The Digital Mindset

Theoretical foundation and empirical evidence

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ZUSAMMENFASSUNG (GERMAN SUMMARY)

Digitale Technologien revolutionieren die zukünftige Arbeitswelt (Benbya et al., 2024). Durch die umfassende und rasche Integration dieser Technologien in alle Abteilungen gewinnen Mitarbeitende und ihre Eigenschaften, das Humankapital eines Unternehmens, zunehmend an Bedeutung (Sabherwal & Grover, 2024). Unternehmen sind nun auf die Mitarbeit *aller* angewiesen, um neuen Wert, neue Produkte und neue Dienstleistungen aus diesen digitalen Technologien zu generieren (Nambisan et al., 2017; Yoo et al., 2012). Sie müssen folglich besser verstehen, wie sie ihre Belegschaft für diese neue Arbeitswelt optimieren und vorbereiten können, um konkurrenzfähig zu bleiben.

Magazine und Medien sind sich hier einig: „Eine Schlüsselrolle spielt das „Digital Mindset" von Managern und Mitarbeitern" (Computerwoche, 2018), „[b]eim Digital Mindset hapert es am meisten" (CIO-Magazin, 2017) und Unternehmen müssen „das Mindset schaffen dafür, was alles möglich ist oder wird durch Digitalisierung" (Microsoft, 2022). Zustimmend zeigt auch die wissenschaftliche Literatur, dass in dieser neuen Arbeitswelt weniger spezifische Fähigkeiten, sondern vielmehr das *Mindset* der Mitarbeitenden relevant wird (Paul et al., 2024; Weritz, 2022). Ein solches Mindset wird durch Wissen und Erfahrungen geprägt und beeinflusst, wie Informationen wahrgenommen und interpretiert werden (Dweck, 2006; Gollwitzer, 2012; Gupta und Govindarajan, 2002; Nadkarni et al., 2011). Um in einer digital geprägten Arbeitswelt zu bestehen, nennt auch die Literatur speziell das *digitale Mindset* als einen entscheidenden Faktor für Mitarbeitende (Grover et al., 2022; Lorenz und Buchwald, 2023; Weritz, 2022).

Trotz der Betonung der Relevanz dieses Konzepts existiert jedoch keine empirisch fundierte Forschung darüber, was ein solches *digitales Mindset* ist, wie es entwickelt werden kann und welche Effekte mit einem solchen zu erwarten sind. Ohne theoretische Fundierung sowie empirische Belege bleiben die medial sowie wissenschaftlich prognostizierten Auswirkungen und der Wert eines solchen digitalen Mindset jedoch spekulativ. Das Fehlen einer robusten Definition und empirischer Studien wirft grundlegende Fragen hinsichtlich der Natur und Entwicklung des digitalen Mindsets auf, insbesondere darüber, wie dieses zur Optimierung der Belegschaft beitragen kann, um bestehende Theorien in der Wirtschaftsinformatik zu erweitern oder besser zu verstehen. Ohne empirische Validierung bleiben also die Fragen offen, welche Vorteile von Mitarbeitenden mit einem solchen Mindset zu erwarten sind, wie sich dieses bewerten und erheben lässt, und inwiefern sich die Investition in die Entwicklung dieses lohnt. Aus diesen Gründen lautet die Forschungsfrage dieser Dissertation:

Was ist das digitale Mindset und warum sollten Organisationen das digitale Mindset ihrer Mitarbeitenden im Kontext digitaler Innovation berücksichtigen?

Um diese Forschungsfrage zu beantworten, verfolgt diese Dissertation drei Forschungsziele, die jeweils ein Kapitel der Dissertation bilden. Das erste Kapitel verfolgt das Ziel des Verständnisses des digitalen Mindsets von Mitarbeitenden, einschließlich seiner Definition, Konzeptualisierung und Operationalisierung im Kontext digitaler Innovation sowie der Untersuchung nomologischer Variablen im Kontext der zukünftigen Arbeitswelt. Das zweite Kapitel untersucht die Vorteile eines digitalen Mindsets für Organisationen, insbesondere wie es IS-Infusion-Verhalten fördert, also Verhaltensweisen, die die vollen Potentiale aus Informationssystemen schöpfen und dadurch neuen Wert für Unternehmen schaffen. Das dritte Kapitel analysiert, wie ein digitales Mindset nicht nur positive Effekte katalysieren, sondern auch negative, wie den Stress durch Informationssystemnutzung, sogenannten Technostress, abpuffern kann.

Die Ergebnisse der Dissertation definieren das digitale Mindset als eine Sammlung kognitiver Schemata bzw. habitualisierter Denkmuster und ordnen dieses als IT-spezifische Eigenschaft von Individuen ein. Diese Denkmuster umfassen angesammeltes Wissen und Erfahrungen in Bezug auf verschiedene Aspekte der Digitalisierung, die sich in Form von Überzeugungen, kognitiven Filtern und Prozessen äußern und Individuen in entsprechenden Situationen unterstützen, in denen sie mit entsprechenden

Stimuli konfrontiert sind. Sie sind veränderbar (z.B. durch Erfahrungen mit digitaler Innovation), technologieunabhängig und beeinflussen relevante Verhaltensweisen in der zukünftigen Arbeitswelt. Im Kontext digitaler Innovationen ist das digitale Mindset nicht als ein übergeordnetes Konstrukt zu verstehen, sondern besteht aus drei unabhängigen, koexistierenden Kognitionen, die elf Denkmuster gruppieren, welche mittels Umfrageskalen gemessen werden können. Die Ergebnisse zeigen außerdem Auswirkungen auf Mitarbeitende aus zwei Perspektiven. Erstens fördert es indirekt IS-Infusion-Verhalten, was für Organisationen im Kontext digitaler Innovation essenziell ist. Ein höheres digitales Mindset hilft Mitarbeitenden, das Potenzial digitaler Technologien besser zu erkennen, indem sie eine breitere Palette an Nutzungsmöglichkeiten mit höherem Innovationsgrad wahrnehmen. Es führt zu optimistischeren Erwartungen hinsichtlich deren Umsetzung und einer stärkeren Ausprägung von IT-spezifischen Verhaltensneigungen, was letztlich zu einer höheren Umsetzung der identifizierten Potenziale in Form von innovativen Verhaltensweisen führt. Zudem fördert es den komplementären Einsatz digitaler Technologien. Zweitens trägt es direkt und indirekt zu einem gesünderen Arbeitsumfeld bei, da Mitarbeitende mit einem digitalen Mindset besser mit dem durch den ständigen Einsatz digitaler Innovationen verursachten Technostress umgehen können und sich als produktiver und zufriedener bei der Arbeit wahrnehmen.

Die Ergebnisse dieser Dissertation bieten theoretische Beiträge zur bisherigen Wirtschaftsinformatikliteratur. Die Definition und Konzeptualisierung des *digitalen Mindsets* erweitert die bisherige Literatur um das Verständnis und eine klarere Abgrenzung dessen, was ein digitales Mindset beschreibt und wie kognitive Schemata die Nutzung digitaler Technologien beeinflussen. Die entwickelte multidimensionale Skala zur Messung des digitalen Mindsets ermöglicht Forschenden empirische Untersuchungen dieses neuen Konstrukts. Die belegten Einflüsse von vorherigen Erfahrungen mit digitalen Innovationen helfen dabei, besser zu verstehen, wie ein solches Mindset entsteht und wie Trainings- und Entwicklungsprogramme entwickelt werden können. Zudem zeigt die Dissertation, dass ein digitales Mindset die Wahrnehmung von Handlungsmöglichkeiten mit digitalen Technologien fördert, was zum besseren Verständnis von Affordanzen und deren Realisierung führt. Die Verbindungen zwischen digitalem Mindset und anderen IT-spezifischen Eigenschaften sowie deren Auswirkungen auf das Verhalten helfen Forschern, die Interaktionen und Einflüsse dieser Eigenschaften und des digitalen Mindsets auf das Verhalten besser zu verstehen. Schließlich tragen die Erkenntnisse zur Wirkung des digitalen Mindsets auf Technostress dazu bei, bessere Strategien zur Stressbewältigung, gerade im digitalen Kontext, zu entwickeln. Insgesamt helfen diese Beiträge, bestehende Theorien zu erweitern, neue Forschungsfragen zu identifizieren und praktische Anwendungen zur Optimierung der Nutzung digitaler Technologien in Organisationen zu entwickeln. Organisationen sollten die Entwicklung eines digitalen Mindsets bei ihren Mitarbeitern fördern, da dies die Innovationsfähigkeit und die Nutzung digitaler Technologien steigert sowie den Stress durch diese Technologien reduziert. Dies kann durch gezielten Erfahrungsaufbau erreicht werden, der auf die Stärkung der kognitiven Schemata abzielt.

Zusammenfassend war das Ziel der Dissertation, das theoretische Verständnis des digitalen Mindsets zu erweitern und empirische Belege für dessen Wert und erwartete Effekte zu liefern. Die Ergebnisse dieser Dissertation zeigen empirisch: „Eine Schlüsselrolle spielt das „Digital Mindset" von Managern und Mitarbeitern" (Computerwoche, 2018), weil es IS-Infusion-Verhaltensweisen positiv beeinflusst, Technostress reduziert sowie die Zufriedenheit und Produktivität am Arbeitsplatz fördert. Diese Dissertation dient somit als Leitfaden für Praktiker und Akademiker, um die potenziellen Effekte und Vorteile eines digitalen Mindsets besser zu verstehen.

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Yannick Hildebrandt

Introductory Paper

Introductory Paper

THE DIGITAL MINDSET

THEORETICAL FOUNDATION AND EMPIRICAL EVIDENCE

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INTRODUCTORY PAPER: TABLE OF CONTENTS

1 INTRODUCTION

"Looking for true innovators? Turn traditional hiring on its head. Why? To focus less on what they know and more on how they think. To focus on mindset—not skill set." (Forbes, 2020)

"A digital mindset will future-proof you, your career, and your organization." (Leonardi & Neeley, 2022, p. 1)

New digital technological advancements are revolutionizing the future of work, changing occupational requirements and optimal characteristics across the entire workforce (Benbya et al., 2024). With recent digital technologies, it is no longer only IT professionals (12%) but predominantly non-technical professionals (88%) who are affected in how they work (McKinsey, 2024). Hence, the "[…] future of work needs humans more than ever" (Wired, 2024), making human capital even more valuable for organizations (Sabherwal & Grover, 2024). Organizations now rely on *all* employees to create new value, products, and services from these digital technologies, respectively, to pursue digital innovation and to stay competitive (Nambisan et al., 2017; Yoo et al., 2012). Consequently, organizations need to understand how they can optimize their workforce for this new future.

In this new future of work, they need to rethink their approaches to optimize their workforce because the value of skills "[…] is difficult to predict because the answer depends partly on how new tools are designed, regulated, and used" (New York Times, 2023). Taken further, consultancies claim that "mindsets trump skillsets" (EY, 2018), and recent information systems (IS) research weighs employees' *mindset* more crucial than skills in the future of work (Paul et al., 2024; Weritz, 2022). A mindset is a collection of cognitive schemas that represent accumulated knowledge and experiences, expressed through cognitive filters, processes, and beliefs, and determine how individuals notice, identify, and interpret information (Dweck, 2006; Gollwitzer, 2012; Gupta & Govindarajan, 2002; Nadkarni et al., 2011). These schemas represent recurring patterns of thought derived from numerous instances of similar experiences concerning a particular concept (Fiske & Taylor, 1991). In today's era and new future of work, with pervasive and fastly evolving digital technologies and digital phenomena (Hund et al., 2021), "every executive, every worker needs to have a *digital* mindset" (Harvard Business Review, 2023) and also scholars underscore the pivotal role of employees' *digital mindset* (Grover et al., 2022; Lorenz & Buchwald, 2023; Weritz, 2022). They indicate its relevance for digital innovation as it enables employees to seize digital opportunities (Davison & Ou, 2017), enhance performance and job satisfaction (Leonardi & Neeley, 2022), adeptly engage with digital technologies (Korotkova et al., 2023), and develop new digital business models (Hildebrandt et al., 2015).

Taken together, the existing literature assumes that the future of work with ubiquitous digital technologies heightens the value of human capital for organizations (Sabherwal & Grover et al., 2024), enabling them to digitally innovate and create competitive advantage. At the same time, it is indicated that traditional aspects that determine the value of these resources (e.g., job-specific skills) change, and organizations must engage with new parameters, specifically employees' *digital mindset* (Leonardi & Neeley, 2022; Weritz, 2022). Despite this emphasis on the relevance and significance of this concept for employees to potentially support companies in their digital innovation efforts, there exists no empirically grounded research on what this digital mindset is and what value can be expected, leading to the focus on the digital mindset in this dissertation.

Without empirical evidence, the anticipated effects and value of a digital mindset, as quoted in the beginning, remain largely speculative. The absence of a robust definition and empirical studies raises fundamental questions regarding the nature and development of employees' digital mindset and, therefore, how it can help to optimize the workforce to expand or better understand existing IS theories and their assumptions. Hence, the benefits of cultivating employees' digital mindset in the context of digital innovation remain unverified, leaving scholars and practitioners with unanswered questions regarding the precise expectations and encouragements for employees, methods to evaluate the status quo, and the viability of developmental investments, leading to the central question of this dissertation:

What is the digital mindset and why should organizations consider employees' digital mindset within the context of digital innovation?

This question is answered by pursuing three research objectives that form the three chapters of this dissertation. The first research objective focuses on a better understanding of employees' digital mindset as a new aspect of an organization's workforce through a general definition and conceptualization, operationalization in the context of digital innovation, and the examination of relevant nomological variables. This addresses a missing definition in IS research, superficial descriptions, and ambiguous references (cf. van der Meulen et al., 2020), as well as missing links to previous psychological literature (cf. Allen, 2020; Solberg et al., 2020), which describes various perspectives on mindsets (French, 2016). The conceptualization and operationalization focus on the context of digital innovation. This focus on digital innovation within an organization is used as it serves as the precursor to subsequent phases of digitalization, such as digital transformation. The specific aim was therefore to elaborate on ways of thinking that play a role for employees in this phase, especially because a digital mindset is often mentioned precisely for being beneficial for behaviors and activities in this phase (Davison & Ou, 2017; Leonardi & Neeley, 2022), while later phases increasingly emphasize a mindset that refers to changed structures and working styles (cf. Eilers et al., 2022). Hence, these endeavors form the basis for delimiting the construct, propositions, and, ultimately, theory development (Gregor, 2006) and contribute to:

Research objective 1: Understanding the digital mindset.

The second research objective focuses on a better understanding of what benefits organizations can expect from employees with a digital mindset by focusing on IS infusion behaviors of employees with digital technologies. These behaviors refer to the innovative use of IS to support more tasks and to potentially support tasks previously unrecognized, thereby utilizing the full potential of IS (Hsieh & Zmud, 2006). Such behaviors can generate new value not only for themselves but also for the company and thus represent an essential part of organizational digital innovation. Related research emphasizes the relevance of individual differences and, specifically, IT-specific traits (Li et al., 2013; Tams & Dulipovici, 2022). Further, the literature proposes that a digital mindset is necessary for employees to leverage digital opportunities and create new value through digital technologies in companies (Davison & Ou, 2017; Korotkova et al., 2023), or indicate different usage possibilities (Tour, 2015). Hence, these endeavors empirically contribute to:

Research objective 2: Understanding how employees' digital mindset can foster IS infusion behaviors.

The third research objective is concerned with understanding how employees' digital mindset can not only potentially lead to new value by catalyzing positive outcomes but also buffer negative consequences. Specifically, it focuses on understanding how it can reduce technostress. It spotlights technostress as, with continuous digitization, employees in the realm of digital innovation face a constant influx of new digital technologies and processes, precipitating associated stress (Gimpel et al., 2024; Ragu-Nathan et al., 2008). Individual differences play a particularly important role in how technostress is perceived and processed (Maier et al., 2019; Srivastava et al., 2015), and psychology provides evidence for mindset effects on stress (Casper et al., 2017). Consequently, this part probes the implications of employees' digital mindset regarding such negative effects and contributes to:

Research objective 3: Understanding how employees' digital mindset can mitigate technostress.

In sum, this dissertation includes an introductory paper and eight subsequent research papers, all contributing to fulfilling the research objectives and answering the research question. The introductory paper covers the various theories and concepts used in the papers, identifies research questions relevant to the research objectives and the overall research question, and provides an overview of the methods, results, contributions, limitations, and future research avenues. Aligned with the three raised research objectives, the papers of this dissertation are grouped into Chapter I (**Papers I-III**), which focuses on conceptualization, operationalization, and a nomological net of the digital mindset; Chapter II (**Papers IV-VI**), which explores its effects on employees' IS infusion behaviors; and Chapter III (**Papers VII** and **VIII**), which investigates its role in mitigating technostress. Figure 1 provides a concise overview of the chapters, included papers, and theoretical lenses and concepts used. The following section introduces the theories and concepts used in the eight papers of this dissertation.

