturers – teaching	
1	Reflect on how ChatGPT can be used to achieve the learning goals of your course
2	Use ChatGPT to create learning materials
3	Create quizzes for your students with the help of ChatGPT
4	Create new learning opportunities with ChatGPT
5	Encourage students to use ChatGPT
6	Teach students how to properly use ChatGPT

Regarding the assessment process, a major concern with integrating ChatGPT in higher education is the risk of making traditional essay assignments obsolete. For instance, the Faculty of Business Administration at the University of Economics Prague has replaced Bachelor theses with Bachelor projects owing to worries that students may use ChatGPT to evade plagiarism detection (Friedmannová, 2023). Current tools struggle to identify AI-generated text, and although solutions such as the OpenAI Text Classifier are being developed, their accuracy remains low (Wiggers, 2023). Also, ChatGPT's inability to fully understand context has led some institutions to consider banning AI tools (Arif et al., 2023). However, given AI's rapid development, universities are encouraged to focus on responsible integration rather than bans (Vogelgesang et al., 2023). To assist educators, the study offers seven recommendations for adapting assessment methods to incorporate AI, turning potential challenges into opportunities for enhancing education. An overview of the results is displayed in Table 5.

Table 5. Summary of Recommendations for Lecturers regarding Assessment (Gimpel et al., 2024)

Recommendations for lecturers – assessment	
1	Adapt your exam design to the current technological possibilities
2	Require students to declare how ChatGPT and other GenAI tools were used
3	Rethink your assessment formats
4	Focus on the supervision process for assignments
5	Innovate the evaluation criteria for assignments
6	Implement guidelines for avoiding plagiarism and copyright infringements
7	Implement "Rules for Tools"

Although conversational agents such as ChatGPT offer significant benefits for university students, supporting academic tasks, saving time, enhancing accessibility, and improving critical thinking and language skills, we provide critical reflection on how lecturers can effectively engage students in utilizing ChatGPT to maximize its advantages while mitigating potential risks. We explored the limitations and challenges associated with ChatGPT use, emphasizing the need for thoughtful integration into academic environments. The discussion concludes with nine key recommendations for educators, as summarized in Table 6, offering guidance on best practices for levering conversational agents in higher education.

In sum, our practical study reveals several interesting insights for lecturers in higher education to unlock potentials, rethink existing structures, and improve learning at universities.

Table 6. Summary of Recommendations for Lecturers to Students (Gimpel et al., 2024)

Recommendations for lecturers towards students	
1	Familiarize students with the examination regulations
2	Teach how ChatGPT can support learning goals
3	Teach how to use ChatGPT as a writing partner
4	Teach how to use ChatGPT as a learning partner
5	Teach how to best converse with ChatGPT
6	Engage to use ChatGPT to summarize learning material
7	Teach to speed up coding with ChatGPT
8	Inform of risks when using ChatGPT
9	Present the checklist at the end of this section before using ChatGPT

First, the integration of GenAI tools such as ChatGPT into higher education requires a major shift based on good academic practice. This change cannot be immediate; it requires lecturers to understand these tools and adapt their teaching methods and content accordingly. Examination formats will also need to be gradually developed and adapted to meet regulatory standards (Friedmannová, 2023; Khalil & Er, 2023).

Second, instead of waiting for a university-wide consensus, lecturers should encourage students to actively engage with GenAI tools such as ChatGPT. Students should create free accounts, explore these tools' capabilities and limitations, and reflect on their learning goals and methods. Such proactive engagement will help shape the evolving dialogue about AI in education (Vogelgesang et al., 2023).

Third, as lecturers integrate ChatGPT, they need to ensure compliance with relevant laws, university regulations, good scientific practice, and OpenAI's terms and conditions. By doing so, they can effectively use GenAI tools to enhance students' educational experiences while adhering to ethical standards.

3.3 Well-being in Digital (Occupational) Health

This chapter presents the findings from five research papers that explore the relationship between digital (occupational) health and well-being from both objective and contextual perspectives. Chapter 3.3 makes important contributions to the understanding of DWB through the integration of digital technologies into (occupational) health.

Paper 4, *A Literature Review on the Risks and Potentials of Tracking and Monitoring eHealth Technologies in the Context of Occupational Health Management* (K. Hall, Oesterle, et al., 2022) sheds light on the uses of health and fitness applications to track employees' health status in the context of digital workplace health promotion programs and, thus, to increase health outcomes. According to the WHO, the workplace plays a significant role in individuals' well-being and overall health (WHO, 2010). However, as the modern workplace, characterized by the proliferation of virtual collaboration and especially remote work, has increased work flexibility and has brought challenges to employees' overall well-being (Wells et al., 2023). Deficient PA levels, sedentary behaviors, or mental stress owing to the blurring of boundaries between work and personal life negatively influence knowledge workers' physical, psychological, and emotional well-being, resulting in poor health and work-related outcomes such as reduced work productivity (Puig-Ribera et al., 2015). Considering these emerging challenges, digital technologies such as wearables equipped with self-tracking capabilities can foster employees' overall well-being. However, while health and fitness apps are dedicated to enhancing employees' health and overall well-being, they also bring about many challenges (cf. H. Chen et al., 2024). Paper 4 is an SLR that extracts valuable insights about the risks and benefits of tracking technologies within digital workplace health promotion programs.

Paper 5, *How to Balance Privacy and (Health) Benefits: Privacy Calculus and the Intention to Use Health Tracking at the Workplace* (K. Hall, Helmus, & Eymann, 2024), provides a privacy-focused analysis of the adoption of health tracking apps in the workplace, specifically from an employee perspective. As employees' perceived privacy is a crucial aspect in technology adoption, paper 5 explores how organizational measures can enhance perceived privacy while simultaneously boosting employee benefits through participation in such programs, ultimately leading to higher participation rates.

Paper 6, *How One Small Step for Occupational Health Management Leads to Many Steps for Employees – An Experimental Field Study of Incentive Designs in a Gamified mHealth App* (K. Hall, Richter, et al., 2022), focuses on the positive design of health tracking technologies in digital workplace health promotion programs. Despite privacy-related issues, employee motivation is crucial to using health tracking at work and to driving behavioral change. Based

on self-determination theory and similar motivation theory, health and fitness apps' success in promoting healthy lifestyle depends on their ability to motivate users, considering both intrinsic and extrinsic motivations (Ryan & Deci, 2001). Gamification, commonly defined as the adoption of game-based thinking and the transfer of successful game mechanisms to nongame domains, emerges as a common approach in commercial fitness applications. Paper 6 applies principles from prospect theory (Kahneman & Tversky, 1979) to evaluate various gamified app designs aimed at enhancing employees' PA levels.

Paper 7, *How Influencing Factors of Intention to Use Smart Watches Changed in Pandemic Times in Germany – A Comparison* (K. Hall, Oesterle, et al., 2024), shifts the focus from direct human-technologies relationships to the broader environmental context in which both users and technologies are integrated and shaped. The COVID-19 pandemic has significantly changed individuals' health priorities and behaviors, heightening awareness and concern about personal health management. Thus, it became crucial to understand how these shifts influence the acceptance and use of self-tracking technologies. In response, paper 7 investigates the impacts of both functional and nonfunctional product factors on the adoption of commercial fitness apps, highlighting shifts observed before and after the pandemic.

Paper 8, *A Maturity Model for Assessing the Digitalization of Public Health Agencies* (Doctor et al., 2023), focuses on the development of a digital maturity model for PHAs to enhance their responsiveness to the COVID-19 pandemic. This model promotes a more structured, strategic, and integrative approach to their digitalization efforts. In this context, the paper examines well-being from a contextual perspective, recognizing that PHAs do not directly contribute to individual well-being; rather, they create the conditions and infrastructure that support and enhance it. By advancing their digital maturity level, PHAs can more effectively coordinate public health initiatives, improve data-driven decision-making, and foster environments that indirectly yet significantly impact on societal health and overall well-being. Thus, the digitalization of PHAs is a significant advancement in the pursuit of human well-being.

3.3.1 A Literature Review on the Risks and Potentials of Tracking and Monitoring eHealth Technologies in the Context of Occupational Health Management

With an aging workforce and increasing workplace health problems such as prolonged sitting, employee health becomes crucial for productivity and economic development (Engbers et al., 2005; Sallis & Saelens, 2000). Recognizing the workplace as a key setting for health promotion, the WHO emphasizes the need for occupational health management (OHM) to improve employee health through primary prevention and behavioral changes (WHO, 2007, 2010).

Despite the benefits of OHM, challenges such as low participation rates and difficulties in tracking progress owing to high data protection issues persist (Bensa & Širok, 2023; Kirchner & Ipsen, 2023). While the rapid development of eHealth technologies offers promising solutions, there is a lack of understanding about their uses, advantages, and limitations in OHM.

The paper *A Literature Review on the Risks and Potentials of Tracking and Monitoring eHealth Technologies in the Context of Occupational Health Management* (K. Hall, Oesterle, et al., 2022) explores these aspects by addressing three research questions relating to the application, benefits, and drawbacks of tracking and monitoring eHealth technologies in OHM:

> **RQ1:** Which tracking and monitoring eHealth technologies are applied in OHM?
>
> **RQ2:** Which advantages and potentials exist within the application of tracking and monitoring eHealth technologies in OHM?
>
> **RQ3:** Which disadvantages and limitations exist within the application of tracking and monitoring eHealth technologies in OHM?

To evaluate the current landscape of eHealth tracking and monitoring technologies in OHM and to identify their advantages and disadvantages, we conducted an SLR, focusing on peer-reviewed articles to ensure high-quality material. We followed established SLR procedures (e.g., Levy & Ellis, 2006; Okoli & Schabram, 2010; Webster & Watson, 2002), beginning with an extensive keyword search across six databases: Business Source Premier, AIS eLibrary, IEEE Digital Library, Science Direct, Emerald Insight, and ACM Digital Library. Two search strings were developed to capture a wide range of relevant studies, incorporating synonyms and alternative spellings for ‘occupational health’ and ‘eHealth.’ The following two search strings are:

> *(‘work* health’ OR ‘employee health’ OR ‘occupational health’ OR ‘operational health’ OR ‘corporate health’ OR ‘company health’ OR ‘office health’) AND (digital* OR ehealth OR e-health OR ‘electronic health’ OR mhealth OR m-health OR ‘mobile health’)*

and

> *(‘work* health’ OR ‘employee health’ OR ‘occupational health’ OR ‘operational health’ OR ‘corporate health’ OR ‘company health’ OR ‘office health’) AND (tracking OR self-tracking OR self-monitoring OR wearable* OR quantified self)*

We limited our search to publications from 2013 onward, focusing on titles, abstracts, and

keywords, resulting in 1,477 entries. After removing duplicates, 1,306 unique entries remain. Applying exclusion criteria – considering only English-language journal articles and conference contributions and excluding commentaries, editorials, presentations, periodicals, and proposals – refines the pool to 1,255 papers. Three authors independently screen titles and abstracts, identifying 67 papers relevant to our research questions. To further enhance the review, we conduct backward and forward searches, as recommended by Levy and Ellis (2006) adding 10 additional contributions. Our SLR identifies 77 relevant entries, which are thoroughly analyzed to extract data and insights pertinent to our research questions. An overview of the screening process is displayed in Table 7.

Table 7. The Results of the Systematic Literature Review (K. Hall, Oesterle, et al., 2022)

Screening process step	Number of articles
Retrieved papers from database screening	1,477
After duplicates removed (-171)	1,306
After quality assessment and exclusion criteria (-1,239)	67
After forward and backward search (+10)	77

As our analysis focuses on understanding how eHealth tracking and monitoring technologies can effectively promote healthy behaviors in OHM, we examined the advantages and disadvantages of these technologies and identify several success factors that are critical for effective implementation. The success factors we derived from our analysis were grouped into three dimensions: operational factors, technological factors, and a combination of the two.