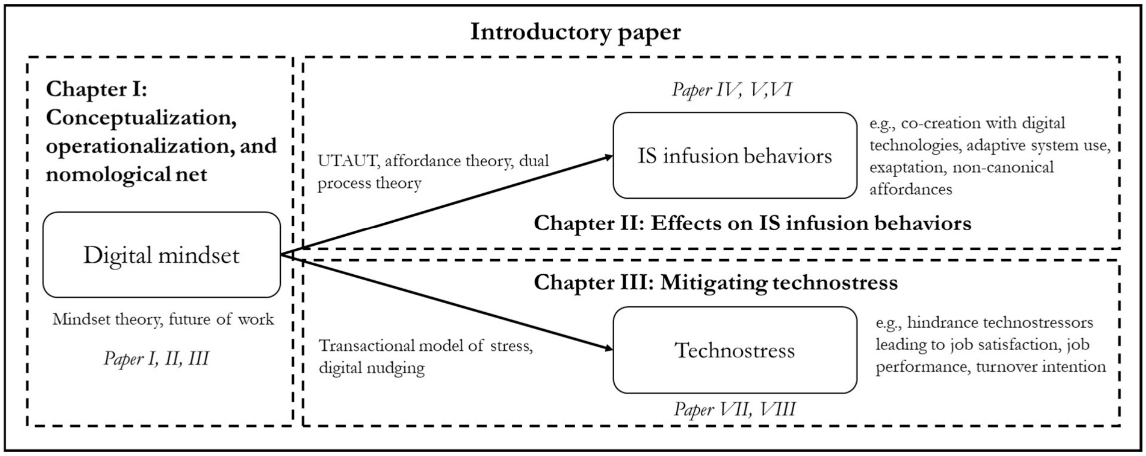


Figure 1. Structure of this dissertation

2 Theoretical Foundation and Related Research

To investigate the nature and effects of a digital mindset, a multifaceted approach was conducted, drawing upon various concepts and theoretical lenses. The first part of this section decomposes the concepts of digitalization leading to a new future of work, mindsets, and the digital mindset. To investigate its effects on IS infusion behaviors, the different dependent variables used are explained and related work is summarized in the second part of this section. In the same section, UTAUT, affordance theory, and the dual process theory are explained, which were employed to explore the link between employees' digital mindset and IS infusion behaviors. The third part of this section explains technostress, the transactional model of stress, and digital nudging, which are used to explore its impact on technostress and the moderating role of employees' digital mindset.

2.1 Digitalization and Mindsets

In order to conceptualize, operationalize, and empirically investigate the digital mindset, a mutual understanding of the terms *digital* and *mindset* in the scope of this dissertation is essential.

2.1.1 Digital, Digitalization, and the Future of Work

The term 'digital' derives from the Latin word digitalis (using the finger) or digitus (finger) and has the meaning of using digits and was used to describe the function of digital objects, which at their core consist of binary digits (Duden editorial, 2024). The associated noun 'digitization' is defined as "[…] converting an analog signal into […] binary digits" (Legner et al., 2017, p. 306). Through this technical conversion, information can be dematerialized, meaning physical information (e.g., printed documents) can be reduced or replaced inexpensively through digital equivalents (Tilson et al., 2010), creating digital objects (Hund et al., 2021). These digital objects become a digital technology[1] when social actors assign meaning for applying them (Hund et al., 2021). Through reprogrammability, data homogenization, decoupling, and distributedness, the boundaries of these digital technologies become fluid (Yoo et al., 2012). From an organizational perspective, digitization results in an environment of digitalization in which companies apply[2] these digital technologies, change their organizational logic and, through new socio-technical phenomena, generate new value (El Sawy et al., 2016; Tilson et al., 2010). Thus, on the one hand, smaller, cheaper, and more powerful computers and networks create convergence and generativity (Yoo et al., 2010), enabling organizations to create, adopt, or exploit value-adding novelty in products, services, processes, or the business model through incorporating digital technology (Hund et al., 2021). On the other hand, digitalization is understood as digital transformation, defining it rather as the process of new architectures, structures, and culture as a consequence of those new digital technol-

[1] Digital technology possesses material (physical IT hardware or objects) as well as non-material components (e.g., software) and, therefore, includes IT but also a social component determined by users that shape its boundary (Hund et al., 2021).
[2] For example, by creating information systems (IS) within companies that describe socio-technical systems that provide organizations with information services needed for operations and management. For consistency, this dissertation uses the term of digital technologies, also including IS.

ogies to create and offer these products and services that customers, employees, and partners find valuable (Drechsler et al., 2020).

The terms digital innovation and digital transformation are often used interchangeably with digitalization and are partly congruent (Hund et al., 2021; Vial, 2019). Digital innovation refers to the creation of new value through digital technology, while digital transformation rather describes the management of fundamental structural and organizational changes through these digital innovations to existing or old elements of firms (Drechsler et al., 2020). Accordingly, digitization enables digital innovation, which can be understood as a predecessor of digital transformation, and both form organizational digitalization (see Figure 2).

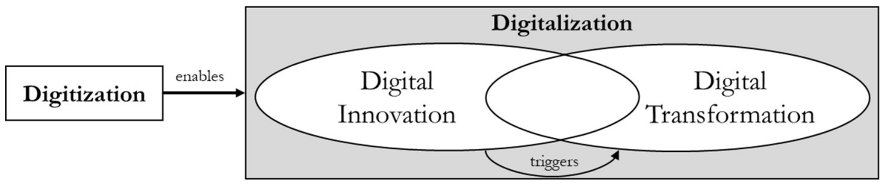


Figure 2: Digitalization, its subphenomena and interpretation throughout this dissertation (own illustration)

This dissertation primarily focuses on the aspect of digital innovation as a component of digitalization. As digitization and new digital technological advancements become more and more ubiquitous, organizations are no longer solely dependent on R&D or IT employees but also on "ordinary" employees to generate new value and achieve competitive advantages, leading to a new future of work (Opland et al., 2022).

This future of work includes shifts in the nature of work itself, and the required composition of the workforce within companies (Kaarst-Brown et al., 2018; Wang et al., 2020). Digital technologies modify core activities and responsibilities, either by replacing existing tasks or by complementing them (Brynjolfsson et al., 2023; Feuerriegel et al., 2024), increasing rather than decreasing the human capital of organizations, as "[…] humans with smart machines can do much more than humans without smart machines" (Sabherwal & Grover, 2024, p. 324).

The literature has identified various aspects of the new workforce that are beneficial for organizational success in the context of digitalization. For instance, research has indicated that to optimize their IT workforce, organizations should promote gender equality (Schmitt et al., 2023; Sundermeier et al., 2020) and embrace neurodiversity (e.g., expanding the talent pool to include employees with autism or autistic tendencies) (Jia et al., 2022; Loiacono & Ren, 2018). Further, for the IT workforce, traditional IT skills, while still important, are becoming less critical compared to non-job-related digital experiences and cognitive factors (Chen et al., 2022; Kaarst-Brown et al., 2018; Karaevli et al., 2021; Petter et al., 2018).

However, the new future of work affects the entire workforce, going beyond the IT workforce and focusing on optimizing the IT workforce alone is increasingly insufficient in a world where digital technologies permeate all aspects of work (Feuerriegel et al., 2024; Weritz, 2022). Across the entire workforce, primarily individual differences or technology-specific behavioral tendencies (e.g., IT mindfulness, empowerment, or identity) have been examined as relevant aspects of employees that are beneficial for organizations (e.g., (Carter et al., 2020; Thatcher et al., 2018) (see Table 24 in the Appendix). Recently, literature suggests that to optimize their entire workforce and create new value in this future of work, organizations rather need to consider how individuals think and, specifically, their *mindset* (Paul et al., 2024; Weritz, 2022).

2.1.2 Mindsets

A mindset can be defined as the collection of cognitive schemas that represent accumulated knowledge and experiences of a specific concept, expressed through cognitive filters, processes, or beliefs that represent how individuals make sense of themselves or the environment, leading to divergent response patterns (Dweck & Yeager, 2019; French, 2016; Gollwitzer et al., 1990; Rhinesmith, 1992).

These schemas represent recurring patterns of thought, reflecting accumulated knowledge and experiences derived from numerous instances of similar experiences concerning a particular concept (Fiske & Taylor, 1991). This definition integrates three different, overlapping perspectives of different psychological research strands on mindsets, all referring to entrenched underlying cognitive schemas and their mechanisms (French, 2016).

Cognitive schema theory claims that our knowledge of the world is organized and categorized in cognitive schemas, which are organized units of knowledge and experience regarding a subject or event, which can influence our cognition and behavior (Fiske & Taylor, 1991). Schemas allow people to make sense of new information by relating it to what they already know, thereby facilitating understanding and learning. The evolution of schemas is driven by two core processes: *assimilation* and *accommodation* (Markus, 1977; Piaget, 1970). Assimilation involves integrating new information into existing schemas without altering the schema itself (Piaget, 1970). For instance, when a child who knows about dogs encounters a German shepherd, they assimilate it into their existing dog schema. Assimilation allows for the expansion of existing knowledge frameworks without the need for structural changes. Accommodation occurs when new information cannot fit into existing schemas, necessitating modification of the schema or the creation of a new one (Piaget, 1970). For example, if a child who has only seen dogs encounters a cat, they need to create a new schema for cats as they do not fit their existing schemas. Accommodation ensures that schemas remain accurate and relevant, adapting to new experiences and information. The interplay between assimilation and accommodation ensures that schemas remain dynamic and adaptable, reflecting the continuous evolution of knowledge and experience. By organizing and interpreting information through schemas, individuals can navigate complex and fast-changing environments, learn efficiently, and make informed decisions (Nadkarni & Narayanan, 2007).

Schemas affect how individuals encode information and reduce the perceived complexity by biasing the content of perception in directions already known. Further, people remember schema-relevant material more than irrelevant material and make inferences and evaluations that are in line with existing schemas (Fiske & Taylor, 1991). Previous research on mindset refers to these mechanisms, terming the expression of those mechanisms as cognitive filters, processes, or beliefs.

Mindsets were defined as cognitive filters that determine how individuals *notice* things in situations (Gupta & Govindarajan, 2002; Nadkarni et al., 2011). Therefore, it is seen as a "predisposition to see the world in a particular way that sets boundaries and provides explanations for why things are the way they are […]. In other words, a mindset is a filter through which we look at the world […] and orientation to the world that allows you to see certain things that others do not see" (Rhinesmith, 1992, p.63). This perspective relies on one mechanism of the schema-based nature of reasoning. When people encounter stimuli, relevant schemas are triggered, directing their attention to information that aligns with their pre-existing schemas, while filtering out irrelevant or conflicting details, thus reducing cognitive dissonance (Carlston et al., forthcoming). Schemas that are used frequently become more easily accessible and are activated more quickly than those used less often. As a result, repeated exposure to similar situations and stimuli reinforces a schema, making it easier to activate. This causes individuals to process certain stimuli or action possibilities with more cognitive ease (Kahneman, 2011), finally resulting in different perceptions of the same environment and stimuli. Hence, mindsets from that perspective are interpreted as cognitive filters that change how stimuli and the environment are perceived (Rhinesmith, 1992).

Mindsets are also viewed as connected to specific task completion, describing them as the sum of cognitive procedures that support the completion of tasks (Gollwitzer, 1990). In particular, this perspective is grounded in cognitive experiments conducted by the Würzburg School (Külpe, 1904) and was later described as the evaluation of the desirability and feasibility of several action possibilities when solving a task, based on previous knowledge structures. This perspective argues that, based on cognitive schemas built through knowledge and experiences, individuals are provided with a set of rules and cause-effect understanding to evaluate the desirability and feasibility of actions, altering how individuals *identify* appropriate actions in situations (Gollwitzer, 2012; Gollwitzer et al., 1990). As a result, mindsets are interpreted as cognitive processes that change how people evaluate appropriate actions in situations.

This perspective thus refers, on the one hand, to the altered perception through mechanisms of cognitive schemas, which are also described from the viewpoint of cognitive filters, and, on the other hand, to the different interpretation through these schemas, which is likewise described from the perspective of beliefs (French, 2016; Gollwitzer, 1990).

The belief perspective on mindsets views mindsets as beliefs and core convictions that change how individuals *interpret* situations or themselves (Dweck, 2006; Dweck & Yeager, 2019). Those beliefs are based on stored cognitive schemas consisting of experiences, knowledge, or education. They lead to an implicit and absolute conception that something about one's own attributes, things, actions, or environment is true without requiring additional information (Dweck & Yeager, 2019). Hence, from this perspective, the cognitive schemas represent rather a collection of attitudes derived from knowledge and experiences (DeShon & Gillespie, 2005). These schemas serve as a basis for inferring missing information and shaping evaluations and judgments about stimuli that align with pre-existing schemas. When information is ambiguous or incomplete, it is interpreted through the lens of the activated schema, attempting to fit new information into this existing schema (i.e., assimilation) (Smith, 1998), potentially leading to confirmation bias (Kahneman, 2011). Through that mechanism, stimuli are interpreted divergently, leading to an implicit and absolute conception that something about their attributes, things, actions, or environment is true without requiring additional information (Dweck & Yeager, 2019). Hence, these schemas operate as logical structures for individuals and are often described as beliefs and absolute convictions about objects, the environment, or people, influencing how situations are interpreted (Dweck, 2006; Dweck & Leggett, 1988). Exemplarily, scholars from educational disciplines frequently employ this perspective to explore the development of individuals through the growth mindset, which mirrors their ingrained beliefs about their own intelligence and capacity to develop or acquire skills (Dweck & Yeager, 2019; Keating & Heslin, 2015). As indicated, the belief perspective of mindsets also overlaps with the other mindset interpretations (French, 2016). First, the interpretation relies on the same underlying concept of cognitive schemas, although it refers to other mechanisms. Second, these entrenched beliefs and attitudes also affect how individuals evaluate the desirability of action-outcomes (cf. cognitive processes perspective) and the "emotional core" of such a belief affects associations and perception (cf. cognitive filters perspective) (French, 2016; Kahneman, 2003).

In summary, a mindset is grounded in cognitive schemas that develop through the accumulation of knowledge and experience. These schemas influence how individuals think about things or themselves within a specific context. Researchers have interpreted the expression of this thinking in diverse yet interconnected ways as cognitive filters, processes, and beliefs, which are not directly observable (Beck, 1964; Sinha & Pandey, 2007) but can be assessed by asking individuals how they typically *notice*, *identify,* and *interpret* things or themselves in a specific context. Figure 3 illustrates the different perspectives on the mindset concept and their overlaps.

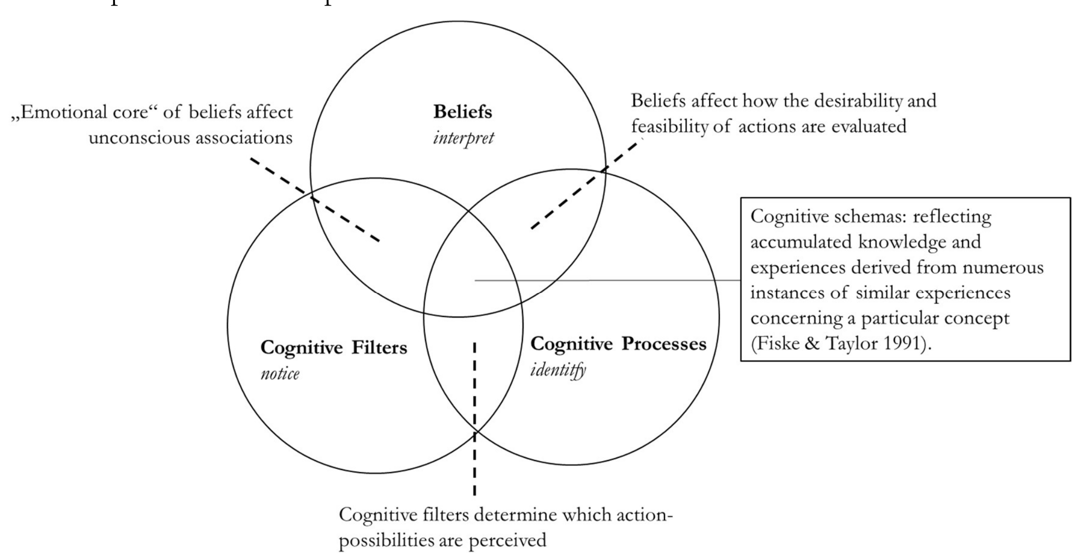


Figure 3. Mindset perspectives and conceptual overlaps (own illustration based on (French, 2016))

Management, education, or psychology literature primarily used one of these perspectives and investigated different mindsets in work contexts, showing the relevance of specific mindsets for employees to approach different situations and tasks in these environments effectively and support organizations. Exemplarily, the work growth mindset describes beliefs regarding the growth opportunities of one's own abilities at work (Dweck & Yeager, 2019; Rogers et al., 2023) and makes employees more likely to help coworkers (Heslin et al., 2006), work more innovatively, and seek feedback (Janssen & van Yperen, 2004). The global mindset is defined as the awareness of different cultures and markets in an environment of continuous globalization that enables managers to see various shared meaning systems or global consequences (Gupta & Govindarajan, 2002; Rhinesmith, 1992). A global mindset showed to affect innovative work behavior as well as direct and indirect effects on work performance (Pusparini & Aryasa, 2021) and leadership behaviors (Konyu-Fogel, 2011; Tran et al., 2016). These mindsets are influenced by working abroad and involvement in global operations (Andresen & Bergdolt, 2021; Wollenberg et al., 2020), but also broad personality traits (Andresen & Bergdolt, 2021). Lastly, deliberative mindsets were investigated in accounting contexts using the perspective of cognitive processes, describing how individuals identify inconsistencies between assumptions and data in situations and have been shown to improve auditors' judgement and decision making (Rixom & Plumlee, 2023). Table 22 in the Appendix provides an overview of mindset concepts that have been conceptualized or empirically investigated in related disciplines.

Nevertheless, mindsets cannot be neatly categorized into one perspective, and an integrative view should be used that combines these previous perspectives, which rely on the same phenomenon (French, 2016). This dissertation adopts this integrative perspective, defining a mindset as a collection of cognitive schemas shaped by the accumulation of knowledge and experiences that form diverse cognitive filters, processes, and beliefs.

2.1.3 Digital Mindset[3]

In the context of pervasive digitalization, IS research has emphasized the relevance of different mindsets for organizational success and employee behaviors. Many studies vaguely mention new mindsets of employees to be considered for IS design (Bhattacharyya et al., 2020), important for working in the digital age (Aroles et al., 2021), for managerial decision-making through IS (Ramaprasad et al., 1993), to see the benefits of IS (Shih et al., 2012), and in general for digitally innovating and transforming firms (Li et al., 2018; Nolte et al., 2020). More specifically, organizations need to promote a *digital mindset* among their employees to stay competitive and succeed in the age of digitalization (Davison & Ou, 2017; Leonardi & Neeley, 2022; Warner & Wäger, 2019).

Management literature holds initial approaches to define such a mindset, which are limited to the belief perspective and describe convictions about one's own ability to learn technologies (Solberg et al., 2020) or the value of disruptive technologies (Allen, 2020); however, hardly any explicit definitions, conceptualizations, or empirical research exists in IS research. Studies focusing on digital transformation use it synonymously with an agile mindset, which has been identified as a success factor for digital transformation (Fuchs & Hess, 2018) and is required for the adoption of new agile methods (Ciriello et al., 2022; Ramesh et al., 2017). In the context of digital innovation, it is cited as necessary for employees, managers, or CIOs (Grover et al., 2022; Holotiuk et al., 2024; Lorenz & Buchwald, 2023) and seen as a critical antecedent to harnessing digital opportunities (Davison & Ou, 2017), as facilitators for familiarity with technologies (Korotkova et al., 2023), as a requirement to participate in a digital society (Zhao et al., 2023), and as a requirement to transform a company into a digital company through business model innovations (Lucas & Goh, 2009). An overview of IS studies that reference various mindsets, study them explicitly, or mention mindsets of employees in their results is provided in Table 23 in the Appendix.

Considering this blind spot in the IS literature, **Paper I** and **Paper II** in the first chapter of this dissertation focus on defining, conceptualizing, and operationalizing a digital mindset, while **Paper III** complements these findings by investigating a nomological net. Serving as a theoretical foundation for

[3] This sections contains passages and results of *Paper I, II,* and *Paper III*

subsequent empirical studies, its definition and conceptualization are briefly summarized in the following.

In line with the more in-depth integrative view on mindsets and digitalization that has already been discussed, the digital mindset can be described as follows (see also **Papers I, II,** and **III**): *The digital mindset describes a collection of cognitive schemas, or thinking patterns, formed through accumulated knowledge and experience regarding concepts and aspects of digitalization that express themselves as cognitive filters, processes, and beliefs and represent how individuals make sense of digital technologies, their use, application, and consequences in individual, organizational, and societal contexts* (Hildebrandt & Beimborn, 2022). In this case, "digital technologies" mean those that have a modular, layered digital architecture with technology layers like content, service, network, and devices that are only loosely connected to each other (Yoo et al., 2010) (see section 2.1.1). This flexibility allows for the creation of new functions and value by combining these layers with other digital or non-digital technologies, and their widespread presence in society and organizations enhances their value-creating potential for diverse employees, leading to more distributed innovations and platform-like usage within organizations (Henfridsson et al., 2018; Yoo et al., 2012). Hence, in terms of boundary conditions, a digital mindset pertains to digital technologies with these characteristics and is not limited to specific employee groups. Instead, it is relevant for the entire workforce and all employees across various departments and hierarchical levels, as it allows all personnel to identify new opportunities with these digital technologies and create new value (cf. Opland et al., 2022).

Paper I conceptualized in more detail what a digital mindset means for employees in organizations that pursue digital innovation endeavors, deriving 11 distinct schemas, or thinking patterns. Each thinking pattern represents an established cognitive schema related to aspects that facilitate digital innovation within organizations. These schemas are expressed as cognitive filters, processes, and beliefs, influencing how employees, regardless of their position or role, perceive and interpret key aspects crucial for digital innovation. **Paper II** organized these thinking patterns into three interrelated yet distinct second-order cognitions, which provide thematic coherence (Hildebrandt & Beimborn, forthcoming). Therefore, the digital mindset in the context of digital innovation does not describe one superordinate construct but three coexisting cognitions:

1. *Digital Cognition*: Typical perceptions and interpretations of novel paradigms arising from and accompanying emergent digital technologies, encompassing exponential thinking, data-driven thinking, platform thinking, and digital-oriented thinking.
2. *Creative Cognition*: Sensitivity to and perception of the creative potential and possibilities of digital technologies and their properties inherent to their layered modular architecture, involving disruptive thinking, combinatorial thinking, generative thinking, and risk-affine thinking.
3. *Agile Cognition*: Beliefs and convictions about agile methods of problem-solving and experimentation with digital technologies, reflected through collaborative, iterative, and resilient thinking.

Table 1 depicts these cognitions and thinking patterns. As not all employees face all tasks and situations simultaneously in the context of organizational digital innovation, not all cognitions and thinking patterns may be relevant for every situation. Thus, depending on the situation and task, only one or two cognitions or specific thinking patterns may be relevant to embodying the digital mindset supportive in the given situation (Hildebrandt & Beimborn, forthcoming).

In summary, new mindsets, and specifically a digital mindset, have frequently been discussed in the IS literature as indispensable for organizations' employees in the context of digitalization. Rooted in the absence of clear definitions or conceptualizations detailing the attributes of such a mindset, a definition and conceptualization of a digital mindset have been developed and are used throughout all parts of this dissertation. Within organizations that pursue digital innovation, employee's digital mindset is described as a collection of cognitive schemas built through accumulated knowledge and experience that change how individuals perceive, evaluate, and interpret newly arising phenomena and paradigms (digital cognition), opportunities based on the attributes of digital technologies (creative cognition), and consequential new forms of work (agile cognition).

Papers I, II, and **III** take all three cognitions into account. In the subsequent stages of the empirical investigations within this dissertation, the focus *primarily* revolves around the thinking patterns associated with the *creative cognition*. The emphasis stems from a focus on employees' behaviors of innovatively using digital technologies in the subsequent empirical investigations, wherein the unique attributes of digital technologies are believed to enable nearly boundless creative possibilities (Yoo et al., 2010) as well as the focus on employees' technostress stress created by these attributes.

As the digital mindset represents the enduring inclination of individuals to think in certain ways in the context of digital innovation, it can be considered a trait, making the *hierarchical model of personality and IT-specific traits* an appropriate framework to delineate and locate the construct within existing individual differences in IS.

Table 1. Conceptualization of employees' digital mindset based on (Hildebrandt & Beimborn, forthcoming)

	Schema/thinking pattern	Description
Digital cognition	Digital-oriented thinking	Interpreting usage and application of digital technologies as desirable especially innovative applications and usage.
	Exponential thinking	Observing and interpreting digital technologies not only with present capabilities and potentials but anticipating also future exponential development potential.
	Data-driven thinking	Easily recognizing created data as valuable byproduct resources of digital technologies.
	Platform thinking	Easily recognizing and seeing value in decentralized solutions and utilization possibilities of digital technologies as platforms with multiple facets.
Creative cognition	Risk-affine thinking	Interpreting and evaluating associated risks regarding digital technologies and their applications more positively.
	Disruptive thinking	Questioning existing solutions by easily perceiving how digital technologies could induce alternative scenarios, including fundamental pivots.
	Combinatorial thinking	Easily perceiving combinations of different (independent) digital technologies or components, broadening the perceived potential solution space.
	Generative thinking	Being aware of the generativity and reprogrammability of digital technologies and easily perceiving usage possibilities beyond the intended use of digital technologies.
Agile cognition	Iterative thinking	Easily perceiving and interpreting simple experimentation with digital technologies and prototypical digital solutions for problems as desirable.
	Collaborative thinking	Easily recognizing and interpreting action options that involve collaboration, cooperation and co-creation as valuable when solving problems that involve digital technologies.
	Resilient thinking	Being convinced of and embracing the necessity of trial-and-error cycles during digital technology interactions and specifically the consequent learnings.

2.1.4 Digital Mindset as an IT-Specific Trait

Trait theory views individuals as an organization of different traits that describe habitual patterns of thought, emotion, or behavior and form their personality. Traits are distinguished based on different properties. The breadth of a trait describes its context and behavioral breadth. Context breadth distinguishes between traits that are prevalent in all situations and traits that are more likely to show up in specific contexts. The number of behaviors that a trait includes is called its behavioral breadth. Traits with narrow behavioral breadth are more closely linked to a single behavior (Hampson et al., 1986; Mowen & Spears, 1999). Subordinate traits influence smaller sets of behaviors than superordinate traits. In line with other work in the field of IS, this dissertation uses the hierarchical model of personality and IT-specific traits to explain discrimination and how the digital mindset interacts with traits that have already been studied. Hence, traits can be structured hierarchically into cardinal, central, and secondary traits based on their breadth and dynamics (Davis & Yi, 2012; Thatcher et al., 2018; Thatcher & Perrewe, 2002) (see Figure 4).

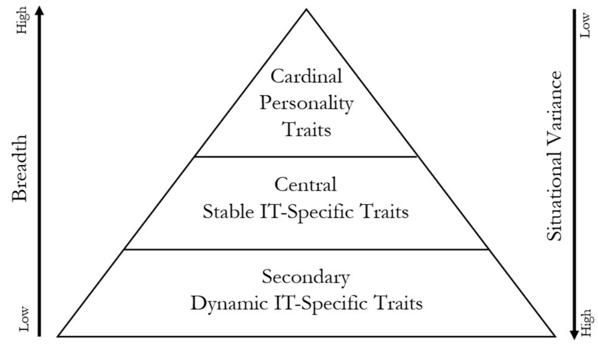


Figure 4. Hierarchical model of personality and IT-specific traits based on (Davis & Yi, 2012)

Cardinal traits describe broad traits without a specific context, predisposing a wide range of behaviors and representing the main characteristics of a person (Allport, 1961; Hampson et al., 1986). Typical traits representing those habitual patterns of behavior that were investigated in IS contexts are the Big Five personality traits (Costa & McCrae, 1991). Additionally, cognitive styles, describing context-independent patterns of how people absorb and arrange information, are rather habitual patterns of thought and showed to have no direct predictive power for use behaviors but affect technological beliefs (Chakraborty et al., 2008; McElroy et al., 2007).

Central stable IT-specific traits are tailored to the domain of IT, therefore narrower than broad context-free traits and less likely to change significantly over time (Davis & Yi, 2012). Extensive research exists at this layer, and various traits are categorized as central stable IT-specific traits, such as personal innovativeness with IT (PIIT) (Thatcher & Perrewe, 2002; Venkatesh et al., 2014). It has been shown that these traits are affected by cardinal traits, such as the Big Five personality traits (Davis & Yi, 2012), affect traits of lower hierarchy levels, and therefore indirectly and directly affect behavior (Mcilroy et al., 2007; Tams & Dulipovici, 2022).

Secondary dynamic IT-specific traits are idiosyncratic to specific configurations of the user and situation and can diminish or increase over time (Thatcher & Perrewe, 2002). Exemplary traits investigated on this hierarchical level include IT mindfulness (Thatcher et al., 2018), IT habits (Limayem et al., 2007), or computer self-efficacy (Compeau & Higgins, 1995). These traits have been shown to possess higher explanatory power for behaviors than higher-level traits (Maier et al., 2019), are indirectly affected by cardinal traits, and are directly affected by central stable IT-specific traits (Davis & Yi, 2012) (see Table 24 in the Appendix for an overview of previously investigated traits in the IS literature).

Paper II uses the trait criteria to categorize and delineate employees' digital mindset. It is IT-specific but does not predispose specific behavior and its expression is not dependent on the specific technology, as it describes employees' general habitual sense-making in the context of digitalization (Hildebrandt & Beimborn, forthcoming). The definition of a mindset implies that its underlying cognitive schemas can be altered through assimilation and accommodation, yet its expression is not contingent upon situational factors (Dweck et al., 1995). See **Paper II** for a more detailed overview and direct comparison between a digital mindset and other traits and concepts.

Existing trait research has also faced criticism in the past for ambiguity regarding trait dynamics, oversimplification, and limitations in predicting behavior (Pervin, 1994). Comprehensive meta-analyses have revealed new findings regarding these trait dynamics. Accordingly, cardinal personality traits show significant changes during young adulthood, peaking around age 25, followed by relatively minor adjustments throughout a lifespan (e.g., through major life events (Bleidorn et al., 2018), with genetic and environmental influences contributing to these shifts (Bleidorn et al., 2022). Given this criticism, it is increasingly important not to rely solely on core personality traits but to consider various context-specific, changeable, and situational traits to avoid oversimplifying individual differences and their influences on behavior.

2.1.5 Summary

In summary, digitalization leads to a new nature of work, making it necessary for organizations to consider new aspects of their workforce, specifically their employees' digital mindset. To define the digital mindset, this dissertation considers the prefix "digital" in the broader sense as digitalization and combines it with different mindset perspectives from previous research that share a core assumption but diverge in how mindsets are expressed. It describes a collection of schemas, or thinking patterns, expressed through cognitive filters, processes, and beliefs. These represent how individuals make sense of digital technologies, their use, application, and consequences in individual, organizational, and societal contexts, leading to divergent response patterns for tasks that occur in these contexts. From the perspective of traits, it describes a situationally invariant but malleable IT-specific trait that influences how employees respond to stimuli in the digitalization context.

Specifically conceptualized for the context of digital innovation, the digital mindset describes a collection of 11 distinct thinking patterns for employees in organizations that pursue digital innovation. In the context of digital innovation, the digital mindset is not to be understood as a single construct but as three cognitions, reflecting schemas that developed through accumulated knowledge and experience that alter how individuals perceive, evaluate, and interpret emerging digital phenomena and paradigms (digital cognition), attributes of digital technologies and their opportunities (creative cognition), and consequential new forms of work (agile cognition).

Further empirical research of this dissertation (**Papers IV, V, VII,** and **VIII**) primarily focuses on the thinking patterns of the *creative cognition* that describe how employees typically perceive, evaluate, and interpret attributes and characteristics of digital technologies and consequential opportunities.

To understand and test the theoretically developed construct in **Paper I** and the measurement model in **Paper II**, **Paper III** evaluates a nomological net of the digital mindset based on mindset theory and underlying schemas. Figure 5 illustrates the overarching research model for investigating the digital mindset construct itself, viewing it as an additional factor for an optimal workforce to consider for the future of work.

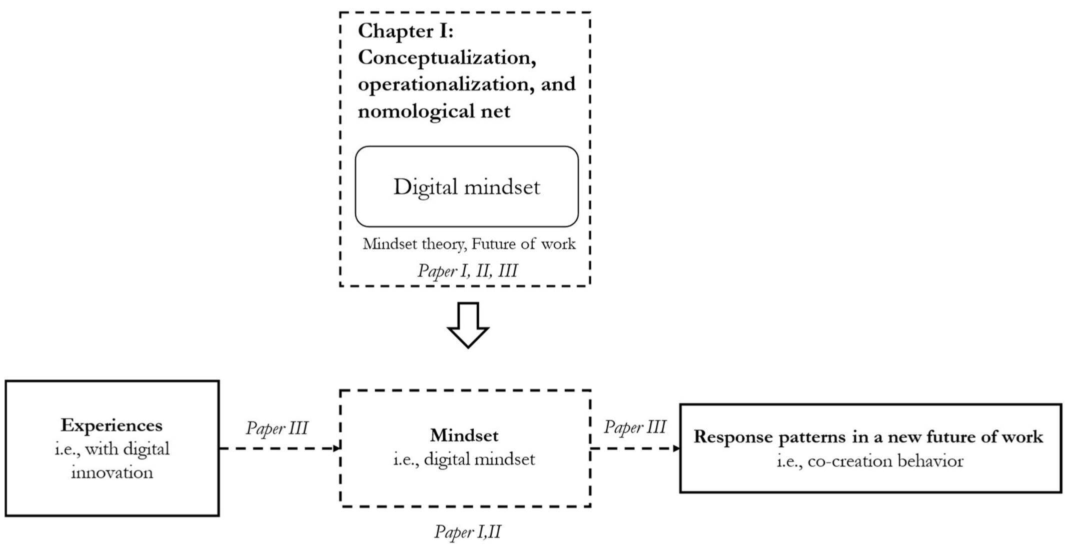


Figure 5. The nomological net of the digital mindset based on mindset and schema theory, viewing it as an individual factor for the future of work; dashed lines indicate foci of papers throughout this dissertation

While the focus of **Papers I**, **II**, and **III** of Chapter I is on the concept of the digital mindset itself, the papers of the second chapter focus on its effects on behavior, specifically relevant behaviors of employees in the context of digital innovation, such as IS infusion behaviors.