Operational success factors include consciousness-related and management-related aspects. These involve for instance fostering a health-conscious work environment through clear communication and active involvement of top management. By integrating health policies into a company's culture and ensuring that health interventions align with company policies and infrastructure, the risks associated with OHM can be significantly mitigated.

Technological success factors center around motivation, user experiences, and technical requirements. Motivation can be enhanced through the integration of social influence mechanisms, such as challenges, leaderboards, and gamification elements, which help maintain employee engagement with a technology (Oxarart & Houghton, 2021; Shahrestani et al., 2017). User experiences are also critical and can be improved by ensuring that technologies are user-friendly, with a clear interface and devices that are convenient and unobtrusive (J. Chen et al., 2017). Further, technologically, these systems must focus on accuracy, reliability, and availability, as technical failures can quickly lead to negative user experiences, reducing overall acceptance and use (Benbunan-Fich, 2017).

The operational and/or technological success factors focus for instance on data protection and profitability (e.g., Mohadis & Ali, 2016; Singh et al., 2015). It is crucial to protect sensitive health data, which requires clear policies that ensure that employees' privacy is respected and that no one is compelled to share personal health information (Jimenez & Bregenzer, 2018). Profitability – another key factor – is achieved by ensuring that the costs associated with implementing digital OHM programs are justified by the resulting increase in employee productivity (Michie et al., 2017). Continual technological advancement also plays a role in reducing costs, particularly through the decreasing prices of sensors and other components used in tracking and monitoring systems.

In sum, our study underscores the importance of a balanced approach to implementing eHealth technologies, where the benefits and risks are carefully weighed. These technologies' success in OHM is contingent on both operational and technological factors, and understanding this interplay is crucial for maximizing such interventions' success. Further, our findings lay the groundwork for further research into the acceptance and long-term uses of these technologies in the workplace, offering valuable insights for practitioners seeking to manage the risks and fully lever the potentials of tracking and monitoring technologies in OHM.

3.3.2 How to Balance Privacy and (Health) Benefits: Privacy Calculus and the Intention to Use Health Tracking at the Workplace

The paper *How to Balance Privacy and (Health) Benefits: Privacy Calculus and the Intention to Use Health Tracking at the Workplace* (K. Hall, Helmus, & Eymann, 2024) delves into the roles of experienced data protection and employees' perceived privacy to increase the intended use of occupational health tracking.

The rise of remote work, accelerated by the COVID-19 pandemic, has led to an increase in digital health monitoring tools in workplace health promotion (WHP) programs (Galanti et al., 2021). These mHealth apps, which track very personal metrics such as heart rate, steps, and sleep quality, help identify health risks and support early interventions (Weerasekara & Smedberg, 2019). However, the voluntary nature of these tools and stringent privacy regulations such as the EU GDPR present significant challenges (GDPR, 2016).

Privacy concerns, combined with the blending of work and personal life, particularly in remote settings, can hinder the adoption of mHealth tools among employees (Miele & Tirabeni, 2020; Sewell & Taskin, 2015). Also, constant monitoring through wearable technology can contribute to stress and burnout. Therefore, organizations must take critical decisions regarding data collection practices, such as whether to limit data collection to work hours and who should

have access to these data. These decisions are essential for ensuring employee privacy and boosting their participation in digital health programs (Yassaee & Mettler, 2019).

This paper applies privacy calculus theory (PCT) to explore how employees weigh the benefits of health tracking (e.g., improved well-being) against privacy risks (Dinev et al., 2006). According to the literature, effective health monitoring systems should enhance perceived benefits while addressing privacy concerns so as to encourage adoption (Culnan & Bies, 2003). Thus, we ask:

> **RQ:** How do data access restrictions and data tracking in the private sphere impact on employees' cost-benefit analyses of digital WHP activities, considering perceived benefits, privacy concerns, and the resulting intention to use?

To address our research question, we developed several hypotheses grounded in literature and tested them empirically using a factorial survey experiment (Ausprug & Hinz, 2014). The conceptual model is displayed in Figure 13. Participants were randomly assigned to different scenarios featuring varying independent variables. Specifically, we use a 2 (data access: employee only vs. employee and employer) x 2 (private use: work-only vs. work and nonwork time) between-subjects factorial design.

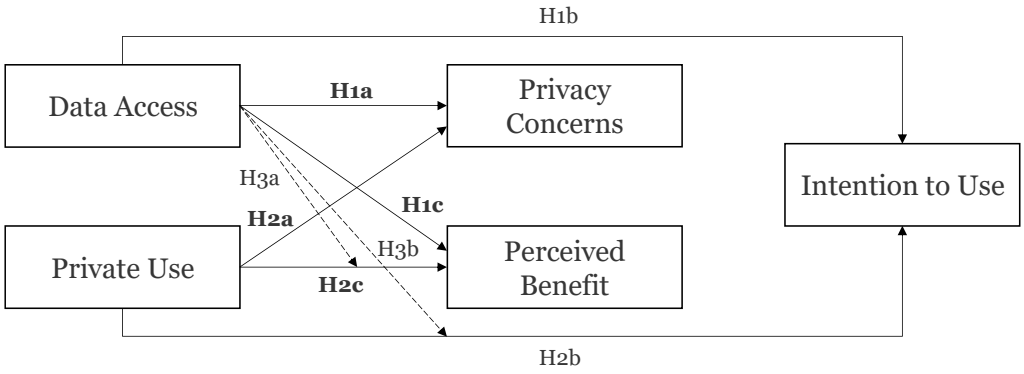


Figure 13. The Conceptual Research Model (K. Hall, Helmus, & Eymann, 2024)

Participants were recruited through work-related social media and e-mail, with data collection from March 30, 2022, to April 19, 2022. The final sample comprises N = 228 participants. We analyzed the data with IBM SPSS Statistics (version 26), using both descriptive and inferential methods, including two-way ANOVAs, to explore interaction and main effects. Further, means and standard deviations are reported. The results are summarized in Table 8.

The findings have several theoretical as well as practical implications. From a theoretical perspective, our findings show that limiting data access exclusively to an employee reduces privacy concerns and increases their willingness to participate in health monitoring activities. This finding highlights the crucial role of data access regulation in influencing employee

engagement. Interestingly, the study underlines that the possibility of private use of health monitoring devices does not significantly affect privacy concerns or the intention to participate in WHP. This indicates that employees prioritize their autonomy and ability to control their engagement with health tracking technologies over the additional option of private use. In sum, the findings significantly contribute to the literature by highlighting the importance of data access management in addressing privacy concerns and enhancing the perceived benefits of health monitoring programs. From a practical perspective, the study provides valuable insights for organizations looking to implement or enhance their WHP programs. By focusing on data access regulations and employee autonomy, organizations can create a more supportive environment that encourages participation in health monitoring, leading to improved health outcomes and productivity. In turn, this supports a healthier workforce and fosters a culture of well-being in an organization.

Table 8. Summary of the Findings (K. Hall, Helmus, & Eymann, 2024)

Number	Hypothesis	Findings
H1a	Limited data access -> decreased privacy concerns	Supported
H1b	Limited data access -> increased intention to use	Supported
H1c	Limited data access -> decreased perceived benefits	Not supported
H2a	Private use -> increased privacy concerns	Not supported
H2b	Private use -> decreased intention to use	Not supported
H2c	Private use -> increased perceived benefits	Not supported
H3a	Private use* data access interaction -> perceived benefits	Conditionally supported
H3b	Private use* data access interaction -> intention to use	Not supported

3.3.3 How One Small Step for Occupational Health Management Leads to Many Steps for Employees – An Experimental Field Study of Incentive Designs in a Gamified mHealth App

In industrialized societies, sedentary behaviors have become increasingly common owing to the widespread use of transport aids such as lifts, escalators, and vehicles, as well as the nature of digital work environments that involve prolonged sitting (Tremblay et al., 2017). This trend poses significant health risks for employees, including cardiovascular disease, diabetes, and musculoskeletal disorders, which can impact on employee productivity and can increase absenteeism (White et al., 2016). The COVID-19 pandemic has exacerbated these issues by increasing remote work and reducing overall PA, further contributing to sedentary lifestyles (Savić, 2020; Stockwell et al., 2021).

To address the challenges associated with sedentary behaviors and to promote PA in the workplace, effective OHM is essential. Digitalization enables companies to lever digital health

solutions, such as mHealth apps, to encourage employees to be more active. The research suggests that various incentives – such as step goals, virtual races, social comparisons, and reminders – can positively influence behaviors (Dadaczynski et al., 2017; Gremaud et al., 2018; Haque et al., 2020). However, a significant research gap remains in understanding how to effectively integrate and sustain the use of activity trackers and mHealth apps in workplace settings. It is crucial to ensure long-term engagement with these technologies, and their success hinges on effective persuasive communication strategies and consistent user interaction (Thomson et al., 2016). This gap highlights the need for further investigation into how these digital tools can be optimized for sustained impact in OHM.

Particularly financial incentives can be a promising method for promoting healthy employee behaviors. However, despite their potentials, the research into integrating these incentives into digital platforms is limited and inconsistent. The study *How one small step for occupational health management leads to many steps for employees – an experimental field study of incentive designs in a gamified mHealth app* addresses this gap by conducting a randomized control trial (RCT). We compared two gamification frames with financial incentives, based on prospect theory (Kahneman & Tversky, 1979), to determine the most effective approach for increasing employee PA. Finally, we test the two hypotheses:

> **H1:** An incentive frame in fitness apps encourages employees to take more steps daily than simple self-tracking.
>
> **H2:** A loss frame in fitness apps encourages employees more than a gain frame with the same economic value.

To conduct our study, we recruited employees from a German university. Participants were recruited via e-mail and needed a smartphone (iOS or Android), a commitment to track their daily steps for six weeks (intervention phase), and consent for data use to participate. After registration and completion of a pre-questionnaire – gathering demographic, health-related, and occupational data – participants were randomly assigned to one of three groups: two treatment groups (TG1 and TG2) with different gamification frames and a control group (CG) with a basic pedometer app. The used app designs for the treatment (control) group are displayed in Table 9.

Participants subsequently installed the app, which syncs with either Google Fit or Apple Health to track daily step counts. At the end of the six-week intervention phase, participants completed a post-questionnaire to assess subjective PA and to validate the manipulation of the incentive frames.

Of 300 employees contacted, 82 participated, and 54 completed the entire six-week study. We

analyzed data from 49 participants (59.75% of the initial group) who fully completed all phases using descriptive statistics and one-way ANOVA. The primary outcome variable is the mean daily step count measured by the built-in smartphone accelerometers. We used the software IBM SPSS Statistics for Macintosh, version 27.0 (Armonk, NY), to perform statistical analysis.

Table 9. Gamification Elements According to the Experimental Condition (K. Hall, Richter, et al., 2022)

Gamification elements	TG1	TG2	CG
Visualization of steps	•	•	•
Points	•	•	-
Level	•	•	-
Visualization of goals	•	•	-
Performance graph	•	•	-
Financial incentive	•	•	-
Frame	A gain frame	A loss frame	-

The average participant age is 32.43 years (SD = 11.20), ranging from 19 to 63 years, with 61% identifying as women and 39% as men. The average BMI is 22.46 (SD = 3.21), with 74% of participants having a healthy BMI, 18% overweight, and 8% underweight. Nearly all participants (96%) described their work as primarily sedentary, and 57% had prior experience in using mHealth apps for tracking steps.

Finally, the results demonstrate that gamified mHealth apps paired with financial incentives significantly increased daily step counts, with participants in the treatment groups walking approximately 3,645.68 more steps per day, a 59% increase compared to the control group. This suggests that such gamified incentive systems can substantially enhance PA levels in the workplace. When comparing the different incentive frames' impacts, the study finds that a loss-oriented approach, where rewards are initially provided and then reduced if step targets are not met, is more effective in increasing daily step counts than a gain-oriented approach, where rewards are only given upon meeting the targets. The loss-oriented group achieved their daily step goals 20% more often than the gain-oriented group. Further, participants in the loss-framed group maintain consistent engagement throughout the intervention period, unlike the gain-framed group and the control group, which show a decline in activity over time.