2.2 IS INFUSION BEHAVIORS

IS infusion describes the extent to which an organization utilizes information systems to their utmost potential. It encompasses the advanced utilization of all functions and features of IT applications in managerial or operational activities, enhancing the work of individuals at a higher level (Cooper & Zmud, 1990). This concept is integral to successful IS implementation, representing the final phase of the IT implementation model and enabling organizations to fully harness the opportunities presented by digital technologies and optimize their IT investments (Kesting & Parm Ulhøi, 2010). IS infusion, as the final stage of IT implementation, is preceded by initiation, adoption, adaptation, acceptance, and routinization (see Figure 6). By progressing through these stages and, ultimately, fully leveraging the potential of IT applications after their adoption, companies can significantly improve organizational productivity, efficiency, and innovation (Venkatesh & Goyal, 2010). The final three stages pertain to various levels of implementation activities, where individual usage behaviors can occur (Cooper & Zmud, 1990; Hsieh & Zmud, 2006). *Acceptance* indicates users' dedication to employing the system. *Routinization* occurs when system use becomes a standard part of an individual's routine behavior. *Infusion* describes the comprehensive and deep integration of an IT application within an individual's or an organization's work processes (Hsieh & Zmud, 2006). In the last stage, IS infusion behaviors occur. These behaviors refer to the innovative use of IS to support more tasks and to potentially support tasks previously unrecognized, thereby utilizing IS to its fullest potential (Hsieh & Zmud, 2006). As employees utilize IS features or functionality in new ways to enhance and support their work, they create new value for both themselves and the company, presenting an essential part of organizational digital innovation and making them a key focus of this dissertation.

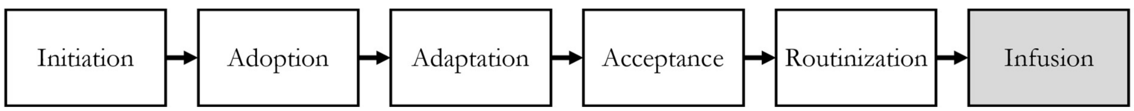


Figure 6. IT Implementation model based on (Cooper & Zmud, 1990) and focus of this dissertation (grey area)

Prior research has employed various variables and constructs as dependent variables to assess IS infusion behaviors (see Table 25 in the Appendix). Consequently, this dissertation also employs a range of dependent variables to explore IS infusion behaviors, summarized in Table 2.

Table 2. Constructs used throughout this dissertation relevant for behaviors in the IS Infusion stage

Paper #	Construct	Definition	References
III	Collaboration with digital technology	Using digital technologies to assist with various components of their job responsibilities, working in tandem with these tools to complete tasks in a complementary fashion.	(Fügener et al., 2022; Hoffman, 2019)
IV	Non-canonical affordance perception	Perceived potential uses of systems that are not recognized by the general population.	(Lehrig et al., 2019)
V	Adaptive system use	Comprises two dimensions that delineate the features individuals employ within a system and the manner in which these features are utilized. These two dimensions are explicated through the sub-dimensions of "trying new features" and "feature substituting," along with "feature combining" and "feature repurposing."	(Sun, 2012)
VI	Exaptation	New need-solution pairings that describe the emergence of latent functionalities within pre-existing artifacts, involving the appropriation of features for purposes beyond their originally intended function.	(Andriani et al., 2017)

On one hand, this dissertation employs either generic constructs, such as "collaboration with digital technology", multidimensional constructs like "adaptive system use", or "non-canonical affordance perception" as a preceding construct of such behaviors. The rationale for employing these constructs stems from the observation that prior literature predominantly relied on unidimensional dependent variables, primarily concentrating on feature exploration or the extension of previous usage patterns (Ahuja & Thatcher, 2005; Akbulut et al., 2004; Carter et al., 2020). These earlier studies only partially captured the complex concept of IS infusion behavior. This is because real-world innovative behaviors can be diverse, with the alteration of existing features being a crucial aspect (Nevo et al., 2016; Sun, 2012). Additionally, co-creative environments can create new opportunities for IS infusion behaviors through collaboration (Feuerriegel et al., 2024; Fügener et al., 2022). Consequently, this dissertation adopts generic or multidimensional constructs to comprehensively capture IS infusion behaviors.

Collaboration with digital technology as an IS infusion behavior is based on the assumption that humans will remain integral to the workplace and will collaborate with AI, algorithms, or other digital advancements to create new value for organizations (Fügener et al., 2022) and is used to assess co-creative behavior. Recent research has focused on the theoretical concept of delegation to and from information systems (Baird & Maruping, 2021). Within this dissertation, co-creation with digital technology is regarded as the collaborative use of digital technologies through delegation. This delegation arises under three conditions. First, complementarities must exist. Second, these complementarities must be recognized by individuals who identify which tasks are better performed by themselves and which by complementary technology. Third, tasks must then be consistently delegated according to rules (Fügener et al., 2022). While this collaboration can occur at various stages of IT implementation (e.g., through the routine delegation of automated tasks), this dissertation examines such collaboration in the context of GenAI and also interprets it as an IS infusion behavior how employees use these new digital technologies in a co-creative manner to enhance and support their work.

Non-canonical affordance perception as a relevant outcome variable for IS infusion behaviors is grounded in affordance theory, which posits that various action possibilities exist that must first be recognized (i.e., perceived) to result in corresponding behaviors (see section 2.2.1). Canonical affordances describe action-possibilities that are commonly known, while non-canonical affordances describe action possibilities that might not be universally perceived, or for which the object was not originally designed. In contrast to the other variables examined, non-canonical affordance perception thus describes a precondition for IS infusion behaviors (Ostern & Rosemann, 2021). For relevant behaviors in the IS infusion stage, it is, therefore, necessary to recognize unconventional possibilities of information systems that are not apparent to everyone to fully exploit their potential. Hence, to better understand the role of the digital mindset in IS infusion behaviors, this dissertation uses not only behavior itself as an outcome variable of interest but also preceding perception.

Adaptive system use (ASU) is a concept describing active system utilization on the feature level after adoption. This theoretical concept assumes that users possess a basket of features that are ready to use, referred to as features in use. Features outside this basket are unknown or unfamiliar. ASU describes different behaviors that change the content (i.e., what features are used) and the manner of these features in use (i.e., how features are used), encompassing multiple IS infusion behaviors within a single construct (e.g., trying new features, feature substituting, feature combining, feature repurposing) (Sun, 2012). Hence, ASU comprises *what* and *how* features are used, manifests as deviations from the conventional use of IS features, and characterizes innovative use that typically occurs in the IS infusion stage more comprehensively. Unlike other IS infusion behavior constructs in the IS literature (see Table 25 in the Appendix), ASU also focuses on examining system use at the feature level, providing more precise insights into why users derive varying benefits from IT applications. Therefore, ASU was chosen as an outcome variable to comprehensively capture various IS infusion behaviors.

On the other hand, empirical research on IS infusion behaviors related to the modification of existing feature usage remains underrepresented (Nevo et al., 2016). However, specifically these behaviors hold significant relevance for companies, as they represent a highly cost-effective means of leveraging IS for enhanced effectiveness (Chan & Lim, 2020; Opland et al., 2022). At the same time, researchers posit that these behaviors necessitate distinct cognitive efforts and are thus subject to differing influences in comparison to exploratory or experimental behaviors (Sun, 2012). Hence, this dissertation also employs "exaptation," a term that was recently transferred from the management literature to IS (Andriani et al., 2017; Chan & Lim, 2020), to systematically review the existing literature pertaining to these behaviors.

Exaptation refers to a phenomenon in which a trait[4], feature, or structure that originally evolved or developed for one purpose is co-opted or repurposed for a different function. This concept is based on evolutionary theory, where the term was used to describe biological features that acquire new functions through evolutionary processes (Gould & Vrba, 1982). In the context of IS, exaptation describes how users discover and utilize features of a system in ways that were not originally intended by the designers or developers (Chan & Lim, 2020; Nambisan et al., 2017). As this concept highlights the flexibility and

[4] In evolutionary research, the term "trait" is used differently, referring to physical and biological properties (cf. Gould & Vrba, 1982).

creativity of users in finding novel value for existing digital technologies, it is particularly interesting as a relevant IS infusion behavior. Table 25 in the Appendix provides an overview of previously empirically investigated IS infusion behaviors.

Related research on the antecedents of IS infusion behaviors reveals that factors related to the organization, tasks, systems, and individuals influence IS infusion behaviors (Hassandoust & Techatassanasoontorn, 2022). The bulk of the literature has focused on individual differences and their impact on IS infusion behaviors, emphasizing the relevance of such individual differences and, specifically, IT-specific traits (Hassandoust & Techatassanasoontorn, 2022; Tams & Dulipovici, 2022). A comprehensive overview of research on the antecedents of IS infusion behaviors can be found in **Paper V**.

Consequently, this dissertation integrates employees' digital mindset as an IT-specific trait and potential precursor to IS infusion behaviors, incorporates various IS infusion behaviors within these investigations (**Papers III, IV,** and **V**), and elaborates on repurposing existing usages within these investigations (**Paper VI**). Within **Papers IV** and **V**, the focus primarily revolves around the facet of *creative cognition* related to the novel attributes of digital technologies (Hildebrandt & Beimborn, 2022) that facilitate innovative utilization (Yoo et al., 2012). To explore these effects, this dissertation approaches the examination of IS infusion behaviors through the lens of affordance theory, coupled with the dual-process theory of human cognition. Additionally, the Unified Theory of Acceptance and Use of Technology (UTAUT) was adapted, as elaborated upon later.

2.2.1 Affordance Theory

The concept of affordances finds its origins in the ecological theory of visual perception, which, in turn, traces back to World War II studies to explain why pilots, facing similar conditions, exhibited varying depth perceptions and made different predictions about flight performance (Gibson, 1979). Gibson (1979) sought to address these discrepancies by proposing that animals and their environments coexist in a complementary manner, where the affordances of the environment represent what the environment and objects in it offer to the animal.

Based on that initial definition, two divergent and opposing viewpoints have emerged regarding what affordances are. Some define affordances as dispositional environmental properties, while others view them as relational aspects between organisms and their surroundings (Seidel et al., 2018; Stoffregen, 2003). The former dispositional perspective implies a consistent realization of affordances under specific circumstances. This perspective was predominantly adapted by scholars who transferred the concept into the human-computer-interaction context to intentionally design specific affordances into a system (Norman, 1999). In the IS context, authors used the relational perspective, contending that affordances describe the potential actions that an object offers to individuals, but they depend on the user, their physical abilities, and also their goals, beliefs, and past experiences (Leonardi, 2011; Markus & Silver, 2008; Seidel et al., 2018). Consequently, this perspective interprets both human actors and technical components as real entities, as well as the potential for actions that arise from their relationship, reflecting the sociotechnical nature of information systems (Lehrig et al., 2017). As a consequence, affordances are defined as the action possibilities that emerge through the specific relationship between an actor and specific features and properties (Markus & Silver, 2008). These action possibilities emerge through the interaction of users with the technology (Leonardi, 2023). This dissertation uses the relational perspective on affordances (Anderson & Robey, 2017; Strong et al., 2014).

In the IS literature, particularly within the realm of digital innovations, affordances hold significant relevance due to the transformative effects of reprogrammability and data homogeneity, which create environments where even simple artifacts enhanced with digital capabilities can offer a multitude of novel affordances through combination and convergence (Ostern & Rosemann, 2021; Yoo et al., 2012). Scholars concur that the notion of affordances follows a three-stage progression involving their existence, perception, and actualization (Bernhard et al., 2013; Lehrig et al., 2017; Wang et al., 2018). Affordance existence encompasses all potential uses of an IT artifact and its features within an organizational context (Ostern et al., 2020). As a result of digital technologies and their inherent properties (cf. Yoo et al., 2012), there may be an abundance of virtually limitless existing affordances (i.e., outer circle in Figure 7). Consequently, in the context of digital innovation, it is particularly interesting to explore why certain individuals perceive these affordances while others do not. Affordance perception is a process influenced by the object itself (e.g., symbolic expression), external information, and the actor's goals, intentions, or beliefs (Hutchby, 2001; Wang et al., 2018). This stage entails recognizing the existence of potential actions, representing a subset of all existent affordances. This subset may also include false affordances, which do not actually exist (Bernhard et al., 2013; Lehrig et al., 2017). The final stage is the actualization of these action possibilities, or actual usage behavior, conditioned by their perception (Anderson & Robey, 2017). Figure 7 illustrates the process.

Even though the original psychological underpinnings of affordance theory emphasize the importance of perception (Gibson, 1979; Hutchby, 2001), previous affordance studies within the IS literature have predominantly focused on affordance existence and actualization (Lehrig et al., 2019). Most of these studies discuss affordances in IS contexts theoretically (e.g., Bernhard et al., 2013; Markus & Silver, 2008) or derive existent affordances of digital technologies (e.g., social media) by synthesizing perceived affordances of multiple cases (e.g., Karahanna et al., 2018; Leidner et al., 2018) (Table 26 in the Appendix provides an overview). This results in a distorted trajectory of the affordance concept in IS research, with an excessive application and utilization of the concept and a less explicit exploration thereof (Leonardi, 2023). Additionally, most of the previous studies treated existent or perceived affordances uniformly, even though some of them may be identified with regularity while others are not (Seidel et al., 2018) and may exhibit varying degrees of innovativeness (Haag et al., 2022). Considering this, a recent synthesis of affordance research has proposed an attribution of affordances as canonical and non-canonical categories (Ostern & Rosemann, 2021).

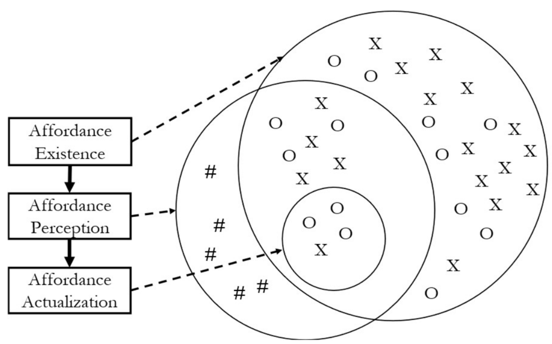


Figure 7. Illustration of affordance process; O: Canonical affordances; X: Non-canonical affordances; #: False affordances (own illustration)

Canonical affordances refer to action possibilities that are well-known and determined by social conventions (Mettler et al., 2017). Such affordances are generally understood and perceived similarly by most people. Non-canonical affordances, in contrast, pertain to action possibilities that hinge on the unique relationship between the user and the object. These affordances often signify unconventional action possibilities that might not be universally perceived or for which the object was not originally designed (Ostern & Rosemann, 2021). Within the context of IS infusion, non-canonical affordances are particularly intriguing, as they may indicate untypical potential usage behaviors that could maximize the utilization of IS.

At the same time, preliminary qualitative investigations of a digital mindset have indicated that varying levels of the digital mindset might impact the recognition and utilization of diverse affordances offered by digital technologies (Tour, 2015). Cooper and Zmud (1990) already noted that the experience of a technology over time influences its interpretation of action potentials and consequently how these features are used. Hence, it is rational to establish a link between a digital mindset and affordances, as a mindset encompasses a collection of accumulated experiences regarding various technologies and features. Consequently, these mindsets aptly encapsulate the experiences of various technologies, akin to those amassed by (Gibson, 1979; Norman, 1999), which potentially influence affordance perception.

In summary, there is limited quantitative research on affordance perception, especially in distinguishing between various types of affordances. In the context of digital innovations, the perception of affordances, particularly non-canonical ones, is noteworthy and a significant prerequisite for IS infusion behaviors. Hence, the dual process theory of human cognition was used to investigate how a digital mindset affects perception processes.

2.2.2 Dual Process Theory of Human Cognition

The dual process theory of human cognition explains human behavior by categorizing the mental operations responsible for processing environmental inputs into two distinct categories. These categories encompass automated processes that are unintentional, require low cognitive resources, are rather uncontrollable, and happen unconsciously, versus more controlled processes that happen intentionally, may consume high cognitive resources, are controllable, and happen consciously (Gawronski & Creighton, 2013). The integration of features from prior theories led to the development of a dual-system theory, which distinguishes between two mental systems: System 1 and System 2 (Gawronski & Creighton, 2013; Kahneman, 2011).

System 1, often referred to as the implicit system, encompasses fast, parallel, automatic, and associative processes, relies on associative connections, and is structured around similar associations. Consequently, the outcomes are intuitive responses that occur outside of conscious awareness. System 1 thinking evolves gradually through repetitive or intense experiences (Epstein, 2003; Gawronski & Creighton, 2013). For example, when brushing teeth, System 1 thinking is used, which does not necessitate deep reasoning or analysis.

System 2, often referred to as the explicit system, is characterized by slow, controlled, complex, and rule-based reasoning processes and relies heavily on logical rules for its operations. Consequently, the outcomes are judgments that are derived either purely from the application of logical rules or may also incorporate intuitive impressions. This implies that System 2 can consider the results generated by System 1 as additional input and may either endorse, impede, modify, or rectify the intuitive responses generated by System 1. System 2 processes can be influenced and learned more rapidly (Gawronski & Creighton, 2013; Kahneman, 2011). Exemplarily, System 2 thinking is used when analyzing which toothpaste is the best to cure cavities.

Recently, theories that view human cognition as only two processes have faced increasing criticism (Gawronski & Creighton, forthcoming), particularly concerning their distinct characterization of the two processing systems based on a multitude of characteristics (Melnikoff & Bargh, 2018). This critique arises from the observation that no single process fully embodies all these characteristics. Consequently, these theories fail to establish fixed criteria for unequivocally identifying processes as either associative or rule-based (Moors, 2014). As a result, some scholars define a process as System 1 if individuals remain unaware of the underlying processing steps, while others categorize a process as System 1 if it does not demand substantial cognitive resources for execution. As a consequence, researchers also present single or multi-process alternatives. Assumptions about the truly existent processes remain ontological statements that cannot be empirically and specifically tested. The utility of these ontological statements lies in the ability to validate the predictions stemming from these theories. To date, the majority of such confirmations are primarily associated with the theory of dual processes. Consequently, this dissertation adopts the theory of dual processes (Gawronski & Creighton, forthcoming).

Dual process theory has been applied within the realm of IS, specifically to categorize IS usage. For instance, routinization behaviors (cf. Figure 6) are typically categorized as System 1 processes, while IS infusion behaviors fall under the classification of System 2 processes (cf. Figure 6) (Limayem et al., 2007; Thatcher et al., 2018). The utilization of dual process theory has also been prominent in the context of affordance actualization, albeit less so in affordance perception. Moreover, previous research primarily investigates affordance perception, much like affordance actualization, primarily from a conscious, rule-based, and analytical reasoning (e.g., Lehrig et al., 2019). Within the scope of this dissertation, the dual process theory serves as a framework for investigating affordance perceptions, particularly in the context of IS infusion. Consequently, this dissertation distinguishes between perceived affordances originating from System 1 processes (implicit canonical or non-canonical affordances) and those stemming from System 2 processes (explicit canonical or non-canonical affordances).

In summary, there are indications that mindsets, particularly the digital mindset, can influence affordance perception, which has been little studied, although it is a precondition for their implementation. Consequently, a part of this dissertation (**Paper IV**) employs the affordance theory in conjunction with the dual process theory of human cognition to examine the impact of the digital mindset on the conscious and subconscious recognition of potential IS infusion behaviors by employees. Subsequently, other aspects of this thesis explore how a digital mindset affects innovative behavior and, therefore, affordance actualization, drawing on the unified theory of acceptance and use of technology.

2.2.3 Unified Theory of Acceptance and Use of Technology (UTAUT)

The unified theory of acceptance and use of technology (UTAUT) explains usage and adoption behaviors among individuals through their behavioral intentions for these behaviors, which, in turn, are shaped by their beliefs towards the consequences of such behaviors. It merges insights from eight diverse models originating from various domains, including social psychology, IS management, and behavioral psychology. These models collectively investigate human behavior, encompassing both general behavioral patterns and those specifically related to technology adoption and acceptance. Consequently, the UTAUT stands as a synthesis of key independent variables gleaned from established IS acceptance and usage models (e.g., TAM or TAM2), rooted in the foundational principles of the theory of reasoned action (TRA) (Fishbein & Ajzen, 1975) and its subsequent evolution, the theory of planned behavior (TPB) (Ajzen, 1991; Venkatesh et al., 2003).

These foundational models possess two fundamental assumptions: 1) the intention to do a certain behavior is a good indicator of how that behavior will actually be carried out; and 2) a person's intention to do a certain behavior depends on how they feel about that behavior, what they think is the norm, and how much control they think they have over their behavior, all of which come from their beliefs (as depicted in the upper area in Figure 8). Hence, the execution or non-execution of a specific behavior hinges on one's intention toward that behavior, with beliefs about that behavior playing a pivotal role in shaping one's attitude towards it (Ajzen, 1991; Fishbein & Ajzen, 1975). Within the fundamental theoretical and conceptual framework posited by Fishbein and Ajzen (1975), intentions for behavior comprise the best way to predict actual behavior, whereas beliefs represent an essential concept to explain these intentions. These beliefs are often used interchangeably with cognitions and are relatively broadly defined as the comprehensive body of information an individual possesses about an object, encompassing knowledge, opinions, beliefs, or thoughts related to that object. They encapsulate subjective judgments regarding an aspect of the world or the understanding of oneself and the environment.

The synthesis of the UTAUT supports the central role of beliefs within the IS context, continuing the arguments of earlier IS models that beliefs play a paramount role (cf. Figure 8). This streamlined approach excludes attitudes as explanatory variables, stemming from recognizing the sporadic association between attitudes and intentions in the IS domain, largely due to the strong influence of usage-specific beliefs (Venkatesh et al., 2003). In this vein, "performance expectancy" relates to beliefs about how using a system will improve job performance, while "effort expectancy" concerns beliefs concerning the perceived ease of system use. Additionally, it incorporates beliefs about subjective norms regarding system usage ("social influence") and beliefs about the perceived availability of "facilitating conditions". The latter includes the belief that organizational and technical infrastructure exists to support the use of the system. The UTAUT suggests that beliefs about technology use and outcomes significantly influence both intention and behavior. Instead of proposing direct effects of individual differences (e.g., age, gender) on these beliefs, the UTAUT argues that individual backgrounds moderate these influences (Venkatesh et al., 2003).

While UTAUT was originally developed to elucidate technology adoption and acceptance behaviors, it has also been extensively adapted to post-adoption contexts, where it serves to elucidate post-adoption behaviors, particularly with regard to IS infusion behaviors (Hassandoust et al., 2016). The traditional predictors for technology acceptance and continued usage have also demonstrated substantial impact on IS infusion behaviors (Hassandoust et al., 2016; Hsieh & Wang, 2007). Scholars contend that these rational-oriented predictors may prove insufficient in comprehensively explaining IS infusion behaviors, and it is imperative to transcend these predictors, given that IS infusion behaviors typically involve more self-motivated behaviors (Kim & Gupta, 2014).

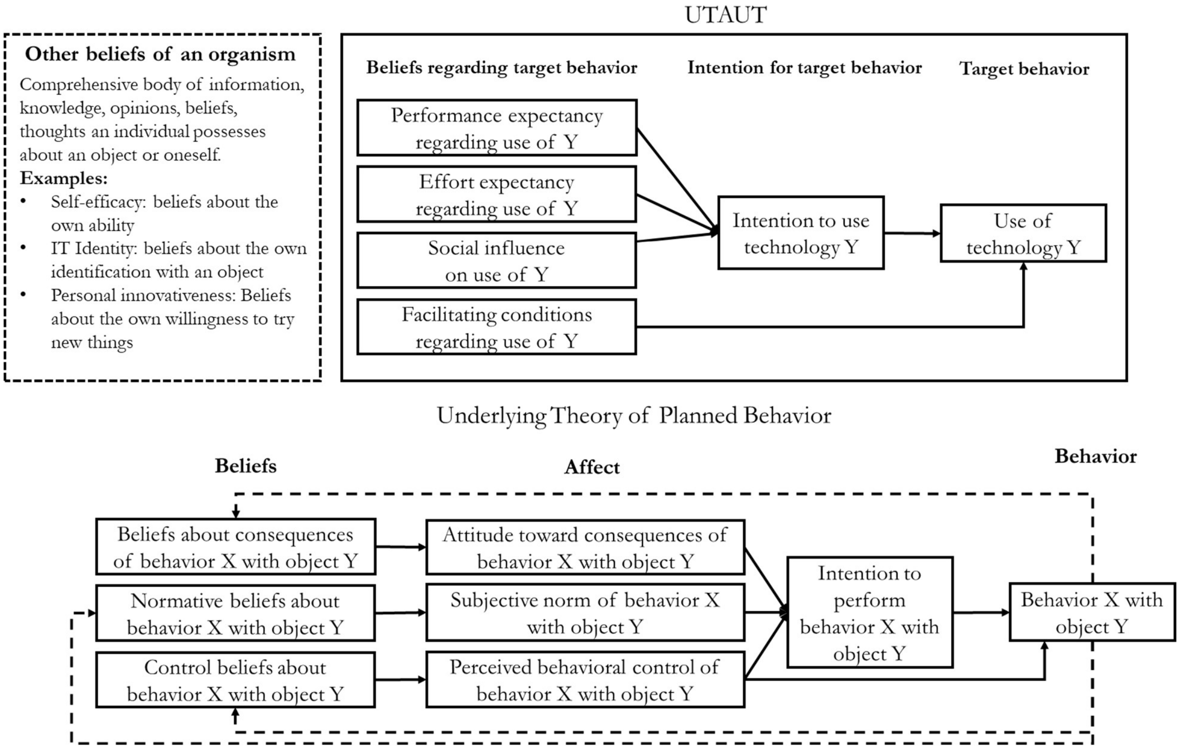


Figure 8. UTAUT and the underlying theory of planned behavior (TPB)

Also, in adoption and use contexts, other self-related beliefs pertinent to the behavior (cf. dashed box in Figure 8), such as anxiety or self-efficacy, have been shown to influence intention but are mediated by these specific beliefs regarding consequences (Venkatesh et al., 2003). This means that, advancing the assumptions of the TAM (Davis, 1989), these beliefs about the consequences (i.e., cognitive responses) of a behavior are not only determined by the features of the system itself (i.e., stimuli) but also by other cognitions, i.e., beliefs. A recent meta study also indicated that other beliefs concerning the technology itself (e.g., costs) or one's general willingness to try new technologies (e.g., PIIT) can serve as potent new predictors and can even cause traditional predictors to lose importance (Blut et al., 2022). Especially in post-adoption contexts, other beliefs, such as one's beliefs about their own IT identity, have been shown to provide a more nuanced understanding of beliefs about the consequences of specific IS infusion behaviors and actual behavioral IS infusion intentions (Carter et al., 2020). Taken together, these findings emphasize the need to broaden the conceptualization and advocate for the incorporation of new theories to comprehensively grasp the development of these predictors and mechanisms of the UTAUT, especially in post-adoption contexts such as IS infusion (Blut et al., 2022; Carter et al., 2020).

At the same time, using the definitions from the UTAUT and underlying TPB, the focus object of this dissertation, employees' digital mindset and its cognitions, can also be seen as what the original authors defined as beliefs. However, these beliefs are not tied to a specific system or a particular behavior and its consequences. Instead, they pertain to how individuals generally perceive and think about novel work paradigms, ubiquitous and newly emerging phenomena through digital innovations, and their inherent characteristics. Since these cognitive schemas cannot be directly observed, they are best represented by explicitly articulated beliefs regarding how an individual perceives (cognitive filters), evaluates (cognitive processes), and thinks about (beliefs) their environment within this context. In contrast to conventional predictive factors, the digital mindset is not centered on a specific digital technology, system, or feature. Further, it does not describe individuals' beliefs about typical ways to behave with a specific system (cf. IT habits) or systems in general (e.g., PIIT), but instead individuals' beliefs about how they think about and perceive novel work paradigms through digital technologies (cf. agile cognition), newly emerging phenomena and paradigms (cf. digital cognition), and attributes and characteristics of digital technologies and consequent opportunities (cf. creative cognition).

In summary, the UTAUT represents a well-established model within the IS domain to explain behavior, particularly emphasizing the pivotal role of individual beliefs. Further, it is stated that behaviors related to IS infusion differ in their origins from those linked to adoption and routine use. Thus, IS research must transcend conventional predictive factors. Notably, within the IS infusion context, it has been demonstrated that beliefs beyond the conventional ones wield a significant influence. Consequently, **Paper V** of this dissertation investigates the impact of employees' digital mindset, specifically the creative cognition, on IS infusion behaviors employing the UTAUT.

2.2.4 Summary

Summarizing section 2.2, various generic, multidimensional, and specific dependent variables to investigate IS infusion behaviors are utilized, and various established theories are applied to investigate the effects of the digital mindset. Figure 9 visually summarizes and merges the different theories, models, and concepts to highlight their compatibility and interconnection, illustrating an overarching research model used in **Papers IV, V,** and **VI**.

The UTAUT conceives the individual as a composition of various beliefs about an object, oneself, and one's own traits to explain behaviors. Hence, combining these theories and integrating the digital mindset as well as other IT-specific traits enhances the comprehension of UTAUT mechanisms and their effects on target behaviors. Simultaneously, the target behavior can also be interpreted as the realization of previously perceived affordances. Dual process theory has been used in the past to separate target behaviors. In this dissertation, the theory is used to separate how these affordances are perceived. Therefore, the compatibility and interconnectedness of the applied theories and the simultaneous utilization of different dependent variables collectively contribute to a holistic comprehension of how employees' digital mindset can impact IS infusion behaviors.

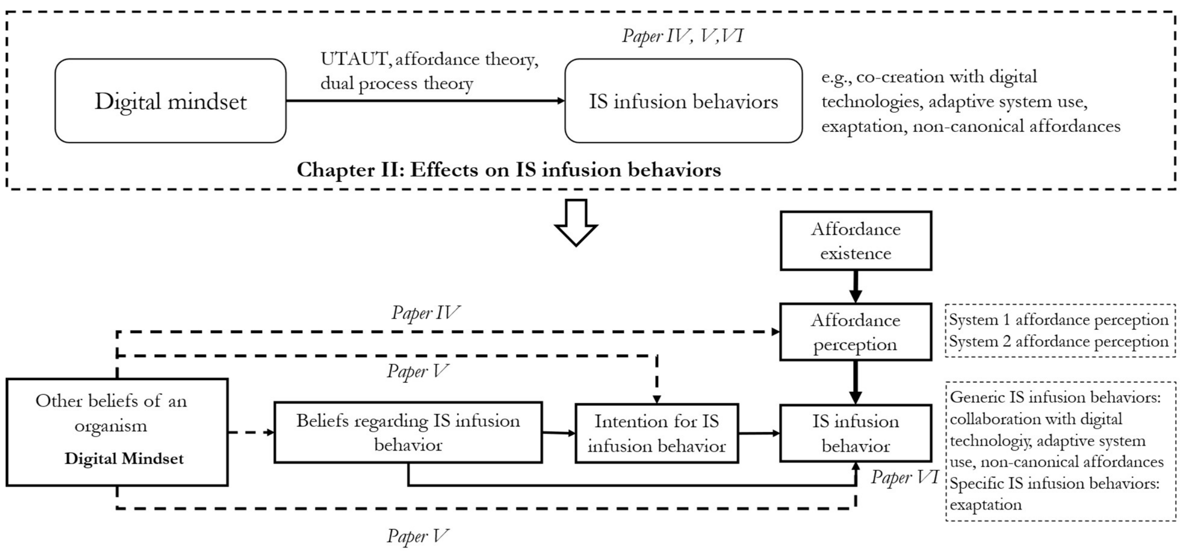


Figure 9. Compatibility and interconnection between used theories and concepts; dashed lines indicate foci of papers

This part of the dissertation explores how the digital mindset supports employees in IS infusion behaviors to contribute to an organization's digital innovation. However, the surge in digitization, new digital processes, and the growing reliance on digital technologies coming along with digital innovation also create negative effects in this new future of work, such as stress and hindering employees. Hence, Chapter III and **Papers VII** and **VIII** emphasize the digital mindset's role in technostress.

2.3 TECHNOSTRESS

Technostress[5] can be defined as the stress stemming from the utilization of information systems for tasks at work, which is frequently experienced by employees at the workplace (Ragu-Nathan et al., 2008). It stems from an individual's efforts to navigate the evolving landscape of digital technologies and their use at work and its demands on physical, social, and cognitive processes, viewing stress as a dynamic interaction with the environment (Gimpel et al., 2024; Ragu-Nathan et al., 2008).

This definition is grounded in the transactional theory of stress, which views stress not as an inherent quality of the environment or the individual but rather as a dynamic interplay between the individual and their environment. Hence, stress from stimuli or situations arises from how they are evaluated by the individual. During the initial appraisal of a situation, an individual interprets a stimulus or situation (e.g., job characteristics), categorizing it as either stressful, positive, controllable, challenging, or irrelevant. If that stimulus induces demands that are interpreted as stressful or harmful, it is perceived as a stressor (e.g., job overload). In the subsequent secondary appraisal, individuals assess the degree to which they can effectively address these stressors. If this assessment surpasses their available resources, the perceived stressor results in strains, encompassing negative psychological, behavioral, or physiological consequences (e.g., burnout or low job performance) (Lazarus & Folkman, 1984; Ragu-Nathan et al., 2008). In summary, stress happens when estimated needs are not met by available resources (Srivastava et al., 2015) (see upper area in Figure 10 for the transactional perspective on stress creation).

In the IS literature, this theory has been employed to elucidate the stress stemming from IS and their attributes, including complexity, rapid development pace, and ongoing evolution (e.g., the introduction of new features). These characteristics of IS and their use give rise to events or demands within individuals that are frequently assessed as stressful during the primary appraisal, consequently manifesting as perceived stressors. These demands are referred to as technostressors (Ayyagari et al., 2011; Ragu-Nathan et al., 2008).