This study bridges behavioral economics and IS by being one of the first RCTs to explore how gamified financial incentives, framed by prospect theory (Kahneman & Tversky, 1979), can increase PA in the workplace. The study emphasizes the importance of personalized incentive systems, recognizing that individual differences in regulatory focus (a prevention focus vs. a promotion focus) (Higgins, 1998) can influence how people respond to health interventions. This personalized approach not only maximizes these interventions' effectiveness but also

aligns with broader efforts to support employee well-being by addressing individuals' unique needs and motivations.

3.3.4 How Influencing Factors of Intention to Use Smart Watches Changed in Pandemic Times in Germany – A Comparison

The paper *How Influencing Factors of Intention to Use Smart Watches Changed in Pandemic Times in Germany – A Comparison* (K. Hall, Oesterle, et al., 2024) explores the influences of both functional and nonfunctional characteristics on the pre-adoption of smart watches before and during the COVID-19 pandemic. We examined how the pandemic has shifted these characteristics' importance in determining the intention to use smart watches. Further, the study explores the roles of personal characteristics – such as income and fashion consciousness – in moderating the relationships between these factors and the intention to adopt smart watches.

COVID-19 impacted on priorities – notably individual health, and technological innovation – in a matter of weeks (Brem et al., 2021; Eden et al., 2020; Rosa & Mannarini, 2021; Xu et al., 2020). This shift prompted the rapid development and integration of COVID-19-related mobile apps to monitor public health and manage patients under quarantine. These technological innovations have permeated daily lives and have become essential, particularly in mHealth apps. While mHealth – defined as "mobile medical computing, medical sensor, and communications technologies for healthcare" – was already frequently used for the self-management of health issues without constant medical supervision (Baxter et al., 2020) before the pandemic, the onset of COVID-19 has significantly increased the importance of individual health management through smart watches.

Previous studies have identified various product-related factors that influence the intention to use smart watches, referred to as pre-adoption (Pfeiffer et al., 2016). However, the relationships between these factors and personal characteristics, particularly during the pandemic, remained underexplored. This study investigated the extent to which functional (e.g., perceived usefulness, perceived ease-of-use, and perceived content quality) and nonfunctional (e.g., perceived aesthetics, perceived haptics, and perceived price) characteristics influence the intention to use smart wearables, focusing on smart watches as a popular product category (Cecchinato et al., 2015). The study examined how the pandemic has altered the importance of both functional and nonfunctional characteristics, asking:

> **RQ1:** What functional and nonfunctional factors determine the pre-adoption of smart watches before and during COVID-19?
>
> **RQ2:** To what degree do personal characteristics moderate the relationships between

certain nonfunctional factors and the pre-adoption of smart watches before and during COVID-19?

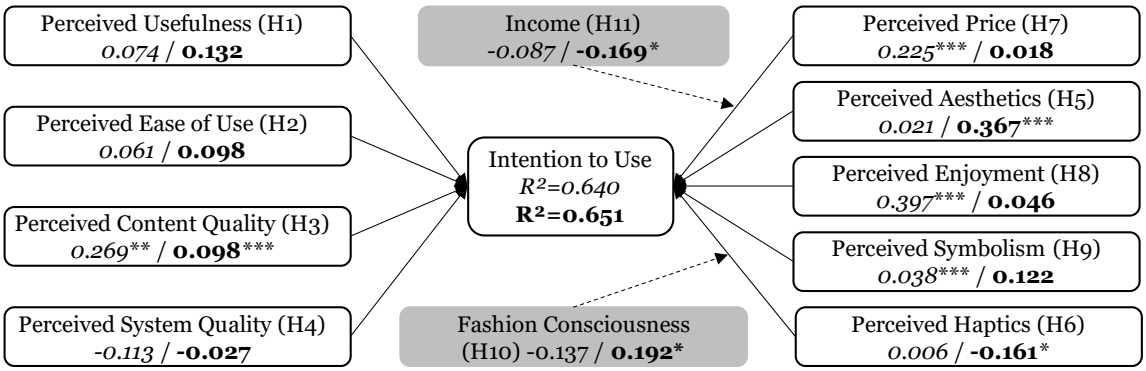
We drew on existing acceptance research, such as the theory of planned behavior (TPB) (Ajzen, 1985, 1991) and the Technology Acceptance Model (TAM) (Davis, 1989), arguing that these have not fully accounted for all relevant functional and nonfunctional aspects of adoption and have not shown how users' needs for smart wearable functionalities have changed owing to the pandemic. Informed by pertinent theory and literature, we developed multiple hypotheses and a conceptual framework to determine the relationships between nonfunctional and functional product factors and the intention to use smart watches.

We employed a quantitative-empirical approach to test our hypotheses. To enable a comparison of our findings over time, we conducted an online survey via Qualtrics at two intervals: one prior to the COVID-19 pandemic in 2018, and another during the pandemic in 2021. To prepare for the empirical validation of our research model, we used established measurement scales, which we translated and adapted to fit our context. The items for intention to use, perceived usefulness, and perceived ease of use were adapted from Davis (1989) and Venkatesh et al. (2003). Scales for perceived content quality and perceived system quality were based on Shin (2009) and Ho Cheong and Park (2005). To measure perceived aesthetics and perceived haptics, we utilized scales from Tzou and Lu (2009) and Ogbanufe and Gerhart (2018). Items for perceived price and perceived enjoyment were derived from Venkatesh et al. (2012), while perceived symbolism was measured using scales adapted from Homburg et al. (2015). All constructs were measured using multiple items on a seven-point Likert scale, ranging from 1 (fully disagree) to 7 (fully agree).

Data were collected online via social media and forums, focusing solely on Germany to analyze local pandemic responses. During the 2021 survey, Germany was experiencing a partial lockdown with strict contact restrictions, partial exit limitations, school closures, and significant restrictions on gastronomy, trade, and public life. In both surveys, participants were presented with an illustrative example of a regular smart watch, accompanied by a detailed description to ensure a consistent understanding of the study's main attributes.

After cleaning the datasets, 295 responses were considered for further analysis. To test our hypotheses, we used PLS-SEM and multigroup analysis (Chin, 1998) with SmartPLS. PLS-SEM is well regarded in the IS research for its advantages over covariance-based approaches, particularly in terms of sample size requirements and predictive analysis capabilities (Fornell & Bookstein, 1982). However, we were also mindful of the limitations of the PLS-SEM approach (Rigdon et al., 2017). The results of our analysis appear in Figure 14.

Our results make several theoretical contributions to the IS research, particularly in the realm of technology acceptance models and theories. First, we extend established technology acceptance models and theories, such as the TPB (Ajzen, 1985, 1991), the TAM (Davis, 1989), and UTAUT (Venkatesh et al., 2003), by integrating both functional and nonfunctional factors. Although UTAUT2 (Venkatesh et al., 2012) includes nonfunctional elements such as hedonic motivation and price value, it overlooks aesthetics, which are crucial for products such as smart watches. Our comprehensive framework enhances understanding of smart watch adoption and applies to other identity-linked technologies.



Notes: italics = 2018; bold = 2021; * p = <0.050, ** p = <0.010, *** p = <0.001; moderators in grey-shaded boxes.

Figure 14. The Structural Model (K. Hall, Oesterle, et al., 2024)

Further, our findings challenge the binary classification of smart watches as either fashion items or IT products. Instead, we advocate for the importance of identity-related attributes, alongside functional and design factors, in explaining smart watch adoption and non-use (Gerhart & Ogbanufe, 2021; Ogbanufe & Gerhart, 2018). Also, our study is among the first to explore how the significance of functional and nonfunctional factors in smart watch adoption has evolved during the COVID-19 pandemic. We find that nonfunctional factors became more important during this period, underscoring the context-dependence of technology adoption and the need for ongoing updates to acceptance models (Jeong et al., 2017).

3.3.5 A Maturity Model for Assessing the Digitalization of Public Health Agencies

The paper *A Maturity Model for Assessing the Digitalization of Public Health Agencies* (Doctor et al., 2023) explores how federally managed PHAs, which must also operate in crises, can digitally mature to enhance their effectiveness and responsiveness. By advancing their digital maturity, PHAs can significantly improve their capacity to manage and respond to public health emergencies, streamline operations, and enhance communication and coordination. In turn, this has direct impacts on the improvement of public health and overall

societal well-being. During the COVID-19 pandemic, locally operating PHAs became pivotal in a coordinated crisis response, delivering essential health services to all citizens. While maintaining and improving public health is a crucial responsibility of a welfare state (Moran, 2000), Germany's 375 PHAs had generally received little public attention prior to the pandemic (Arnold & Teichert, 2021). PHAs perform critical functions beyond routine tasks such as administering medical services and tracking infections. They also act as central hubs for health promotion, including counseling and educational information on preventive measures, and for care, such as providing information on nursing services (Rechel et al., 2018). Despite these vital roles, many of these functions had not yet been digitalized, partly owing to municipal governance structures.

COVID-19 exposed significant challenges in federally-managed healthcare systems, particularly the need for unified messaging and recommendations across federal and state agencies to ensure consistency (RKI, 2020). As an "extreme, unexpected, or unpredictable event" (Doern et al., 2019) the pandemic required rapid and adaptive responses at multiple levels, significantly impacting on society (Dutton, 1986). The crisis highlighted the critical need for effective contact tracing, which demanded additional resources, extensive data processing, and enhanced coordination with stakeholders. This situation underscored the urgency for PHAs to advance their digital capabilities and achieve digital resilience. However, guiding the digitalization of PHAs in a federally-managed field requires an approach that supports reaching a consensus on a jointly negotiated digitalization goal and transformation process.

Maturity models (MMs) are a well-established tool in IS to create a clear vision and outline the steps needed to achieve it (Becker et al., 2009; Mehta et al., 2007; Rao et al., 2003). This paper introduces and assesses the Public Health Agency Maturity Model (PHAMM), designed specifically for PHAs in Germany. The PHAMM addresses the challenge of enhancing and harmonizing digital maturity in PHAs by incorporating a structured approach to digital transformation. Crucially, it involves employees as key participants in the process, ensuring that their needs and perspectives are integrated into the journey toward improved digital capabilities.

To develop the PHAMM, we followed a DSR approach incorporating methods from Kuechler and Vaishnavi (2008) as well as Sonnenberg and vom Brocke (2012), involving several key steps: recognizing the problem, proposing a solution, iterative build-and-evaluate cycles, and drawing conclusions. Specifically, we utilized Becker et al.'s (2009) procedure model for MM development, which has the following stages: (1) problem definition, (2) comparison of existing MMs, (3) strategy determination, (4) iterative development, (5) implementation, (6) evaluation, and (7) decision on application or rejection. Throughout these stages, we employed

various methods such as literature reviews, interviews, and observations to guide the digitalization of PHAs.

The developed MM has eight dimensions, each with associated subdimensions that organize the various aspects of digitalization. These eight dimensions collectively outline the key focus areas for the digital transformation of PHAs, structured by specific subdimensions and stages of maturity, ensuring a comprehensive and unified approach across organizations. Further, the MM features more than 350 practices mapped to the five maturity levels within each dimension that guide PHAs toward greater digital maturity. The description of each dimension, along with its subdimensions, is presented in Table 10.