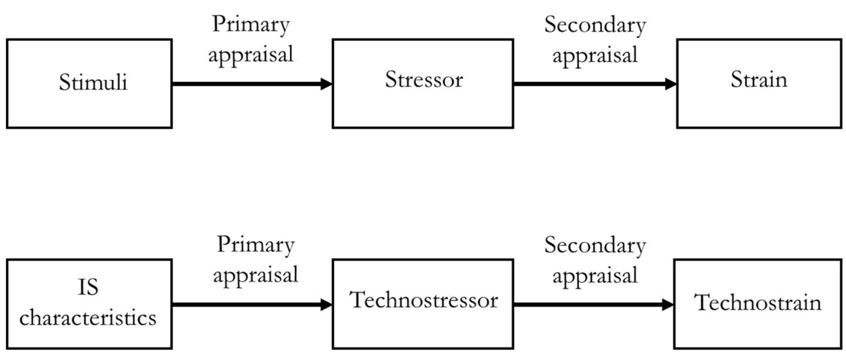


Figure 10. The transactional model of stress (upper area) (Lazarus & Folkman, 1984) and its adaptation to the IS context and technostress (Ragu-Nathan et al., 2008) (lower area).

The seminal research on technostress traditionally delineates five technostressors (Ragu-Nathan et al., 2008), widely adopted and examined for the conceptualization of the transactional process of technostress (Maier et al., 2019; Pirkkalainen et al., 2019; Tarafdar et al., 2015). *Techno-overload* refers to heightened demands for speed or extended working hours. *Techno-invasion* describes the blurring of work and personal boundaries due to digital technologies, necessitating a constant online presence. *Techno-complexity* denotes a mismatch between system complexity and individuals' proficiency, prompting the pursuit of new knowledge. *Techno-insecurity* arises from workplace apprehensions caused by features like automation. *Techno-uncertainty* stems from rapid technological evolution, fostering uncertainty and prompting continuous information updates (Ragu-Nathan et al., 2008). While additional technostressors, such as techno-unreliability (Fischer et al., 2021), IS interruptions (Tams et al., 2018), or security-related technostressors (Hwang & Cha, 2018), have been identified, this dissertation focuses on the

[5] Technostress (Ragu-Nathan et al., 2008), IS use stress (Maier et al., 2021), or digital stress (Gimpel et al., 2024) were used synonymously in the literature, defined as stress associated with the use of ICT or digital technologies (Gimpel et al., 2024; Maier et al., 2021). For the sake of consistency, this introductory paper refers to technostress, as it is employed in **Paper VIII**. **Paper VII**, however, utilizes the term IS use stress.

established five technostressors to link to existing research on the impact of various individual differences, which leverage these technostressors (Maier et al., 2019; Pflügner et al., 2021, 2023; Srivastava et al., 2015). Further, recent studies show that none of these traditionally studied technostressors is out of date (Gimpel et al., 2024).

Recent studies also provided insights that the technostress process is not always linear (Maier et al., 2019; Pflügner et al., 2023), and not all demands arising from IS characteristics are uniformly perceived as negatively stressful (Califf et al., 2020; Maier et al., 2021). These studies indicate that individuals can also view IS-induced demands as positively challenging, termed "challenging technostressors", rather than exclusively as negatively threatening, referred to as "hindrance technostressors". By considering the well-established five technostressors, this dissertation investigates linear effects and focuses on negative hindrance IS technostress.

If these technostressors surpass the individual resources to address them during the secondary appraisal process, they result in technostrains that encompass the psychological, behavioral, and physiological repercussions of these technostressors (Maier et al., 2019; Tarafdar et al., 2015). Psychological consequences may encompass diminished job satisfaction, heightened exhaustion, or the onset of burnout (Pflügner et al., 2021). Meanwhile, behavioral consequences can entail reduced job performance or an increased intention to turnover (Tarafdar et al., 2015). Physiological effects may include the release of stress hormones (Tams et al., 2014). **Paper VIII** concentrates on the psychological implications of job satisfaction and the behavioral outcomes of job performance and turnover intention, as these directly translate into substantial costs for organizations.

Existing literature has already identified numerous factors that impact the hindrance technostress process (see **Paper VIII** for a detailed overview). In addition to organizational factors such as the provision of IT support (Tarafdar et al., 2015), control mechanisms (Galluch et al., 2015), or technological aspects like IT complexity (Suh & Lee, 2017), studies demonstrate the significant role of individual differences (Maier et al., 2015; Srivastava et al., 2015). Besides direct influences of personality traits on how individuals perceive hindrance technostressors (Maier et al., 2019; Ragu-Nathan et al., 2008), these traits moderate the impact of technostressors on technostrain (Srivastava et al., 2015) and directly reduce technostrain (Maier et al., 2019; Pirkkalainen et al., 2019).

In parallel, stress literature reveals that stress mindsets, encompassing the resulting beliefs of accumulated experiences and knowledge about stress, moderate the effects of stress on one's well-being (Casper et al., 2017; Huebschmann & Sheets, 2020). Furthermore, these mindsets directly influence behavioral outcomes. Consequently, individuals with these mindsets experience fewer feelings of depression or anxiety when encountering stress and are more inclined to seek feedback rather than exhibit strain behavior (Casper et al., 2017; Jiang et al., 2019). Recent research also underscores that the experience of hindrance technostress is influenced not only by beliefs about stress but also by beliefs about the underlying causes of stress, namely digital technologies (Zielonka & Rothlauf, 2022). Hence, this dissertation turns attention towards employees' digital mindset as an influencing factor.

Besides the emphasized influence of individual factors, recent studies also highlight the IS design as part of the IS characteristic as an underexplored factor (Tarafdar et al., 2019). Unlike other characteristics, IS design can be modified to reduce ambiguous information and cognitive load. Effective design can provide visual cues or prompts to help users find the right features or information (Mirsch et al., 2017), thus alleviating stress from unclear information or missing features (Maier et al., 2021; Tarafdar et al., 2019). Consequently, **Paper VII** also includes and investigates IS design principles, specifically digital nudging.

2.3.1 Digital Nudging

Digital nudging refers to the strategic use of user-interface design elements to influence user behavior in digital environments (Weinmann et al., 2016). Nudging is a concept derived from behavioral economics and psychology, aimed at subtly guiding individuals' decisions by modifying the environment in which choices are made (Thaler & Sunstein, 2021). It leverages insights from dual process theory, which posits that human cognition operates through two systems: System 1, which is intuitive, fast, and automatic, and System 2, which is deliberate, slow, and effortful. Most daily decisions are influenced by System 1, making them susceptible to biases and heuristics (also see section 2.2.2) (Kahneman, 2011). Nudging uses this understanding to design choice architectures that make beneficial behaviors more likely without restricting freedom of choice (Thaler & Sunstein, 2021). In digital environments, this is known as digital nudging and involves adjusting user interface elements. Digital nudging can take various forms, such as graphic design, wording, or small features (Weinmann et al., 2016).

Previous literature shows several forms of nudging that posit different psychological effects to subtly steer these decisions. *Framing*, for instance, involves presenting information or decision problems in ways that affect perception to make shifts and outcomes of decisions more predictable. Framing is influenced by availability bias, as certain options are, for example, made more visually appealing and presented as more accessible (Kahneman, 2011; Mirsch et al., 2017; Tversky & Kahneman, 1973). *Status quo bias* is utilized by setting default options in decision problems, making users more likely to stick with these choices (Weinmann et al., 2016). *Social norms* influence behavior by providing information on the behavior of others. Individuals often look to the behavior of others for guidance, seeking social proof when they are unsure of the appropriate way to act in a given situation (Mirsch et al., 2017). *Loss aversion* assumes that losses and disadvantages have a greater impact on preferences than gains and advantages, and *anchoring* provides initial information to influence judgment where individuals lack information (Kahneman, 2011; Thaler & Sunstein, 2021). In the context of digital nudging, reviews showed that framing and status quo bias are the most popular digital nudges (Mirsch et al., 2017). *Framing* and *status quo bias* are also particularly interesting nudging techniques for mitigating hindrance technostress because they reduce cognitive effort and decision fatigue by pre-selecting options and making certain choices more visually appealing and accessible (Lee & Joshi, 2017; Polman & Vohs, 2016). Accordingly, this dissertation concentrates on *framing* and *status quo bias* as relevant IS design principles, respectively forms of digital nudging, to investigate their effects on hindrance technostress.

Recent research indicates that the impact of digital nudges can differ based on users' individual characteristics (Ingendahl et al., 2021). While these studies highlight the role of factors like need for cognition and uniqueness in shaping the effectiveness of digital nudges (Ingendahl et al., 2021), other research suggests that individual preferences might sometimes negate the effects of digital nudging, reducing its overall impact (De Ridder et al., 2022). Consequently, this dissertation focuses on employees' digital mindset as a factor that potentially affects these effects on hindrance technostress.

2.3.2 Summary

In summary, section 2.3 delineates the concept of technostress, which arises from the demands generated by IS characteristics, perceived as hindrance technostressors, leading to adverse outcomes known as technostrains. Hindrance technostress can be influenced by a combination of organizational, technological, and individual factors, which shape the perception of stressors, the experience of technostress, and behavioral responses.

Prior research on stress established the moderating effects of stress-related mindsets on stressors and their direct influence on strains, providing evidence suggesting that beliefs regarding the causal factors can impact the stress experience. Further, literature on hindrance technostress showed moderating effects of individual differences and indicated the relevance of the design of IS as an influential factor. Hence, this dissertation links to previous IS research on hindrance technostress and stress research on individual differences affecting hindrance technostress experience by including employees' digital mindset as an influencing factor. Figure 11 shows the research model designed to explore the role of IS design and employees' digital mindset for hindrance technostress.

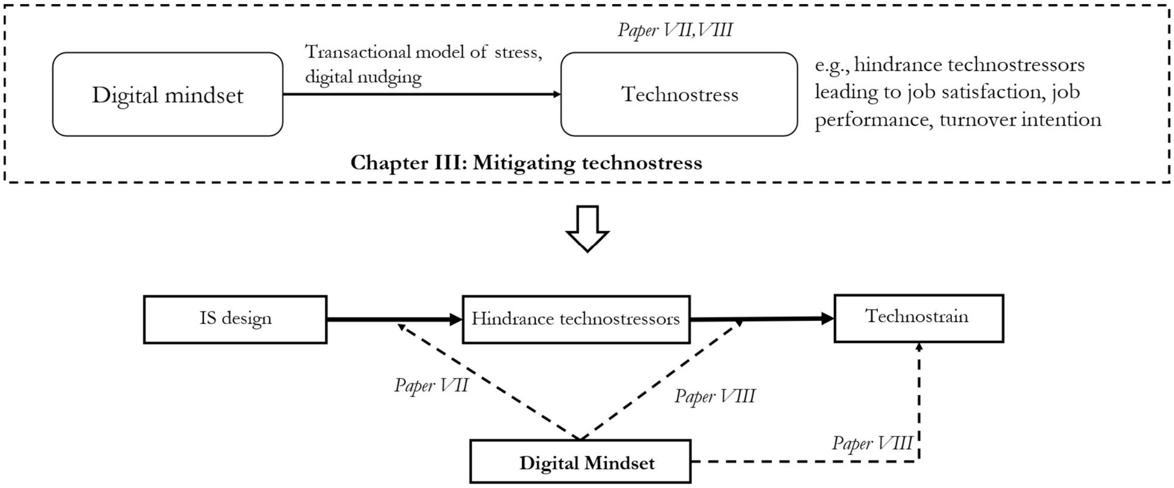


Figure 11. Research model of this dissertation to study digital mindset effects on hindrance technotress.

2.4 RESEARCH QUESTIONS

Practitioners' and scholars' frequent mention and commendation of employees' digital mindset formed the overarching research question of this dissertation: **What is the digital mindset and why should organizations consider employees' digital mindset within the context of digital innovation?** This question is answered by five distinct research questions that contribute to three specific research objectives. These objectives are aimed at understanding what the digital mindset is (research objective 1), elucidating its role in fostering IS infusion behaviors as valuable behaviors in the realm of digital innovation (research objective 2), and ultimately exploring its potential to mitigate technostress (research objective 3). Figure 12 visually represents these research questions and their contributions to the overarching research objective and general research question.

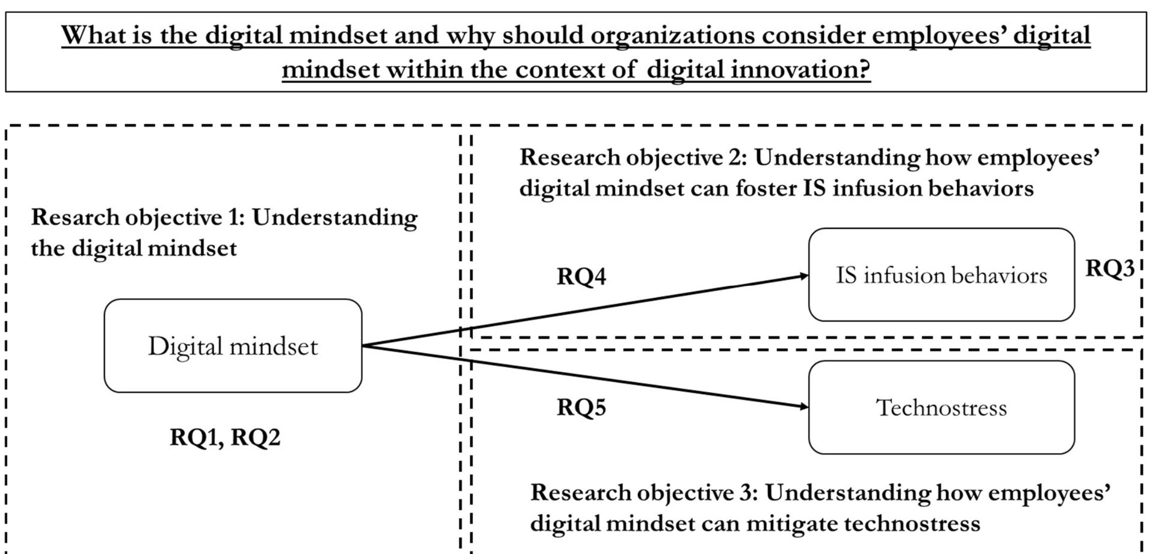


Figure 12. Research questions (RQ) and research objectives of this dissertation

2.4.1 Research Objective 1: Understanding the Digital Mindset

Both researchers and practitioners underscore the significance of cultivating a digital mindset among employees within the context of digital innovation (see section 2.1.3.), emphasizing its significance for enabling the correct utilization of digital technologies and enhancing organizational innovation (Davison & Ou, 2017; Grover et al., 2022; Lucas & Goh, 2009). Despite initial efforts to approach the notion of a digital mindset in related disciplines (Allen, 2020; Solberg et al., 2020), the IS literature lacks a systematically derived definition, conceptual framework, and operationalization. Consequently, several challenges arise from this research gap. Firstly, as the precise meaning of the term "digital mindset" is unclear, it is difficult for organizations to anticipate how it can be effectively nurtured among employees. Secondly, the use of the same term to refer to disparate concepts in different contexts, such as synonymously with the agile mindset (van der Meulen et al., 2020), leads to ambiguity and inconsistencies, preventing cumulative knowledge development. Thirdly, existing literature concludes effects and potential benefits for organizations, but these cannot be empirically quantified, verified, and investigated due to the absence of a conceptualization and operationalization of the construct. Hence, an integrated definition, conceptualization, and measurement model are essential to establish the theoretical groundwork for the digital mindset construct and phenomenon. It holds importance for researchers as it facilitates the conduct of both quantitative and qualitative studies. Also, it is valuable for practitioners as it enables systematic approaches for digital mindset development programs and the empirical assessment of its presence among employees within an organization. To build an understanding of the digital mindset, this dissertation asks the research question:

Research question 1: *How can the digital mindset be conceptualized and operationalized?*

Literature suggests that cognitive parameters will be increasingly relevant in the future of work, as employees outside IT will also be impacted by new digital technologies and consequential co-creative environments (McKinsey, 2024; Opland et al., 2022). Hence, it is important to better understand parameters that are relevant across the entire workforce. We know that employees' digital mindset is a cognitive aspect that is frequently indicated as crucial for the future workforce (Weritz, 2022). At the same time, we only partially understand the direct value of employees' digital mindset and how organizations can anticipate or develop it within their workforce, making it unclear how and if organizations should pursue investments in developing their employees' digital mindset or expand the talent acquisition pool to find prospective employees. Consequently, an understanding of the nomological net of employees' digital mindset in the context of the future of work holds significance regarding two key aspects. It aids in gauging the extent to which potential trainable factors, such as experiences, influence the formation of a digital mindset. This knowledge is valuable in leveraging existing training for the existing workforce or anticipating the presence of a digital mindset in prospective employees. Also, it provides insights into the role of such a mindset for relevant behaviors of employees in the future of work, enabling a more comprehensive understanding of the role of such factors when aiming to optimize the future workforce. Thus, the second research question aims to better understand the antecedents and consequences of the digital mindset that are relevant in the future of work:

Research question 2: *How can employees' digital mindset be developed and how does it affect behaviors relevant in the future of work?*

2.4.2 Research Objective 2: Understanding How Employees' Digital Mindset Can Foster IS Infusion Behaviors

Prior research on IS infusion behaviors has revealed the inclusion of a wide spectrum of behaviors (see section 2.2). Within these individual behaviors, there is often a range of innovative actions. For instance, trying and combining new features is frequently equated with more complex innovative behaviors such as repurposing, although these behaviors substantially differ in terms of cognitive effort and cost-efficiency (Sun, 2012). Within the digital context, generativity, and deferred binding, precisely these potential behaviors hold particular interest for organizations (Yoo et al., 2010). Exemplarily, the innovation literature adapted the concept of "exaptation," borrowed from evolutionary theory (Andriani et al., 2017), which is relatively unexplored within IS research, where similar but scattered concepts, such as IT reinvention (Nevo et al., 2016), unethical code reuse (Sojer & Henkel, 2010), or feature repurposing (Sun, 2012), have been used. Conducting a review of the existing literature pertaining to these specific behaviors offers researchers insights into the extent to which such IS infusion behaviors have been studied, providing specific avenues for further investigation and an overview of usable constructs to empirically investigate such behaviors, particularly concerning their facilitation, as these behaviors represent a cost-effective and readily apparent approach for companies and employees to fully harness the potential of digital innovations. Hence, as a starting point, this dissertation formulates research question 3 to better understand how employees' digital mindset can foster IS infusion behaviors:

Research question 3: *How have specific IS infusion behaviors been investigated in IS?*

Research on IS infusion behaviors has highlighted the pivotal role played by individual differences in shaping IS infusion behaviors (Hassandoust & Techatassanasoontorn, 2022), and the beliefs of individuals unrelated to the IS infusion behavior also influence its execution (Carter et al., 2020). In line with this, a meta-analysis shows the importance of including various traits, especially IT-specific traits, in examining IT usage behavior (Blut et al., 2022). The literature also indicates a limited understanding of factors that lead to affordance perception (Lehrig et al., 2019), which is an essential precursor to these behaviors. At the same time, findings from literature in other disciplines suggest that context-specific mindsets predominantly impact innovative work behaviors (Janssen & van Yperen, 2004). Qualitative studies in the IS literature also posit that a digital mindset plays a pivotal role as a critical precursor to an organization's innovative capabilities and indicate that it changes the interaction with and perception of technology affordances (Davison & Ou, 2017; Grover et al., 2022; Tour, 2015). However, these propositions remain untested, despite the intriguing possibility that such a digital mindset, with its broad influence on sensemaking, could serve as a potent, technology-independent variable, significantly affecting individuals' behavior and reshaping perceptions of systems or tasks. It operates as a central yet malleable control mechanism compared to previously explored traits, with the potential for cascading effects on various narrower IT-specific traits. Hence, investigating employees' digital mindset and its effects on IS infusion behaviors adds valuable empirical verification of previous indications and can serve as a rationale for managers to justify the implementation of digital educational initiatives, specialized training, or employee allocation. For a better understanding of how employees' digital mindset can foster IS infusion behaviors, this dissertation asks:

Research question 4: *What is the role of employees' digital mindset for IS infusion behaviors?*

2.4.3 Research Objective 3: Understanding How Employees' Digital Mindset Can Mitigate Technostress

Prior research focused on mitigating technostress within the workplace context has demonstrated that individual differences assume a crucial role in mitigating technostress (see section 2.3). These individual differences can fundamentally alter the direct perception of stressors, shape the transformation of stressors into strains, and directly impact the experience of technostrain (Maier et al., 2019; Srivastava et al., 2015). Additionally, recent studies highlight IS design as an underexplored factor that impacts these stressors (Tarafdar et al., 2019). Simultaneously, the stress literature has elucidated the role of mindsets as individual differences that moderate the effects of stressors on strains and directly influence the experienced strains (Casper et al., 2017; Huebschmann & Sheets, 2020). Hence, it is assumed that mindsets, rooted in accumulated experiences from prior stressful events, can act as moderators in the context of technostress. Recent studies indicate that it is not just individuals' prior stress experiences that are pertinent, but also their experiences with the stress-inducing stimuli (Zielonka & Rothlauf, 2022). Therefore, by examining the concept of the digital mindset in the context of technostress, we can improve our understanding of how employees can become more resilient to stress in the era of ubiquitous digital innovations. This resilience might not be dependent on their past stress-related experiences but rather on their mindset about the stress-creating stimuli (i.e., digital technologies). To get a deeper understanding of how a digital mindset can effectively mitigate technostress, this dissertation asks:

Research question 5: *What is the role of employees' digital mindset in mitigating technostress?*

To answer the research questions, the different papers of this dissertation use a variety of research methods introduced in the following section.

3 Research Design, Methodology, and Data Analysis

A research design offers guidance on the most suitable approach for answering a specific question and provides a framework for collecting, measuring, and analyzing data (Bhattacherjee, 2012; Recker, 2021). Various research designs have been selected to address the specific research questions and aspects. Each paper can be categorized along different spectra of *aim, strategy, boundary, setting, timing, and ambition* (Recker, 2021), as seen in Figure 13. *Aim* defines research goals as exploratory or explanatory; *Method* details procedures for addressing qualitative or quantitative research questions; *Boundary* sets research limits tied to chosen strategies; *Setting* distinguishes real-world from controlled environments; *Timing* contrasts longitudinal and cross-sectional studies; *Ambition* separates understanding-focused research from designing-focused research (Recker, 2021).

These spectra represent a continuum, with research projects combining diverse elements. Figure 13 illustrates the integration of various designs and strategies to address the research questions, both in the dissertation and individual papers.

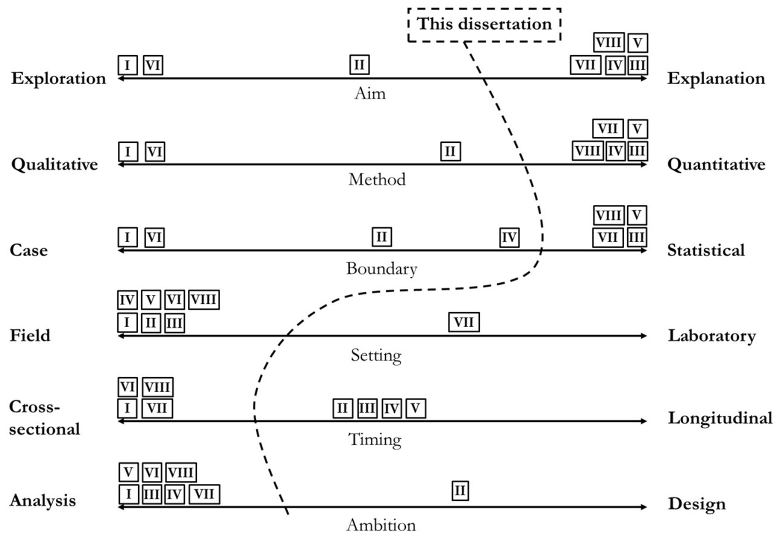


Figure 13. Research design choices throughout this dissertation (squares indicate location of papers, culminating in the dashed line representing the overall research design)

Research design hinges significantly on the chosen methodology, often referred to as research strategy, which encompasses quantitative, qualitative, design, and computational techniques. However, since this dissertation only employs quantitative and qualitative strategies, this chapter focuses solely on discussing these, their combined use (mixed methods), and involved research methods, each with distinct forms of data collection and analysis (Recker, 2021), as outlined in Figure 14.

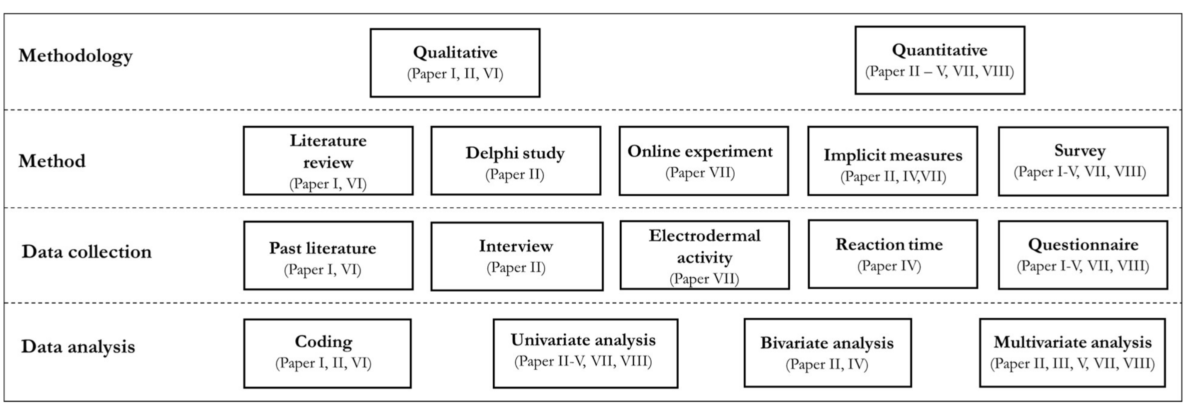


Figure 14. Overview of the applied methodology, methods, and analyses in this dissertation

3.1 Research Methodology

Quantitative research employs numerical data to understand and explore relationships within phenomena (Adams et al., 2007; Recker, 2021). While statistical analysis tools are often associated with quantitative methods, they are not always obligatory for conducting quantitative research (Recker, 2021).

In IS research, quantitative methods typically follow a hypothetico-deductive model, forming hypotheses to test relationships between variables. This approach aims to confirm or reject theories and establish general laws about reality (Recker, 2021). Most papers in this dissertation (**Papers II-V**, **VII,** and **VIII**) utilize quantitative methods.

Qualitative research aims to deeply understand phenomena that have received limited study or remain incompletely understood (Recker, 2021). Unlike quantitative methods, they do not focus on the collection of numerical data; instead, they focus on capturing words expressed through mediums such as text, audio, or video, gathered through exploratory interviews, open survey questions, or observations (Bhattacherjee, 2012). They are typically used for theory formation, concept development, and construct understanding (Recker, 2021). In this dissertation, qualitative methods are employed in **Papers I, II,** and **VI**, with **Paper II** utilizing mixed methods combining qualitative and quantitative approaches.

Mixed methods involve using multiple research methods within a single project, as seen in this dissertation, where both quantitative and qualitative methods are utilized (Recker, 2021; Venkatesh et al., 2013). Unlike multimethod approaches, which use various techniques within a single method, mixed methods integrate techniques from two distinct research methods (Recker, 2021; Venkatesh et al., 2013), which can be applied concurrently or sequentially. This approach is valuable for addressing both exploratory and confirmatory research questions, leveraging the strengths of each method while mitigating their weaknesses. For example, **Paper I** uses a multimethod approach, while **Paper II** adopts a sequential mixed-method approach for scale development, aiming for both development and triangulation objectives.

3.2 Methods

Different methods are applied in this dissertation, including literature reviews, a Delphi study, a sentence completion approach, implicit association tests, and surveys (see Figure 14). Literature reviews are a crucial step in rigorous research to identify gaps, but when systematically conducted, they can also stand alone as a research technique.

3.2.1 Literature Review

A literature review involves the consolidation, description, synthesis, and critical interpretation of past literature and materials without the collection of primary data (Cooper, 1988; Rowe, 2014). The focus of a literature review is on summarizing the substance of the past literature, including methodologies and findings, and drawing conclusions, such as flaws or future research avenues, from it (Cooper, 1988).

While such a review can also involve the analysis of numerical data, as exemplified by the meta-analysis of existing empirical studies (Blut et al., 2022), this dissertation primarily centers on the words and text (i.e., formulated findings) found in the literature. Hence, it is interpreted in this dissertation as a technique that is part of a qualitative research strategy. As such, they provide an explorative opportunity to consolidate existing findings on emerging topics, creating a robust starting point for further investigations (Rowe, 2014).

In the IS literature, research has identified a total of nine distinct types of literature reviews, each distinguished by seven key characteristics (Pare et al., 2015). The type depends on the overarching goal, scope, search strategy, nature of primary sources, explicitness in study selection, quality appraisal, and the methodology employed for analysis (refer to Table 3 for details). This dissertation applies umbrella and scoping literature reviews.

An umbrella literature review integrates findings from multiple reviews to address a specific research question in rapidly evolving domains. It follows the methodological standards of systematic reviews but focuses on synthesizing findings for a very specific research query, resulting in outcomes like concept matrices (Webster & Watson, 2002) tailored to the research question rather than a general overview (Pare et al., 2015).

A scoping literature review offers an initial overview of prior research on a specific topic, assessing the breadth and extent of existing literature. Specifically, it seeks to understand the depth of investigation, methods, research quantity, and approaches employed in examining the phenomenon without delving deeply into the results themselves (Pare et al., 2015). Both types of literature reviews necessitate and adhere to a systematic approach (Pare et al., 2015; Rowe, 2014), wherein the quality hinges on the collection, filtering, and content analysis of relevant literature.

Table 3. Typology of literature reviews based on (Pare et al., 2015) and utilized types in this dissertation (grey rows)

Goal	Type	Scope of research question	Search Strategy	Source Type	Explicit Study se lection	Quality Appraisal	Methods for content analysis
Summary of prior knowledge	Narrative review	Broad	Usually Selective	Conceptual/ empirical	No	No	Narrative summary
	Descriptive review	Broad	Representative	Empirical	Yes	No	Content/frequency analysis
	Scoping review	Broad	Comprehensive	Conceptual/ empirical	Yes	Not essential	Content/thematic analysis
Data aggregation and integration	Meta-analysis	Narrow	Comprehensive	Empirical (quant.)	Yes	Yes	Statistical analysis
	Qualitative systematic review	Narrow	Comprehensive	Empirical (quant.)	Yes	Yes	Narrative synthesis
	Umbrella review	Narrow	Comprehensive	Systematic Reviews	Yes	Yes	Narrative synthesis
Explanation building	Theoretical review	Broad	Comprehensive	Conceptual/ empirical	Yes	No	Content analysis
	Realist review	Narrow	Iterative/ purposive	Conceptual/ empirical	Yes	Yes	Mixed-method approaches
Critical Assessment	Critical review	Broad	Selective/ representative	Conceptual/ empirical	Yes or no	Not essential	Content analysis

Collecting relevant literature involves defining databases and websites, establishing selection criteria for publication outlets and periods, and identifying search terms. In the IS domain, various rankings help select relevant outlets (Fink, 2010). In the IS domain, various rankings help to select relevant outlets. Harzing's journal quality list[6] (subject area "Management Information Systems") serves as a metaranking, offering an overview of 12 distinct journal rankings. It includes the VHB Jourqual 3 ranking[7] (subject area "Wirtschaftsinformatik"), prominent in the German community, and the internationally esteemed Senior Scholar Basket of 8[8]. To ensure comprehensive coverage, various synonyms and related terms should be incorporated into the search terms (Rowe, 2014; Webster & Watson, 2002). During the filtering process, the results obtained from the collection phase are systematically refined to identify relevant papers. This involves screening titles and abstracts, followed by a thorough examination of the full text to align with the research question of the literature review. Additionally, forward and backward searches are conducted to further expand the pool of relevant papers.

During the step of analysis, the utilization of concept matrices is recommended as an effective approach to succinctly summarize the key findings from the literature (Webster & Watson, 2002). When conducting scoping literature reviews, standardized questions should be employed that aid the structured extraction of information related to methodologies, theories, or types of results (Pare et al., 2015).

Paper I conducts an umbrella literature review to conceptualize the digital mindset. Using Proquest, AIS, and EbscoHost databases, essential concepts, encompassing requirements, drivers, phenomena, or characteristics related to digital innovation are identified and extracted from literature to derive corresponding thinking patterns based on past literature. From the initial 7929 results, 1378 articles explicitly mentioned digital innovation in their titles or abstracts, along with 42 articles that conducted literature

[6] https://harzing.com/resources/journal-quality-list
[7] https://vhbonline.org/vhb4you/vhb-jourqual/vhb-jourqual-3/tabellen-zum-download
[8] (which has since expanded to 11 journals, adding the journals *Information & Management*, *Information and Organization*, and *Decision Support Systems* to form the Senior Scholar List of Premier Journals (https://aisnet.org/page/SeniorScholarListofPremierJournals). During the time of the conducted literature reviews, it was adhered to the Senior Scholar Basket of 8.

reviews and 16 articles that addressed or contained crucial concepts. Five publications were added that were uncovered through the search terms and were not included in literature reviews but deemed relevant due to their topicality (published in or later than 2020). The identified concepts were systematically summarized and presented through a concept matrix.

Paper VI conducts a scoping literature review to grasp how the concept of exaptation has been explored within IS research. To ensure comprehensive coverage, the review incorporated the Journal Quality List, the Senior Scholar Basket of 8, and journals with VHB Jourqual ratings up to and including B. Given the novelty of the phenomenon, the review also encompassed contributions from the AIS conferences, resulting in a total of 22 relevant outlets. Initially, 6290 articles were identified, which were narrowed down to 198 after title and abstract screening. After full-text screening, 46 relevant papers were identified. The review systematically extracted data using standardized questions and synthesized the findings narratively.

3.2.2 Delphi Study

The Delphi method is a qualitative research approach that gathers insights from independent experts on a specific topic. It is valuable when statistical methods are not suitable but relevant experts are accessible (Schmidt, 1997; Skinner et al., 2015). This method is effective in areas lacking consensus or incomplete research, as expert judgments and their systematic structuring and organization help bridge these gaps (Powell, 2003).

The Delphi method relies on a panel of experts who contribute anonymously and independently, undergo multiple rounds to collect, confirm, or justify responses, and incorporate iterations and feedback (Skinner et al., 2015). Research has shown that the size of the expert panel does not significantly impact decision-making effectiveness (Boje & Murnighan, 1982). Typically, panels are relatively small, comprising between 10 and 30 experts, with three structured rounds considered sufficient (Rowe & Wright, 2001). Each phase serves as a foundation for the subsequent one, culminating in consensus. In the IS domain, ranking Delphi studies are employed to determine the relative importance of concepts and issues (Schmidt, 1997; Skinner et al., 2015).