Table 10. Dimensions of the Public Health Agency Maturity Model (Doctor et al., 2023)

Dimension	Description, including subdimension
Digitalization strategy	The dimension *digitalization strategy* comprises (1) **the definition, communication, and implementation** of the digitalization strategy, the (2) **definition of responsibilities**, and the planning of the necessary (3) **digitalization budget** for the PHAs' tasks and objectives.
Employees	The dimension *employees* includes the (1) **sensitization** and (2) **participation** of the employees in digitalization activities, as well as the aspects of (3) **training** possibilities.
Process digitalization	The dimension *process digitalization* includes: the extent to which processes are (1) **documented**, the extent to which processes are (2) **IT-supported**, and the extent to which there are (3) **overlapping processes** to be addressed via cross-process coordination. Finally, we lay out criteria for the (4) **evaluation of processes** across tasks and departments.
IT security	The dimension *IT security* includes the scope of (1) **IT security management**. It also addresses concrete measures for (2) **dealing with IT security risks and attacks** as well as (3) **identity and access management**.
IT provision	The dimension *IT provision* includes the equipment of the (1) **IT workplace** (hardware and operating systems), the (2) **organization of the IT procurement** and of the (3) **IT infrastructure**, and the (4) **application of IT service processes**
Citizen focus	The dimension *citizen focus* includes the consideration of the (1) **interaction** with citizens and orientation and design of the available information (2) **preferences**
Cooperation	The dimension *cooperation* includes (1) **cooperation within the public health departments**, (2) **cooperation between health departments among themselves and with provincial offices**, and (3) **cooperation with external stakeholders**
Software, data, and interoperability	The dimension software, data, and interoperability includes the (1) **use of specialist applications** as well as their (2) **technical interoperability**, (3) **data analysis and reporting**, (4) **requirements and documentation** of specialist applications, and (5) the protection of data

The contributions of this paper are multifaceted. First, by demonstrating how the PHAMM can be adapted to various national contexts, it offers a versatile framework for both public and private sectors to standardize digitalization maturity and foster interoperability across decentralized units. This expands the traditional role of MMs beyond assessing organizational digital readiness, showing their potentials for use in decentralized organizations to

collaboratively define goals and outline steps to achieve them, particularly in federal systems. Our research illustrates how MMs, specifically the PHAMM, can facilitate the negotiation of digitalization objectives in federal settings, highlighting democratic processes' roles in fostering institutional commitment and building trust.

Further, the PHAMM is utilized to allocate €800 million in national funds for the digitalization of PHAs. This dual role not only supports PHAs in their digitalization efforts by providing concrete practices, but also ensures effective fund distribution.

Also, the study enriches the MM literature by integrating diverse stakeholders in a mixed-method approach to collectively negotiate digitalization goals, leading to the development of an MM used by more than 350 organizations. It identifies necessary adaptations for consensus-building in federal systems, refining Becker et al.'s (2009) MM development process to incorporate a negotiation approach, enabling user support activities and emphasizing iterative stakeholder engagement.

Overall, the research establishes the PHAMM as a versatile tool for assessing and advancing digital maturity while fostering collaboration and resource allocation in decentralized systems.

4 Discussion

4.1 Shaping Digital Well-being

It is crucial to get a clear and unified understanding of DWB, as it can significantly influence the development of human-centered technologies that promote well-being, can inform policy and regulatory frameworks to protect well-being (e.g., GDPR, EU AI Act[9]), and can guide communities to educate well-being in digital societies. Although the focus of *IS for human well-being* is not new in the academic discourse (see Chapter 2.2), we still lack a universally accepted definition and conceptualization of DWB in the IS research.

In this dissertation, I seek to shape DWB by developing a well-being lens on the socio-technical systems perspective in the IS research (RO). However, effectively conceptualizing such a complex topic requires a foundational deconstruction and in-depth understanding of the diverse components and dimensions of well-being, along with the ways in which they are influenced by the digital transformation era (RG1). This dissertation first pursues a *knowledge-oriented approach* to develop a deeper understanding of how DWB is being

[9] The European Union's AI Act sets forth ethical guidelines and a regulatory framework that governs the development, deployment, and use of AI systems in the EU. Under the Act, AI systems are classified by risk levels, ranging from minimal to unacceptable risk, with each category subject to specific regulatory obligations.

addressed in the IS literature (e.g., Pawlowski et al., 2015) as well as in the broader academic discourse (e.g., Burr & Floridi, 2020). Further, this dissertation includes eight research papers that empirically investigate *how* digital technologies shape the ways in which we build social relationships (RG1.1), engage in educational processes (RG1.2), and manage our health (RG1.3). I illustrate that human well-being is a complex construct that encompasses multiple dimensions, including health, social connections, education, and work. I highlight that well-being goes beyond merely the absence of illness; it involves achieving positive states in these areas, such as maintaining good health, enriching educational experiences, and fostering meaningful social relationships (see Chapter 2.3.2). However, "achieving a positive state" can be experienced, measured, and influenced on subjective, objective, and contextual levels. Further, as Melvin Kranzberg, the renowned historian of technology, articulated in his First Law, "technology is neither inherently good nor bad; nor is it neutral" (Kranzberg, 1986, p. 545). Technologies' impacts depend on the specific context that shapes their uses and the level of analysis. By examining these relationships across subjective, objective, and contextual levels, this dissertation provides an in-depth understanding of how well-being is experienced across multiple dimensions of human existence. To gain a holistic picture of how DWB is experienced across multiple dimensions of human existence, I will now summarize the main insights of these findings and will discuss them across these three levels.

4.1.1 The Subjective Level

At the subjective level, digital technologies shape individual experiences of well-being by influencing personal perceptions of specific phenomena or trends associated with digital transformation, which are likely to have significant effects on our overall well-being. Paper 1 shows that social media can influence SWB through social comparison processes, where individuals may compare their lives to the curated, often idealized lives of others (Diel et al., 2021), leading to feelings of inadequacy or envy (Latif et al., 2021). Further, although social media platforms are originally designed "to give people the power to build community and bring the world closer together" (Meta, 2024), paper 2 reveals that they can in fact have the opposite effect (K. Hall, Buck, & Diel, 2024). Feelings of online ostracism – being ignored or excluded by other users – can be a significant problem in digital environments, as ostracism has adverse effects on users' mental health and subsequent online behaviors. While the OECD already includes measurable indicators such as *children's exposure to cyberbullying* or their *engagement with online social networks* in frameworks that assess digital transformation's impacts on human well-being (OECD, 2019), indicators such as *levels of online ostracism* and *social comparison processes* – which offer deeper insights into how individuals subjectively

experience interactions with technologies in building social relationships – have remained underexplored.

Further, as emphasized in papers 4 and 5, and as discussed by the OECD (cf. Hatem & Ker, 2021), users' *personal security* in online environments is crucial, especially when it involves sensitive health data. While mHealth technologies provide users with opportunities to self-manage their health and assist in the early detection of risk factors, the role of information privacy is crucial, as it significantly influences both technology adoption and users' overall trust and engagement with digital health measures (K. Hall, Helmus, & Eymann, 2024; K. Hall, Oesterle, et al., 2022), but also individuals' well-being (Hatem & Ker, 2021). Privacy concerns – as the perceived loss of control and inadequate protection of personal information (Dienlin, 2014) – not only reduce the likelihood of technology use but also act as significant stressors, leading to feelings of frustration. The GDPR underscores the importance of safeguarding personal data, making privacy protection a key challenge in digital transformation for individual well-being (Gluckman & Allen, 2018). Subjective indicators of well-being, such as users' *perceived privacy*, are particularly important because they can reflect users' sense of safety and satisfaction in digital societies. Focusing on such subjective indicators highlights the deeply personal and individual ways in which well-being is experienced.

However, subjective indicators of well-being should always be handled with caution, since individual perceptions and behaviors could influence the larger society. For example, even if some individuals are comfortable with their health data being shared, this aggregation can lead to generalized assumptions about groups that may not accurately represent the diverse experiences and identities in a community. Behavior patterns, preferences, and vulnerabilities can be identified, which could result in misleading conclusions about individuals. This highlights the critical need for a more nuanced examination of *perceived privacy* in relation to human well-being. Acknowledging the potential downsides of positive design factors aligns with the understanding of the second wave in positive psychology (see Chapter 2.1.2).

This perspective emphasizes the importance of acknowledging not only the positive dimensions of human experience (e.g., high levels of perceived privacy) but also the complexities and potential drawbacks associated with these experiences. In the context of DR, it becomes crucial to consider how privacy is managed in digital environments, ensuring that individuals are not only protected but also empowered to make informed decisions about their digital presence.

4.1.2 The Objective Level

On objective levels, digital transformation's quantifiable impacts on various dimensions of human well-being can be objectively assessed. According to Hatem and Ker (2021), and as underlined by the empirical findings in Chapter 3, digital technologies' impacts on components of well-being can be measured using two main approaches:

- Focusing on *digital indicators* of the objective effects of digital technologies on various dimensions of well-being within digital societies.
- Focusing on *nondigital indicators* of the objective effects of digital technologies on various dimensions of well-being within digital societies.

Digital indicators refer to quantifiable, measurable metrics that objectively assess the impact of digital technologies on various digital aspects of well-being in digital societies. These indicators can include digital skills, digital divide, and technology adoption rates.

Paper 3 demonstrates that *digital indicators* to quantitatively assess the impact of digital technologies on key life dimensions for human well-being, such as education, are crucial in digital societies. The rise of GenAI, particularly with the launch of ChatGPT by OpenAI in November 2022, has exemplified how rapidly new digital innovations can disrupt traditional systems, such as higher education institutions (Gimpel et al., 2024). Educators and learners were suddenly compelled to acquire new *digital skills*, because completely banning ChatGPT was neither feasible nor practical. While *digital skills* are crucial for individuals to fully lever the advantages of such innovations, they "are only an opportunity for those who have them" (Hatem & Ker, 2021, p. 38). The 'digital divide' also presents a risk at the societal level that could further increase existing inequalities. Thus, as outlined in paper 3, universities should encourage a broad, multiperspective dialogue among many stakeholders in higher education to develop best practices, regulations, guidelines, to lever the potentials of ChatGPT in the short term and other GenAI tools in the medium term (Gimpel et al., 2024). The IS research should also establish new, robust indicators to evaluate and ensure that digital technologies promote well-being rather than detract from it.

While *digital skills* are key indicators in digital societies, research has shown that especially younger and more educated people use the Internet for more productive activities such as access to healthcare services compared to people from lower socio-economic status (Hatem & Ker, 2021). *Making medical appointments online* and *seeking health information online* are among the few indicators currently available to assess the tangible benefits people gain from digital innovations in healthcare in the OECD countries (Hatem & Ker, 2021). Here, the adoption rate of self-tracking technologies such as smart watches in digital societies could

serve as important additional metrics. These devices facilitate proactive health management by allowing users to monitor key indicators, such as PA levels, blood pressure, and/or heart rate. High adoption rates of these technologies could reflect both the accessibility of digital health tools and the level of digital engagement in a population, offering valuable insights into how digital societies support individual and collective well-being. However, to fully understand their spread in digital societies, it is important for the IS research to investigate which product factors (functional vs. nonfunctional) ultimately lead to intended usage (K. Hall, Oesterle, et al., 2024).

Nondigital indicators refer to quantifiable, measurable metrics that objectively assess the impact of digital technologies on various nondigital aspects of well-being in digital societies. These indicators can include health conditions, work productivity, and physical complaints.

Papers 4 and 6 explore the impact of digital technologies on the objective, nondigital aspects of well-being. Paper 4 highlights how tracking and monitoring through eHealth technologies in OHM can have unintended negative effects on employee well-being. These impacts include increased sick days, physical complaints, reduced work productivity, and risks of injuries or overtraining, revealing the 'dark side' of these interventions, which can undermine objective aspects of well-being (K. Hall, Oesterle, et al., 2022) On the other hand, digital technologies also hold significant potential to enhance employee well-being. By supporting behavior change, these technologies can motivate individuals to adopt healthier habits, leading to improved health awareness, better posture, overall health improvements, and greater engagement in healthier lifestyles. Specifically, paper 6 shows that implementing a loss-framed incentive system within a basic pedometer app can effectively boost employees' PA levels, thereby enhancing their overall well-being (K. Hall, Richter, et al., 2022). These findings underscore Spiekermann et al.'s (2022) argumentation that well-being can be enhanced through digital technologies by influencing users' behaviors through carefully designed digital interventions.

4.1.3 The Contextual Level

On contextual levels, digital technologies impact on well-being not only directly but also by shaping the environments and social frameworks in which people live, work, and interact (J. Hall et al., 2010; Hicks et al., 2013). According to paper 8, digital technologies have the potentials to enhance public health outcomes on the broader contextual level by improving data collection, streamlining communication, and increasing civic engagements in digital societies. As PHAs progress through the stages of digital maturity, they can more effectively enhance their services to the public, such as improving health education, contact tracing, and

other critical public health functions, ultimately contributing to better societal well-being (Doctor et al., 2023).

However, while technologies may shape our context, the context also influences how we interact with technologies. The ways in which technologies are implemented and used are often shaped by the surrounding environment, which in turn affects their overall impacts on well-being. As argued in paper 5, the COVID-19 pandemic significantly transformed work environments, making remote work the new norm (K. Hall, Helmus, & Eymann, 2024). This shift underscored the critical importance of digital workplace health promotion programs, as organizations had to adapt to support employees' well-being in a predominantly digital setting (K. Hall, Helmus, & Eymann, 2024; K. Hall, Richter, et al., 2022). The pandemic has also profoundly shifted what people truly value in their lives, altering how they perceive and use technologies. As demonstrated by paper 7, the unique circumstances of the pandemic have influenced how individuals prioritize the functional and nonfunctional product factors of smart watches during the pre-adoption phase (K. Hall, Oesterle, et al., 2024).

Building on Burr and Floridi's (2020) definition of DWB, digital technologies not only shape our current well-being, but also reshape our self-understanding of what it means to live 'a good life.' Digital technologies profoundly influence our values, priorities, and expectations, thereby altering our conceptions of well-being. For instance, as outlined in paper 3, AI-driven tools such as ChatGPT are reshaping academic and professional standards by shifting the emphasis from traditional skills such as critical thinking, writing, and independent research to new competencies such as effectively utilizing and integrating AI tools into learning and work processes (Gimpel et al., 2024). Thus, our definitions of what constitutes a successful *scientist*, *student*, or *employee* are undergoing profound changes. However, managing these changes requires more than just a technological perspective, such as designing technologies that promote well-being through approaches such as positive computing (Calvo & Peters, 2014). Instead of focusing solely on aligning technology with societal needs, this dissertation aligns with the perspective of van der Maden et al. (2023), who suggest that, in many cases, it may be more appropriate for social institutions to adapt to technological advancements. This change calls for a more comprehensive approach that includes re-evaluating our value systems and managing digital transformation in responsible and holistic ways (Trier et al., 2023).

In sum, understanding the relationships between digital technologies and human well-being remains a complex challenge. However, by acknowledging this complexity, we can deepen our understanding of DWB and guide research toward fostering more satisfied and balanced digital societies. In the next chapter, the dissertation presents a framework designed to support

research into DWB, offering a structured approach to explore the complex interactions between *systems*, *tasks*, and *human well-being*.

4.2 Developing a Well-being Lens on Socio-technical Systems

After establishing a deeper understanding of how digital technologies are impacting on well-being in digital societies, the next step is to structure these insights for the IS research. This involves developing a research framework by developing a well-being lens on the socio-technical systems perspective in the IS research (RG2). In doing so, my dissertation aligns with Schütte et al. (2022), emphasizing that addressing the grand challenges of our time requires a socio-technical view. By developing a well-being lens on the socio-technical systems perspective in IS (Heinrich et al., 2004), the developed framework acknowledges the complex and reciprocal interactions between individuals (*people*) and technologies (*systems)* to live a life (*tasks*) that is 'good' for us (Figure 15). Since the socio-technical systems perspective has been a foundational element of the IS research since its inception, even described by scholars as the "essence of IS research" (Schütte et al., 2022, p. 533), it is particularly well-suited for reinforcing the unique identity of the field and for shaping DWB from its own distinct perspective.

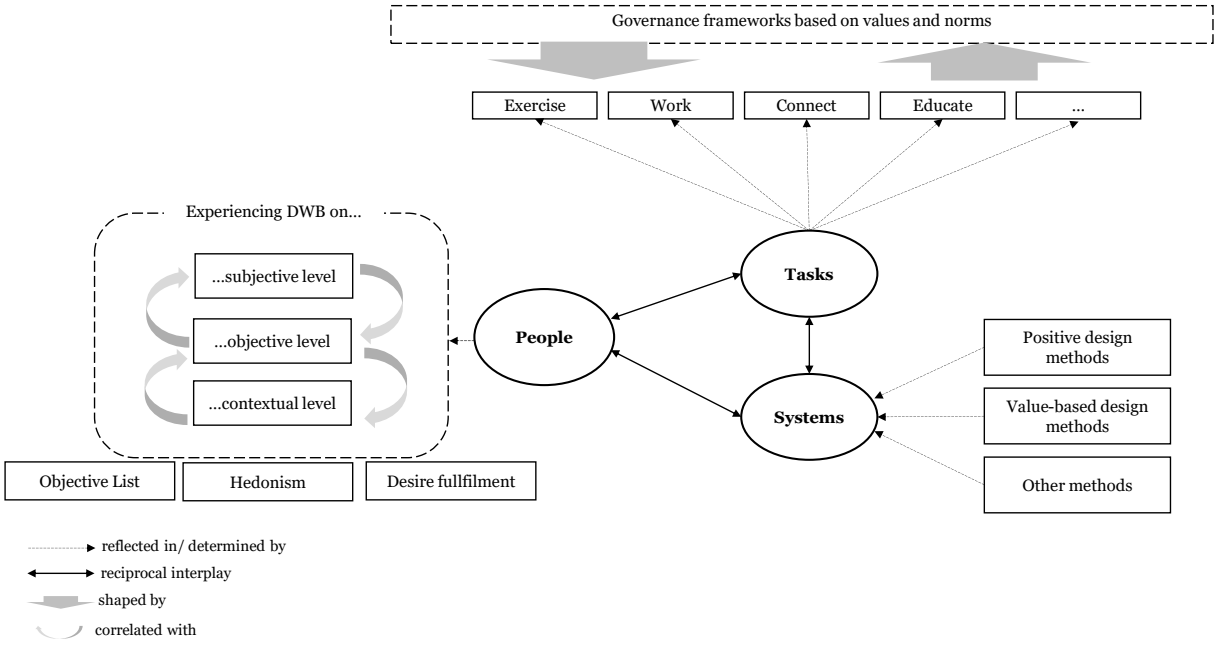


Figure 15. A Well-being Lens on the Socio-technical Systems Perspective in Information Systems (own representation)

Task

In this model, *tasks* are understood broadly, covering all dimensions of human life beyond traditional job-related activities. This can include how we educate, exercise, work, connect, and

even love, all of which significantly contribute to a 'a good life' in a digital society. The most prominent of these fundamental life dimensions are education, health, connections, and work. However, this list is not exhaustive; other crucial dimensions – such as security, housing, or civic engagement – also play vital roles in shaping overall well-being in a digital context (OECD, 2019).

What we do is further shaped by both social norms and values (Gimpel et al., 2021; Schwartz, 1992). Values can be understood as abstract, context-independent beliefs about what people seek to achieve in life (Kesberg & Keller, 2018), such as conformity, security, or hedonism. In contrast, social norms prescribe specific actions to take or avoid, thereby coordinating social behaviors (Schwartz & Rubel, 2005). Thus, both social norms and values shape behaviors (*tasks*), guiding how we pursue things in life.

Our behavior is not only shaped by informal values, norms, and societal expectations but also by codified, enforceable rules and governance frameworks. For example, with the rapid diffusion of innovative technologies, such as AI systems, several countries have established national strategies and formal policies to guide their use (Feldstein, 2024). Formal regulations like the EU's AI Act or national AI strategies provide clear, legally binding standards that go beyond informal guidelines. These regulations aim to protect important societal norms, such as fairness and non-discrimination (Deck et al., 2024). This now brings us to the next part of the framework: the *system* perspective.

System

In a digital society, *what we do* is often mediated by digital technologies (*systems*). With the emergence of ubiquitous computing, where computers are woven into our daily interactions and integrated into both our physical surroundings and social environments (Lyytinen & Yoo, 2002), computing resources have become available anytime and anywhere (Hilty, 2015). While they shape among others how we exercise (K. Hall, Richter, et al., 2022), educate (Gimpel et al., 2024), and communicate (K. Hall, Buck, & Diel, 2024), they raise further ethical concerns in democratic societies such as questions of privacy, conformity, and integrity.

While technologies can mediate what we do and how – such as liking posts on social media, sharing data via fitness tracking apps, or posting content online – several studies have explored the development of new social norms and ethical challenges in digital spaces (Hilty, 2015; e.g., Sabra, 2017; Voggeser et al., 2017). For instance, mHealth apps have revolutionized how employees manage their well-being, offering tools and resources that previously were only available in physical workplaces. Self-tracking technologies now allow individuals to manage their health anytime and anywhere, enhancing their overall quality of life beyond the

traditional confines of the workplace (K. Hall, Helmus, & Eymann, 2024; K. Hall, Richter, et al., 2022).

However, the systems-tasks relationship is not unidirectional. While technologies shape tasks, technologies have the "potential to 'lock-in' or manifest certain values in a variety of ways" (Gabriel & Ghazavi, 2021, p. 2). In this context, technologies often reflect and enforce specific societal values and biases such as cultural norms relating to self-expression on social media (Diel et al., 2021) or privacy settings in tracking technologies (K. Hall, Helmus, & Eymann, 2024). Thus, the two primary significant challenges on the *systems* side of a socio-technical system are: First, the challenge is to design technologies that align with current societal values and norms. Second, this involves mitigating the effects of inherent biases in society. As the IS research is primarily concerned with the designing and engineering of digital platforms and their interfaces to different devices (Weinhardt et al., 2024), it is crucial to develop design methods that determine how to create technologies that are beneficial for people (Shen et al., 2022). HCD approaches that focus explicitly on components of well-being, such as positive design (Desmet et al., 2013), experience design (Hassenzahl, 2010), and positive computing (Calvo & Peters, 2014), or those centered around values, such as value-sensitive design (VSD) (Friedman, 1997), and value-based engineering (Spiekermann & Winkler, 2020), are crucial when researching DWB. However, we should be aware of their inherent limitations, as these approaches may not fully capture the complexity of human well-being or may not fully account for the diverse and evolving needs of individuals across different contexts.

People

The *people* side of the socio-technical perspective is arguably the most important aspect of the framework. At least in democratic societies, every task we perform and every system we create should prioritize, save, and even enhance individual and social well-being, at least in the long term. How well-being is experienced can be further researched and assessed at the subjective level (e.g., subjective well-being), the objective level (e.g., good health, equal educational opportunities, and working conditions), and the contextual level (e.g., a healthcare system's resilience) (J. Hall et al., 2010). Thus, the relationships between humans and digital technologies should also be explored from various perspectives, each contributing to a comprehensive understanding of well-being in digital societies, as the subjective, objective, and contextual levels continuously correlate with one another. However, how these relationships are researched strongly depends on the underlying well-being paradigms, including hedonic (focused on pleasure and happiness), objective list (emphasizing measurable factors such as health and education), and desire fulfillment (focused on the

satisfaction of personal desires and goals) theories. The theoretical paradigms and levels further influence how well-being is evaluated in digital societies.

Thus, underlying theories, methods, and metrics play a crucial role when researching DWB. At this point, notably, the different categories of theories are subject to a series of scientific micro-debates about their validity, applicability, and explanatory power in the well-being research field (Burr & Floridi, 2020). As noted by other researchers, and as I emphasize in this dissertation, the focus is less on painting one theory as superior to another, but rather on determining how theories can collectively contribute to an enhanced understanding of well-being generally, and DWB in particular (Burr & Floridi, 2020). In this sense, and in accordance with Chappell and Meissner (2023), I propose that it is crucial to adopt an integrative perspective on various well-being theories, as these theories often intersect in practice. Further, the importance of different well-being dimensions and metrics may vary according to their application contexts. While achieving a certain daily step count in a fitness application may be a useful objective indicator for evaluating health outcomes, the satisfaction of belonginess needs may be a more valid indicator for assessing the impacts of web-based platforms (i.e., social media) on well-being.

Further, especially in the context of the *people-systems* relationship, it is important to note that while the principles of positive computing, rooted in positive psychology, provide a valuable framework for creating technologies that enhance human flourishing, it is equally important to consider their broader implications on individuals and society. This involves not only addressing the positive aspects, but also examining the potential downsides of the uses of technologies on humans. For instance, while a fitness tracking app designed with positive computing principles aims to encourage users to adopt healthier lifestyles and enhance their physical health through personalized feedback, goal-setting, and social features (K. Hall, Richter, et al., 2022), it can inadvertently trigger social comparison processes that are harmful for individual well-being (Diel et al., 2021). Further, while the *Like* button on social media can fulfill users' fundamental need for belonging, it can also influence online behaviors, potentially impacting on the broader platform community (K. Hall, Buck, & Diel, 2024).

In sum, research into DWB is a reciprocal construct. As outlined in Figure 15, technologies (*systems*) shape what humans pursue in their lives (*tasks*), while simultaneously being shaped by these pursuits (*people*). These relationships are not unidirectional, but rather form a continual feedback loop in which technology, individuals, and their broader societal structure mutually influence one another. For instance, consider the uses of ChatGPT in higher education: Initially designed as a tool to assist with writing, research, and problem-solving, ChatGPT (*systems*) has begun to shape how students and educators approach learning, for

instance by adapting assessment formats or learning methods (*tasks*). Thus, higher education institutions and employers will value different skills in the future compared to what was considered 'good' (*people*) decades ago. As technologies continue to evolve, social structures such as educational institutions must therefore also adapt. They need to redefine what constitutes 'good' in a digital society, aligning their practices and understandings with the ever-changing technological landscape. In turn, what we value as a society could also be integrated into technology design.

5 Contribution

5.1 Theoretical Contribution

While each of the eight research papers provides distinct theoretical contributions in its specific research substream, as elaborated on in the respective papers, the focus now shifts to the broader theoretical contributions of this dissertation. By developing a holistic perspective, I will now emphasize how the collective insights from these papers can inform both the IS research and related fields, enabling research that enhances people's overall quality of life.

5.1.1 Contribution to Digital Well-being as Interdisciplinary Concept

In response to the potential downsides of the uses of technologies, the commercial sector has introduced a range of well-being features, such as notification blockers, into popular apps and wearables, effectively shaping DWB. However, as highlighted in Chapter 2.3.1, these commercially driven interpretations have lacked a solid conceptual foundation that fully captures the complexities of individuals' interactions with digital technologies in ways that genuinely benefit their well-being. Further, they fail to provide a robust understanding that can guide the IS research toward long-term contributions that promote human flourishing. While there are promising definitions of DWB in related fields such as digital ethics (e.g., Burr & Floridi, 2020), they tend to define DWB solely from their own disciplinary perspective, often neglecting the unique insights and contributions that the IS view can offer.

To address these shortcomings, this dissertation seeks to develop a more comprehensive understanding of DWB, which can benefit IS researchers by facilitating interdisciplinary collaboration and fostering a shared understanding of the research aim across disciplines. By accomplishing the overarching RO, this work significantly contributes to the interdisciplinary concept of digital well-being (RG3).

First, by conducting and analyzing eight research papers, with each offering unique theoretical perspectives on components (i.e., dimensions, levels, indicators) of well-being, this

dissertation provides a comprehensive overview of the field. It integrates these diverse contributions to deliver a cohesive summary of the collective insights from the various studies and explores the theoretical foundations of well-being in a digital society in depth. In doing so, the dissertation provides a nuanced perspective on how human well-being is shaped in a digital society by integrating insights from diverse disciplines, including psychology, philosophy, public policy, and IS. It underscores that well-being encompasses multiple dimensions such as health, social connections, education, and work, each mediated differently by different digital technologies. Further, by researching various facts of human well-being across life domains, the dissertation enriches our understanding of what constitutes 'a good life' in a digital society, highlighting that DWB is not a static state, but a reciprocal interplay between *tasks*, *systems*, and *people* in contemporary societies.

Second, this dissertation emphasizes the importance of considering subjective, objective, and contextual indicators when researching DWB (Hatem & Ker, 2021; Hicks et al., 2013). It demonstrates that digital technologies impact on well-being in several ways. At the subjective level, technologies influence personal experiences and evaluations, such as subjective well-being, perceived privacy, and experiences of online ostracism (Diel et al., 2021; K. Hall, Buck, & Diel, 2024; K. Hall, Helmus, & Eymann, 2024). At the objective level, technologies affect measurable aspects of life, such as physical activity levels and conformity behaviors (K. Hall, Buck, & Diel, 2024; K. Hall, Richter, et al., 2022). At the contextual level, technologies shape and are shaped by the broader environment in which individuals and technologies interact, including societal norms, environmental conditions, and even governance frameworks (Doctor et al., 2023; K. Hall, Oesterle, et al., 2024). This comprehensive approach highlights the need to address these different levels if one is to fully understand and enhance digital technologies' impacts on human well-being.

Third, this dissertation emphasizes that DWB goes beyond technology design as "technical developments frequently have environmental, social, and human consequences that go far beyond the immediate purposes of the technical devices and practices themselves" (Kranzberg, 1986, p. 545). While HCD approaches are crucial for creating technologies that benefit humanity, this dissertation advocates for the holistic and responsible management of digital transformation at the levels of *people* (i.e., by individuals themselves), *tasks* (i.e., by governmental bodies, companies, and public institutions), and *systems* (i.e., by systems developers) (Trier et al., 2023). Thus, this dissertation underlines Kranzberg's Fourth Law of Technology, asserting that "although technology might be a prime element in many public issues, non-technological factors take precedence in technology-policy decisions" (Kranzberg, 1986, p. 550).

Finally, by shaping DWB from a socio-technical perspective (Chapter 4.2), this dissertation enhances existing domain-specific interpretations of DWB (e.g., Vanden Abeele, 2021) by incorporating an IS perspective into current understandings established by Burr and Floridi (2020). In this context, this dissertation proposes the following modified working definition of DWB:

> Digital well-being refers to the holistic understanding and responsible management of specific dimensions and components of human well-being in digital societies by examining the dynamic and reciprocal interplays between the tasks we perform (**tasks**), with the technologies we develop (**systems**), and their complex interactions that shape our self-understanding of what it means to live a fulfilling life in a digital society (**people**).

This definition underscores the importance of a comprehensive understanding of DWB, recognizing that it goes beyond merely technologies' impacts on specific aspects of our lives. It underlines that DWB is "far from a straightforward task to define the actual design goal and measuring specific well-being outcomes" (Spiekermann et al., 2022, p. 249). Rather, it is necessary to first break down the multifaceted concept of well-being into its individual dimensions, levels, and components. Further, this definition emphasizes the need for the responsible design and management of these technologies, underscoring the roles of various stakeholders in shaping a digital society that supports human flourishing. This management can occur both on the *systems* side, where technologies are designed to enhance user well-being, on the *tasks* side, where institutions actively engage in implementing policies and practices that promote well-being, and on the *people* side, where we change our perceptions of a 'good' society. Table 11 summarizes the key determinants of DWB, thereby complementing Table 2, which presents the categorization of well-known IS research streams.

Table 11. Key Determinants of Digital Well-being *(*own representation)

Determinants	Digital Well-being
Focus	Focus on the design and responsible/ ethical management of digital technologies
Relation To Well-being *(Indirect vs. Direct)*	*Direct and indirect:* Focus on the subjective/ objective (*direct*) as well as contextual (*indirect*) levels of human well-being
Design Objective On Well-being *(High vs. Medium vs. Low)*	*Medium:* Focuses not only on technology design, but the reciprocal interplay between systems, tasks, and people
Well-being Scope *(Individual vs. Societal)*	*Individual and societal:* Focus on improving users' personal experiences while considering the broader societal impacts in which humans are embedded, and vice versa
Complexity of Evaluating Well-being *(High vs. Medium vs. Low)*	*High:* Requires a deconstruction of the components of well-being and an understanding of its normative perspective

5.1.2 Contribution to the Information Systems Research

Finally, this dissertation not only enriches the interdisciplinary perspective on DWB, but also significantly contributes to the IS field.

As technological progress increasingly shapes our daily lives, concerns among IS researchers have arisen about whether digitalization genuinely contributes to our well-being (Shen et al., 2022; Walsham, 2012; Weinhardt et al., 2024). In response, designing IS for well-being has emerged as a key issue in the academic discourse in the past decade (i.e., Shen et al., 2022; Spiekermann et al., 2022). In the HCI field, design principles have expanded beyond accessibility, usability, and UX to incorporate well-being-oriented design as a key criterion for effective and meaningful technology development (Spiekermann et al., 2022). Aligned with the principles of positive psychology, research streams such as positive computing emerged that actively focus on embedding well-being factors into technology design processes (Calvo & Peters, 2014). Value-based approaches that focus on incorporating human values (such as privacy, fairness, transparency, and inclusivity) directly into the design and development of technologies have become central to the field.

However, as emphasized by Spiekermann et al. (2022), IS for human well-being is not just a matter of technology design but depends on the willingness of various actors to engage in ethical practices. The question of DR (Trier et al., 2023) among different stakeholders has become crucial and highlights the need for a more comprehensive approach that considers the broader environment in which people educate, exercise, work, and connect in an increasingly digital world. Finally, IS researchers face the complex task of developing solutions to pressing societal issues, identifying critical research questions, and effectively managing political and social ambiguities (Spiekermann et al., 2022). This dissertation contributes to these efforts by providing a nuanced perspective on well-being in digital societies.

First, following the call by Schütte et al. (2022) that IS must adopt a multidisciplinary research agenda grounded in the socio-technical paradigm if it is to remain relevant to its stakeholders, this dissertation proposes a conceptual model aimed at understanding and guiding IS research efforts toward increased human well-being. By developing a well-being lens on the socio-technical systems perspective in the IS research, this framework enables researchers to maintain the field's integrity while simultaneously addressing human well-being in their work. This approach can guide them in conducting research that does not only consider *design-oriented approaches* (designing systems based on well-being factors), but also *behavioral-oriented approaches* (analyzing well-being outcomes when using IS) when researching DWB. Further as highlighted by Schütte et al. (2022), the IS field is always domain focused, implying

that research on DWB should always be bound to certain life dimensions.

Consequently, findings underline that the IS research must first deconstruct components of well-being into its dimensions, levels, and indicators to effectively evaluate digital technologies' double-edged influences on human well-being. In this sense, this dissertation emphasizes that, once the research question is defined and once well-being deconstructed into its components, researchers can select the appropriate theories and methodological approaches based on the specific components of well-being that underpin their study. For instance, to answer the broad research question *How does social media affect users' well-being?* researchers could reflect more deeply on the dimensions (e.g., health, social belonging, and education), different experience levels (subjective, objective, and contextual), and their relevant components and indicators (e.g., screen time, subjective well-being, feelings of ostracism, and access to information) to derive precise research questions and hypotheses. Based on the identified components, researchers can select relevant theories and models – such as social comparison theory (Festinger, 1954), the Temporal Need Threat Model (Williams, 2009), and prospect theory (Kahneman & Tversky, 1979) – to guide their study's direction and determine the most suitable methodological approach. Table 12 provides an example of the aspects that IS research can focus on in relation to human well-being.

Table 12. Research Examples on Digital Well-being Aligned with IS Focus (adapted and modified from Schütte et al., 2022)

	Method Focus	**Domain Focus**
Design-oriented	Develop a design method that accounts for social belonging as design factor	Develop an occupational health app that increases employees' PA through social game-design elements
Behavioral-oriented	Analyze the user behavior on SNS	Analyze and describe users' conformity behaviors in response to political decision-making on SNS

Second, viewing DWB through a socio-technical perspective can help researchers to critically evaluate which factors, *tasks*, *people*, or *systems* may be most beneficial to modify for promoting well-being. These considerations serve as a valuable starting point for research, helping scholars to identify the most appropriate measures to their research insights. For instance, given that online conformity may be an issue in digital societies (which may depend on societal values and contexts), various strategies can be implemented to enhance users' well-being. These solutions may include developing reflection prompts that encourage users to critically assess their online interactions (the *systems* side). Further, implementing media literacy programs tailored to users can help them to better understand and reflect on their online behaviors (the *people* side).

Fourth, this dissertation encourages researchers to develop new metrics and indicators of well-being in digital societies, as traditional metrics may no longer fully capture the complexities of how digital technologies impact on various aspects of well-being (e.g., OECD, 2020). While policy frameworks that emphasize well-being indicators in digital environments – such as those proposed by the OECD – provide several metrics for evaluating well-being in the digital age, many of these indicators predominantly focus on objective measurements (Hatem & Ker, 2021). For instance, to assess personal security in a digital society, metrics such as *the risks of data privacy violations* or *digital security incidents* are commonly used (cf. Hatem & Ker, 2021). However, subjective metrics such as *privacy concerns* or *perceived* privacy (K. Hall, Helmus, & Eymann, 2024), which could offer deeper insights into how individuals actually feel and experience their digital environment, are often overlooked. As digital transformation continues to reshape our lives, emerging challenges such as online ostracism, social comparison, and the psychological effects of digital interactions require new, nuanced measures.

5.2 Implications for Practice and Society

> "Improving well-being is the responsibility of government, but also of business and industry, societal groups and, last but not least, every individual citizen" (German Federal Government, 2016).

Each paper in this dissertation offers distinct practical implications for either systems designers, policymakers, or institutions. In the following subchapter, I synthesize the broader practical implications derived from the entire dissertation.

First, digital transformation's extensive impact on society and individuals creates both opportunities and significant challenges for governments and policymakers (see Chapter 3). As many democratic societies recognize the importance of considering objective, subjective, and contextual well-being indicators as measures of progress and guides for people-centered policies (cf. Hatem & Ker, 2021), this dissertation supports policymakers by highlighting the emergence of digital and evidence-based indicators – such as *online ostracism*, *perceived privacy*, and *social comparison processes* – which offer deeper insights into how people experience and assess their lives in a digital society. While the OECD (2019) offers a practical tool, the Digital Well-Being Wheel, which includes 33 indicators along 11 dimensions to create country-specific profiles of opportunities and risks relating to digital transformation, the additional indicators outlined in this dissertation could provide a more in-depth understanding of digital transformation's impacts.

Further, while generic frameworks such as the OECD's may be practical for enabling cross-

country comparisons, this dissertation emphasizes that the pursuit of well-being is also deeply contextual and nuanced (K. Hall, Oesterle, et al., 2024). Crises such as the COVID-19 pandemic have demonstrated that preferences and values can shift significantly in response to external circumstances. Further, while this dissertation draws on different theoretical paradigms, it underlines that what is perceived as 'good' for individuals and societies depends on the underlying well-being paradigm and is to some extent a normative question (cf. Fletcher, 2013). For instance, while privacy concerns in health tracking apps may be a significant factor influencing human well-being in Western countries, the situation is different in China, where privacy considerations may well have a less prominent role owing to varying cultural and regulatory contexts (Huang et al., 2022). Understanding that well-being is not a one-size-fits-all concept is highly important to derive policy strategies that align with a society's cultural norms. Incorporating theoretical well-being paradigms into strategic goal-setting for societal and digital progress can lead to the development of more targeted and effective strategies for prioritizing the SDGs.

Second, this dissertation offers valuable implications for systems designers. HCD paradigms, such as positive computing, which prioritize user well-being in technology development (Calvo & Peters, 2014), provide a robust foundation for creating effective technologies. However, while positive computing focuses primarily on the positive aspects of individual experiences (see Chapter 3.2), this dissertation emphasizes the importance of recognizing the broader societal context influenced by individual interactions. While features such as the *Like* button on many social media platforms can satisfy users' need for belonging and provide short-term well-being (e.g., Schneider et al., 2017), their long-term effects must be considered. These features can for instance influence online conformity behaviors and can contribute to the filter bubble effect on social media, potentially impacting users' overall digital experiences and societal well-being (K. Hall, Buck, & Diel, 2024). On the other hand, systems designers should go beyond prioritizing users' immediate positive experiences with technologies. They should also consider potential challenges that, when addressed, can promote positive behavioral change, enhancing human well-being over time. Further, although designing for specific aspects of well-being – such as increasing employees' daily step counts – can be beneficial for their health (K. Hall, Richter, et al., 2022), platform designer must consider an individual holistically, including their mental state, to ensure that technologies contribute positively to overall quality of life (K. Hall, Oesterle, et al., 2022)

Third, this dissertation offers several valuable insights for organizations and public institutions. As demonstrated throughout this work, digital technologies are reshaping various aspects of our lives, including how we work, exercise, communicate, and manage our health

(see Chapter 3). In response, what we perceive as 'good' in our lives may change. These changes necessitate a re-evaluation of existing organizational practices and policies to ensure that they align with the evolving digital landscape (Gimpel et al., 2024). In the context of digital education, digital transformation extends far beyond the mere integration of emerging technologies into teaching and learning. Higher education institutions must fundamentally reshape their business models, strategic directions, and core values (Kaputa et al., 2022) if they are to align with the evolving understanding of well-being in a digital society. The same applies to companies. In recent years, remote work has rapidly increased, driven by technological advancements and a demand for greater flexibility (García-Salirrosas et al., 2023). Studies have shown that remote work can boost job satisfaction by giving employees more control over their time and work environments (e.g., Jamal et al., 2021). However, to enhance employee well-being, employers should introduce supportive remote work policies, should equip employees with the necessary tools and resources, and should cultivate a culture of trust and flexibility (K. Hall, Oesterle, et al., 2022). In sum, organizations must embrace technological opportunities to create an environment in which individuals can thrive.

Finally, this dissertation's findings are not only not relevant for organizations and institutions, but also for individual citizens. As emphasized by the German Federal Government (2016), well-being is a collective effort that requires responsibility from society. This responsibility can involve protecting personal data, developing media literacy to identify reliable information, and maintaining balanced and mindful uses of digital technologies to prevent harmful effects.

6 Limitations and Future Research

This dissertation has limitations, which open avenues for further research. Each of the research papers presented here has specific constraints relating to its methodological approach, study context, or theoretical framework employed. These limitations are thoroughly addressed in each individual paper. However, I will now provide an aggregated summary of these limitations to offer a comprehensive understanding of challenges and potential directions for further research.

First, it is important to acknowledge that the research papers in this dissertation primarily focus on Western countries and were conducted with participants from these regions, predominantly from Germany. However, well-being is not only a matter of economic, political, and psychological factors, but also of culture (Trommsdorff, 2018). Thus, what constitutes a 'good' life may well differ significantly between countries. However, as indicated by several researchers, the correlates of SWB and basic needs – such as safety, health, and intimate relationships – are equally strong across different cultural contexts (Arampatzi et al., 2018;

Diego-Rosell et al., 2018); thus, the key life dimensions are universally significant in all societies.

Second, this cumulative dissertation focuses on key life dimensions such as health, education, work, and social connection, addressing specific phenomena arising from digital transformation (e.g., online ostracism, social comparison, and privacy). While these dimensions are widely recognized as critical in many policy frameworks, other significant phenomena driven by digital transformation – such as technostress, digital inequality, and the erosion of autonomy – remain underexplored and represent important avenues for future research.

Third, to address the abovementioned limitation, Chapter 4.2 presents a framework designed to be applied independently of cultural context. It emphasizes that the definition of what is 'good' and how technologies influence this notion are deeply rooted in philosophical foundations. This approach enhances the model's flexibility, allowing the framework to be adapted to different cultural and societal contexts. While this may represent a strength of this work, it also introduces further challenges and opportunities for future research:

- First, by incorporating a well-being perspective into the socio-technical systems framework (as demonstrated in Chapter 4.2), this approach offers only a high-level view of how the IS research can enhance human well-being. However, further research is necessary to delve deeper into the individual components of the framework – namely, the *people*, *tasks*, and *systems* – to fully understand their specific contributions and interactions in this framework. For instance, future research should delve deeper into developing new design methods that actively integrate human well-being into systems design. This involves addressing both the upsides and the downsides of technologies used to create systems that not only enhance positive outcomes, but also mitigate potential negative impacts. This is particularly important as autonomous AI systems become increasingly ubiquitous, facing significant new challenges such as the *black box* mentality or biases in data (van der Maden et al., 2023). Further, while current IS research streams are often viewed in isolation, adopting an integrative perspective on how DR influences positive technology design, and vice versa, could help address the shortcomings in current conceptual frameworks.
- Further, focusing on the human perspective (the *people* side) of the framework, more research is encouraged to explore and incorporate a wide range of theories into the IS research. Doing so would address criticisms faced by the HCI field, particularly the concern that many experiments lack a solid theoretical foundation, and that the

hypotheses and data collected often have no or very little relevance or context beyond the experiment itself (e.g., Greenberg & Thimbleby, 1992; Kaptelinin, 1995). Incorporating theories into DWB studies, such as self-determination theory (Ryan & Deci, 2017), flow theory (Csikszentmihalyi, 2000), uses and gratification theory (Apuke & Omar, 2021), or prospect theory (Kahneman & Tversky, 1979) could significantly enhance the research's depth and impacts. By grounding their studies in well-established theoretical frameworks, researchers can provide robust explanations for their findings, can ensure that their hypotheses are more meaningful, and can offer deeper insights into how individuals interact with technologies in ways that are 'good' for them. However, especially in the HCI research, coordinating efforts among people from different disciplines – such as psychology, computer science, and graphic design – presents a significant challenge (Kaptelinin, 1995).

- Finally, when considering the *tasks* perspective of the framework, the dissertation's findings provide only an initial step in understanding how technologies shape *what we do* and how these changes, in turn, influence organizational structures, societal values, and individuals' overall well-being. Digitalization, with its transformative nature, fundamentally impacts organizational systems (Blanka et al., 2022) and reshapes business dynamics through the integration of technology (Henriette et al., 2015). Digital transformation is increasingly recognized as a form of "social change" that transcends the mere adoption of technology. Consequently, it is essential for IS research to explore more deeply how these transformations reshape the execution of social and economic activities and their interconnectedness with both individual and collective well-being outcomes.

In sum, DWB is a complex and multifaceted concept, and this dissertation can serve as a starting point to explore its many dimensions and components. It lays the groundwork for understanding key issues and challenges in the IS research, while also providing a unified working definition that helps to establish a shared understanding of what is being studied when dealing with DWB.

7 Conclusion

One of humanity's most enduring aspirations has been the pursuit of human well-being. Aristotle recognized well-being, or *eudaimonia*, as the ultimate aim of all human actions, considering it the highest good toward which individuals strive (Spencer, 2007). In the context of a digital society and the rapid digitalization of almost all aspects of life, designing for well-being has emerged as a key concern in the IS literature (Shen et al., 2022; Spiekermann et al.,

2022). As technologies become increasingly integrated into daily life, the focus has shifted toward ensuring that digital innovations not only drive efficiency and connectivity, but also promote human well-being (Spiekermann et al., 2022). Considering the significant challenges that have emerged over time – such as societal polarization, radicalization, and threats to democracy – pressing questions arise about whether or not the IS research is actively contributing to both individual and societal well-being (Weinhardt et al., 2024).

Responding to the call by Spiekermann et al. (2022), who argued that the IS research on well-being must first clearly conceptualize and deconstruct the broad notion of well-being into specific, measurable constructs in order to clarify the nomological network, in this dissertation I advance a more refined understanding of well-being in digital societies. To gain deeper insights into how technologies not only affect well-being but also shape our understanding of what it means to live a fulfilling life in a digital society, this dissertation includes eight empirical research papers; they explore pressing research questions of our time, examining various life dimensions and perspectives on well-being. Through this multifaceted approach, the dissertation seeks to uncover how digital technologies influence both individual and societal conceptions of a meaningful, well-rounded life in an increasingly digitalized world.

In this context, the dissertation introduces a working definition of DWB, developed based on the preceding IS research streams, the empirical findings from the papers, and insights derived from multidisciplinary debates on DWB. Ultimately, this dissertation makes two primary contributions: it advances the IS research by providing a comprehensive framework for understanding the interactions between *people*, *systems*, and *tasks* in socio-technical systems to enhance well-being (Heinrich et al., 2004); it also strengthens the interdisciplinary dialogue aimed at fostering research that promotes the improvement of our quality of life across research disciplines.

8 References

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9 Appendix

9.1 Further Publications

Authors	Title	Publication outlet
Buck, C., Hall, K., Ifland, S., Röttger, J.	Managing the Digital Transformation in Professional European Sport Clubs	Presented at the 30th European Sport Management Conference, 2022
Gimpel, H., Hall, K., Decker, S., Eymann, T., Lämmermann, L., Mädche, A., Röglinger, R., Ruiner, C., Schoch, M., Schoop, M., Urbach, N., Vandirk, S.	Unlocking the Power of Generative AI Models and Systems such as GPT-4 and ChatGPT for Higher Education: A Guide for Students and Lecturers	University of Hohenheim, March 20, 2023

9.2 Research Papers and Individual Contributions

Research paper 1: The Double-Edged Sword of Social Comparison on Social Networking Sites – Effects on Subjective Well-Being

Authors

Diel, Sören – University of Bayreuth

Hall, Kristina – University of Bayreuth

Mützel, Caroline – University of Bayreuth

Citation

Diel, S., Hall, K., and Mützel, C. (2021). *The Double-Edged Sword of Social Comparison on Social Networking Sites-Effects on Subjective Well-Being*. Published in: Proceedings of the 29th European Conference on Information Systems, Marrakech, Morocco.

Available at: https://aisel.aisnet.org/ecis2021_rp/33/

Extended abstract: Chapter 3.1.1, pp. 40-42

VHB Publication Media Rating 2024; Information Systems: A

Individual Contributions by Kristina Hall

Paper 1 was developed in collaboration with two co-authors. As a co-author, my authorship is reflected throughout the research project. I was actively involved throughout, especially contributing to discussions and refining our research contributions. I also played a key role in revising the article for resubmission. In sum, I was engaged in the writing, revising, and overall development of the research paper.

Research paper 2: The Echoes of Ostracism and Peer Opinion in Subjective Tasks: Untangling Conformity Dynamics in Social Media through Experimental Exploration

Authors

Hall, Kristina – University of Bayreuth, Fraunhofer FIT

Buck, Christoph – Technical University of Applied Sciences Augsburg, Queensland University of Technology, Fraunhofer FIT

Diel, Sören – University of Bayreuth

Citation

Hall, K., Buck, C., Diel, S. (2024). *The Echoes of Ostracism and Peer Opinion in Subjective Tasks: Untangling Conformity Dynamics in Social Media through Experimental Exploration*. In preparation for Publication in[10]: AIS Transaction on Human-Computer Interaction

Extended abstract: Chapter 3.1.2, pp. 42-46

VHB Publication Media Rating 2024; Information Systems: B

Individual Contributions by Kristina Hall

As the lead author, I was responsible for developing the research question, the methodological approach, designing the research process, collecting the data, and data analysis. Further, I conducted the literature review and wrote most parts of the paper. As the corresponding author, I was deeply involved in every stage of the revision process, taking on a lead role in driving the paper forward. While the paper largely reflects my contributions, the two co-authors were actively engaged throughout, providing valuable input and feedback.

[10] At the time of publication, this paper is in preparation for publication by *AIS Transaction on Human-Computer Interaction*.

Research paper 3: Using Generative AI in Higher Education: A Guide for Lecturers

Authors

Gimpel, Henner – University of Hohenheim, Fraunhofer FIT

Hall, Kristina – University of Bayreuth, Fraunhofer FIT

Decker, Stefan – RWTH Aachen University, Fraunhofer FIT

Eymann, Torsten – University of Bayreuth, Fraunhofer FIT

Gutheil, Niklas – University of Bayreuth, Fraunhofer FIT

Lämmermann, Luis – Frankfurt University of Applied Sciences, Fraunhofer FIT

Braig, Niklas – University of Bayreuth

Maedche, Alexander – Karlsruhe Institute of Technology

Röglinger, Maximilian – University of Bayreuth, Fraunhofer FIT

Ruiner, Caroline – University of Hohenheim

Schoch, Manfred – University of Applied Sciences Esslingen

Schoop, Mareike – University of Hohenheim

Urbach, Nils – Frankfurt University of Applied Sciences, Fraunhofer FIT

Vandirk, Steffen – University of Bayreuth, Fraunhofer FIT

Citation

Gimpel, H., Hall, K., Decker, S., Eymann, et al. (2024). *Using Generative AI in Higher Education*: In preparation for Publication in[11]: Journal of Information Systems Education

Extended abstract: Chapter 3.2.1, pp. 46-49

VHB Publication Media Rating 2024; Information Systems: C

[11] At the time of publication, this paper is in preparation for publication by the *Journal of Information Systems Education*.

Individual Contributions by Kristina Hall

As a co-lead author of the paper, I was responsible for data collection, conducting the literature review, and drafting key sections of the manuscript. I contributed substantially to the writing of each chapter. I also refined the recommendations and prompts, which were then collaboratively discussed and further developed within the author team. Additionally, I played a major role in the revision process by addressing reviewer comments, contributing to the paper's continuous improvement, and ensuring a cohesive and high-quality final version.

Research paper 4: A Literature Review on the Risks and Potentials of Tracking and Monitoring eHealth Technologies in the Context of Occupational Health Management

Authors

Hall, Kristina – Research Center Finance & Information Management

Oesterle, Severin – University of Bayreuth

Watkowski, Laura – Fraunhofer FIT

Liebel, Sabrina – University of Bayreuth

Citation

Hall, K., Oesterle, S., Watkowski, L., and Liebel, S. (2022*). A Literature Review on the Risks and Potentials of Tracking and Monitoring eHealth Technologies in the Context of Occupational Health Management*. Published in: Proceedings of the 17th International Conference on Wirtschaftsinformatik, Nuremberg, Germany.

Available at: https://aisel.aisnet.org/wi2022/digital_health/digital_health/9/

Extended abstract: Chapter 3.3.1, pp. 51-54

VHB Publication Media Rating 2024; Information Systems: B

Individual Contributions by Kristina Hall

Paper 4 was developed in collaboration with three co-authors, with three of us contributing equally to the research project and one co-author with subordinate authorship (Sabrina Liebel). I took the lead in drafting the introduction, including the formulation of the research question, conducting the literature review, and authoring the discussion sections. I played crucial roles in overseeing the review process, guiding the paper through to final approval. Further, I presented the paper at the 17th International Conference on Wirtschaftsinformatik.

Research paper 5: How to Balance Privacy and (Health) Benefits: Privacy Calculus and the Intention to Use Health Tracking at the Workplace

Authors

Hall, Kristina – University of Bayreuth, Fraunhofer FIT

Helmus, Berit – University of Bayreuth, Fraunhofer FIT

Eymann, Torsten – University of Bayreuth, Fraunhofer FIT

Citation

Hall, K., Helmus, B., and Eymann, T. (2024). *How to Balance Privacy and (Health) Benefits: Privacy Calculus and the Intention to Use Health Tracking at the Workplace*. Published in: International Journal of Human–Computer Interaction

Available at: https://www.tandfonline.com/doi/full/10.1080/10447318.2024.2375704

Extended abstract: Chapter 3.3.2, pp. 54-56

Individual Contributions by Kristina Hall

Paper 5 was developed in collaboration with two co-authors, with Berit Helmus and I as lead authors. I took the lead in drafting the introduction, data analysis, discussion, and contributions sections. As the lead author, I was significantly involved in writing each of the chapters. Further, I was heavily involved in the data analysis, while Berit Helmus was primarily responsible for data collection. As the corresponding author, I assumed the lead role in the revision process and was actively involved in every stage of the revisions, guiding the paper through to final approval.

Research paper 6: How One Small Step for Occupational Health Management Leads to Many Steps for Employees – An Experimental Field Study of Incentive Designs in a Gamified mHealth App

Authors

Hall, Kristina – Fraunhofer FIT

Richter, Fabian – Fraunhofer FIT

Schmidt, Tina – Fraunhofer FIT

Eymann, Torsten – University of Bayreuth, Fraunhofer FIT

Citation

Hall, K., Richter, F., Schmidt, T., and Eymann, T. (2022). *How one small step for occupational health management leads to many steps for employees – an experimental field study of incentive designs in a gamified mHealth app*. Published in: Proceedings of the 30th European Conference on Information Systems, Timisoara, Romania

Available at: https://aisel.aisnet.org/ecis2022_rp/11

Extended abstract: Chapter 3.3.3, pp. 56-59

VHB Publication Media Rating 2024; Information Systems: A

Individual Contributions by Kristina Hall

I played a lead role in the development and execution of the study, with my contributions evident throughout the research project. I was actively involved in deriving the hypotheses and took the lead in writing and refining all chapters of the paper, including the methods and findings sections. Additionally, I made significant contributions to crafting the discussion and contribution sections, ensuring the study's insights were clearly articulated and aligned with its research objectives. Throughout the review process, I contributed to both conceptual and substantive revisions, ensuring the manuscript's coherence and integrity. Further, I presented the paper at the 30th European Conference on Information Systems.

Research paper 7: How Influencing Factors of Intention to Use Smart Watches Changed in Pandemic Times in Germany – A Comparison

Authors

Hall, Kristina – Research Center FIM, University of Bayreuth, Fraunhofer FIT

Oesterle, Severin – University of Bayreuth

Watkowski, Laura – Research Center FIM, University of Bayreuth, Fraunhofer FIT

Buck, Christoph – Technical University of Applied Sciences Augsburg, Fraunhofer FIT

Citation

Hall, K., Oesterle, S., Watkowski, L., and Buck, C. (2023). *How Influencing Factors of Smart Wearable Intention to Use Change in Pandemic Times: A Comparison*. Published in: International Journal of Technology Management.

Available at: https://www.inderscience.com/offers.php?id=136432

Extended abstract: Chapter 3.3.4, pp. 59-61

VHB Publication Media Rating 2024; Technology, Innovation and Entrepreneurship: C

Individual Contributions by Kristina Hall

Paper 7 was developed in collaboration with three co-authors, with three of us contributing equally to the research project and one co-author with subordinate authorship (Christoph Buck). As a co-author, my contributions were pivotal to the research project, with my primary focus on the theory, contribution, and discussion sections. I revised key parts of the manuscript to ensure clarity and alignment with the research objectives. I also critically evaluated how our results relate to the literature, emphasizing their significance in the field. Throughout the review process, I engaged in both conceptual development and textual refinement, enhancing the manuscript's overall quality.

Research paper 8: A Maturity Model for Assessing the Digitalization of Public Health Agencies

Authors

Doctor, Eileen – Research Center FIM, University of Bayreuth, Fraunhofer FIT

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Citation

Doctor, E., Eymann, T., Fürstenau, D. et al. (2023). *A Maturity Model for Assessing the Digitalization of Public Health Agencies*. Published in: Business and Information Systems Engineering

Available at: https://link.springer.com/article/10.1007/s12599-023-00813-y#citeas

Extended abstract: Chapter 3.3.5, pp. 61-64

VHB Publication Media Rating 2024; Information Systems: B

Individual Contributions by Kristina Hall

Paper 8 was developed in collaboration with nine co-authors. As a co-author, I played key roles in the project's initiation and development, including formulating the research question, designing the research model, and selecting the methodological approach. I actively contributed to data collection and analysis and took primary responsibility for writing the

comprehensive literature review. Throughout the review process, I significantly contributed to both conceptual and substantive elaboration, ensuring that the paper was refined for final acceptance.