In the initial phase, experts provide numerous concepts, which are consolidated and clarified. In the narrowing-down phase, a selection of top concepts is made. In the ranking phase, remaining concepts are randomized and ranked often in a top-10 selection. Consensus on importance is determined using Kendall's W and standard deviation (Schmidt, 1997).

Delphi studies gather collective expert wisdom, enhancing content validity while also being straightforward, cost-efficient, and flexible, especially useful in areas with uncertainty and scarce data. Further, it provides flexibility to manage responses and subsequent phases while involving experts from diverse locations. Challenges in Delphi studies include validity concerns in panel selection, high drop-out rates, low response rates causing delays, and survey biases leading to hasty responses (Hung et al., 2008).

Paper II of this dissertation employs a Delphi study as a component to develop a scale for measuring digital mindset and its associated thinking patterns, including exponential, data-driven, combinatorial, and generative thinking. Initially, 50 experts provided characteristics for each pattern, which were consolidated into questionnaire items. Then, 26 experts evaluated and rated the top candidates, followed by a ranking phase to identify the most suitable items. Ultimately, four items were derived for each pattern, forming the basis for the scale's development.

3.2.3 Online Experiment

Controlled experiments enable researchers to manipulate independent variables of interest while controlling for extraneous variables, offering the most robust method for establishing causal relationships among empirical methods (Recker, 2021). Traditionally, experiments were conducted in physical settings during the 20th century (e.g., in laboratories). However, advancements in digital technology have enabled the execution of experiments without physical interaction with participants. These virtual interactions, known as online experiments, provide greater efficiency in terms of faster and more cost-effective data collection. Further, they offer enhanced external validity by better representing diverse populations and real-world situations. Online experiments are typically defined as those conducted in digital environments investigating online behavior (Fink, 2022; Recker, 2021).

Experimental design plays a crucial role in structuring research studies to ensure valid and reliable results (Broota, 1989; Recker, 2021). The within-subjects design, also known as repeated-measures design, involves the same participants being exposed to all conditions or treatments of the experiment. This design allows for direct comparison of the effects of different treatments on the same individual, thereby controlling for individual differences that might otherwise confound the results. On the other hand, between-subjects design involves different groups of participants, each of whom experiences only one condition or treatment. This approach prevents carryover effects and interactions between treatments (Recker, 2021).

Most experimental studies involve a factorial design, which describes how many independent variables (i.e., treatments) are manipulated. It can be differentiated between one-factorial, unifactorial, and multifactorial designs. A one-factorial design, also known as a single-factor design, involves only one independent variable. This type of design is straightforward and helps isolate the effect of a single factor on the dependent variable, making it easier to interpret the results without the complexity of interactions with other variables. Unifactorial design is similar to one-factorial design, as it also involves a single independent variable, but it can have multiple levels or conditions. For instance, if the independent variable is the type of training program, a unifactorial design might compare three different programs to assess their impact on performance. Multifactorial design, on the other hand, includes two or more independent variables, each potentially having multiple levels. This design type enables researchers to investigate not only the main effects of each independent variable but also the interaction effects between them. By examining the combined influence of multiple factors, multifactorial designs offer a comprehensive understanding of the complex interplay between variables, providing deeper insights into the phenomena being studied (Recker, 2021).

Paper VII uses a between-subjects design online experiment with a unifactorial design to investigate digital nudging effects on hindrance technostressors and moderating effects of employees' digital mindset. 214 participants were instructed to solve a task on an online website, followed by surveys. The independent variable (i.e., factor) was a specific form of nudging during the task. Participants were randomly assigned to a framing nudge condition, a default setting condition, or a condition with no digital nudges present. Afterwards, information on the dependent and moderating variables was gathered using a questionnaire.

3.2.4 Implicit Measures

In psychology, aside from explicit measures, indirect or implicit methods are utilized to explore concealed dimensions of the human brain (Rudman, 2011; Serenko & Turel, 2019). These methods are crucial as explicit traits represent only a fraction of brain processes, with much occurring subconsciously. Implicit measures, highlighted in IS literature, encompass accessibility-based, interpretation-based, neurophysiological, and association-based tests (De Guinea et al., 2014; Serenko & Turel, 2020; Uhlmann et al., 2012).

Accessibility-based tests aim to assess the accessibility of concepts within participants' minds with tasks like lexical decision tasks, word fragment assessments, and Stroop tasks (Serenko & Turel, 2019, 2020; Uhlmann et al., 2012). Interpretation-based measures operate on the assumption that when individuals encounter ambiguous stimuli, they draw upon their accessible beliefs, attitudes, and motivations for their interpretation, using tests like thematic apperception (Murray, 1951) and sentence completion (Uhlmann et al., 2012). Neuropsychological approaches employ methods such as pupillary distances and functional magnetic resonance imaging (fMRI) to assess subconscious processes under the emerging field of NeuroIS (Riedl et al., 2020). Association-based measurements explore implicit associations between a target construct and specific attributes, revealing how a target construct (e.g., IT employee) is subconsciously linked with certain attributes (e.g., gender: male vs. female) (Serenko & Turel, 2020).

Paper II uses an interpretation-based approach through a sentence completion approach and an association-based approach in **Paper IV** employing an implicit association test. **Paper VII** uses electrodermal activity.

Sentence Completion Approach

Sentence completion approaches are a type of psychological assessment that indirectly measures thoughts, emotions, and attitudes by having individuals complete unfinished sentences. The results are text-based data, making this technique primarily qualitative, although it is often quantified through scoring. Participants are usually unaware of the specific measurements, enabling less conscious control over outcomes (Lah, 2001).

Sentence completion tests present individuals with sentence stems to express thoughts and feelings indirectly, typically related to personality traits or emotions. The method assumes that completing sentence fragments immerses respondents in corresponding scenarios, eliciting associated thoughts and feelings (Rogers, 2003; Sacks & Levy, 1950). Instructions prompt respondents to answer spontaneously, with the length of the stem affecting response breadth and interpretability (Rogers, 2003). Responses can be oral or written, and careful administration is vital to avoid bias. Completed fragments are scored, often by associating them with the measurement construct and validating them through expert consensus (Lah, 2001).

Raised criticisms regarding sentence completion approaches and interpretative implicit measures in general primarily concern the scoring process and the subsequent quantification of results, as well as their predictive validity. Inter-rater reliability and rater biases assume significant importance within this context (Garb, 1999).

Paper II uses a sentence completion approach adhering to recommendations in (Lah, 2001; Rogers, 2003). Structured interviews were used to measure the thinking patterns associated with the digital mindset via a sentence completion approach and compare the results with survey responses to closed questions. Two relatively long stems were developed per pattern to enhance immersion. The survey, conducted in interviews averaging 37 minutes, included 18 students and 24 practitioners, with responses scored by two independent experts. Reliability and validity were addressed through clear construct definitions and objective inter-rater reliability scoring.

Implicit Association Test

Another implicit method is the Implicit Association Test (IAT), developed as an improvement over evaluative priming to address technical complexity, time consumption, and sensitivity issues (Greenwald et al., 2009). Due to its simplicity and accessibility, the IAT is widely recognized as the most prominent approach for measuring implicit attitudes (Serenko & Turel, 2020), notably used in research on racism (Greenwald et al., 1998). In the field of IS, IATs have been utilized to gauge implicit attitudes toward systems or features (Serenko & Turel, 2019). However, the test can be adapted to assess various implicit cognitive processes, encompassing memory, perception, or self-esteem (Greenwald et al., 1998). Essentially, the IAT measures the subconscious association between a stimulus and a target attribute.

In **Paper IV**, two online-based IATs were conducted to measure and compare implicit affordance perception when using Microsoft PowerPoint, based on different digital mindset levels, using established guidelines (Serenko & Turel, 2020). The procedure involves participants categorizing stimuli displayed on the screen using buttons, with reaction time measured in milliseconds. Shorter reaction times indicate stronger implicit associations. The IAT procedure is detailed further below (see Figure 15).

The core elements of the IAT are *target constructs*, *non-target constructs*, an *attribute*, and a *set of stimuli*. The stimuli represent the target construct, non-target construct, and attribute. In **Paper IV**, the first IAT aims to assess the degree to which individuals implicitly perceive canonical affordances (*target construct*), while the second aims to gauge the implicit perception of non-canonical affordances (*target construct*) of Microsoft PowerPoint. In essence, these tests aim to evaluate the extent to which subjects associate these use cases with the *attribute* of usefulness. Given that affordances describe action possibilities of use, the study assumes that the categorization of affordances as useful inherently describes their perception as such an action possibility. In both IATs, target constructs are compared to non-affordances (*non-target construct*), which contrasted in terms of the corresponding attribute. Therefore, no direct comparison of canonical and non-canonical affordances is possible in a test because they are not opposed to each other. Hence, it is imperative to ensure that the non-target construct remained unassociated with the included attribute (Serenko & Turel, 2020), which is confirmed through a preliminary study in which non-affordance stimuli were unequivocally classified as not useful (see **Paper IV** for details).

Representative stimuli were selected that are similar in visual and semantic processing. A preliminary survey in **Paper IV** gathered and validated a diverse set of canonical and non-canonical affordances of Microsoft PowerPoint. Synonymous stimuli for the attribute categories of "useful" and "useless" were formulated using the Merriam-Webster dictionary. Each target construct, non-target construct, and attribute contains a minimum of 5 stimuli or representative words. Table 4 lists all stimuli.

Table 4. Target constructs, non-target construct, attributes and stimuli lists

Target Concept Category	Stimuli	Avg. # of letters
Canonical Affordance (PPT use case) (IAT 1)	Conducting Trainings, Creating Lectures, Editing Slides, Knowledge Sharing, Presentation, Presenting Graphs, Sales Presentation, Slide Creation	16.13
Non-Canonical Affordance (PPT use case) (IAT 2)	Creating Games, Artwork Creation, Calendar Management, Creating Flip Books, Instagram Stories, Photo Editing, Puzzle Creation, Social Media Images	16.13
Non-Affordance (No PPT use case) (IAT 1 & 2)	Data Encryption, Downloading Games, Instant Messaging, Internet Browsing, Lost File Recovery, Music Streaming, Online Payments, Virus Scanning	16
Attributes		
Useful	Applicable, Beneficial, Effective, Practical, Productive, Profitable, Valuable	8.8
Useless	Ineffective, Irrelevant, Nonfunction, Purposeless, Senseless, Valueless, Worthless	9.3

The actual test comprises 7 blocks where stimuli for each target construct and attribute appear randomly, sorted into categories on the right and left. Combinations of constructs on the corners change in each block (Greenwald et al., 1998). In **Paper IV**, the test was generated using IATgen[9] and imported into Qualtrics, where the keys "E" (left) and "I" (right) are used for categorization. Given the theoretical nature of canonical, non-canonical, and non-affordances, they were relabeled as "PPT Use Case" and "No PPT Use Case" in the test. Blocks 1 and 2 serve as practice blocks, with one category in each corner. Block 5 is a practice block for swapping category sides. Blocks 3, 4, 6, and 7 combine target and non-target constructs with the attribute category. Each combined block includes a practice session with 20 stimuli and a measurement block with 40 stimuli. Table 5 summarizes the different steps of the IAT.

Figure 15 illustrates a snapshot of the fourth block of the first IAT, with 40 random stimuli presented sequentially for categorization as "PPT use case" or "No PPT use case," and as "useful" or "useless". For example, when "creating lectures" appears, it should be associated with "PPT use case" and "useful," requiring the participant to press the "I" button. Incorrect responses prompt an "X" display, signaling the need for correction. Responses should be quick to avoid exclusion from the analysis, as prolonged time suggests explicit cognitive processes. Tim penalties are added for incorrect associations (Serenko & Turel, 2020).

Originally, only reaction times from critical measurement blocks 4 and 7 were used for result calculation in the IAT. However, an advanced algorithm now incorporates all four combined blocks, significantly improving results. The outcome is represented by a numerical d-score for each subject, calculated as the difference between response latencies for critical category combinations, divided by the standard deviations across all blocks. A positive d-score indicates a strong association with the target construct and attribute, while a negative score indicates the opposite relationship (Greenwald et al., 2003). As a result, **Paper IV** utilizes the d-score to quantify how individuals subconsciously perceive canonical and non-canonical affordances as useful or useless.

[9] https://iatgen.wordpress.com/

Table 5. IAT structure

Block	Stimuli	Goal	Left Key	Right Key
1	20	Initiate target: learning target stimuli	No PPT Use Case	PPT Use Case
2	20	Initiate attributes: learning attribute stimuli	Useless	Useful
3	20	Practice combination: learning paired categories	No PPT Use Case Useless	PPT Use Case Useful
4	40	Test: congruent category pairing	No PPT Use Case Useless	PPT Use Case Useful
5	40	Reverse target: learning to switch the spatial location of the construct	PPT Use Case	No PPT Use Case
6	20	Practice: learning incongruent paired categories	PPT Use Case Useless	No PPT Use Case Useful
7	20	Test: incongruent target-attribute pairing	PPT Use Case Useless	No PPT Use Case Useful

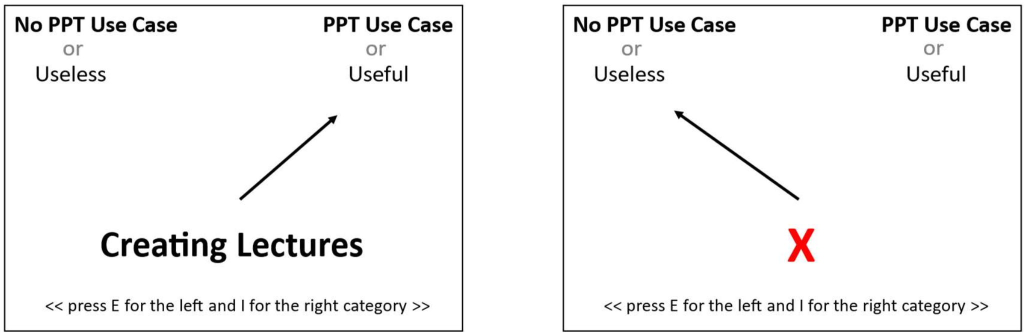


Figure 15. Illustration for a presented stimuli in block 4 of the first conducted IAT in Paper IV (with canonical affordances as a target construct) and a correct association (left side) and incorrect association (right side)

While IATs offer improvements over previous implicit measures, they are not without criticism. One notable concern is their sensitivity to outliers, which can impact reliability and predictive power (Gawronski et al., 2009). To address these concerns, it is vital to identify and remove outliers from the dataset before further processing. Factors like mood, cognitive states, emotions, and motivations can influence reaction times, especially in crowdsourced data collection where participants may prioritize completing tasks quickly for monetary incentives (Arkes & Tetlock, 2004; Blair, 2002). To mitigate this issue, associations that are excessively fast can be filtered out and excluded from the final dataset. Additionally, there is the issue of social desirability and the potential for deliberate test manipulation, although this is more likely to occur in contexts that are highly susceptible to social desirability, such as research on stereotypes (Fiedler et al., 2006; Maina et al., 2018).

Electrodermal Activity

Electrodermal activity (EDA) refers to the changes in the electrical properties of the skin, typically in response to sweat secretion. This physiological response is primarily controlled by the sympathetic nervous system and can be indicative of psychological or physiological arousal. To measure electrodermal activity (EDA), two small electrodes are attached to the skin surface. A low electrical current passes between these electrodes, detecting changes in the skin's electrical properties triggered by various stimuli. EDA is commonly measured using two properties: skin resistance (SR) and skin conductance (SC) (Boucsein, 2012; Weinert et al., 2020).

Paper VII used electrodermal activity (EDA) to measure SC in a pre-experiment with 6 participants to provide initial physiological evidence that the experimental scenarios create hindrance technostress. Throughout the experiment, SC was monitored as an indicator of physiological arousal. The SC values were recorded every second using a MentalBioScreen K3 device and reported in microsiemens (µS), showing an increase in EDA during the experiment.

3.2.5 Survey

A survey is an observational research technique used to systematically observe and map reality. It is a key observational research method for systematically gathering data about the characteristics, behaviors, perceptions, attitudes, thoughts, or opinions of a population (Recker, 2021). They employ open or closed questions through online, mailed questionnaires, or structured interviews. Predominantly used in the IS field (Mazaheri et al., 2020), surveys address questions about "what," "how," and "why," serving exploration, description, and explanation purposes (Recker, 2021).

In the survey context, exploration aims to identify essential constructs or measurement methods, often through open questions. Descriptive surveys provide factual accounts of the current state, typically found in technical reports or practical articles. Explanatory surveys test theories and hypothesized relationships between constructs, utilizing theoretically grounded expectations and directional hypotheses. It is important to note that surveys, while informative, cannot establish causality (Recker, 2021). **Papers I** and **II** utilize exploratory surveys with open questions. **Paper II** uses explanatory surveys with both closed and open questions, and **Papers III-V**, **VII**, and **VIII** use only closed questions.

Surveys possess several strengths, primarily their simplicity in administration, reusability, and analyzability (Recker, 2021). They can be set up and administered quickly, and they are generally cost-effective to run (Burleson et al., 2023; Fowler, 2014). Closed questionnaires minimize data entry errors, enabling standardized measurement and rapid data collection from diverse subjects. Survey data analysis is typically quicker than qualitative methods such as interviews or case studies (Fowler, 2014; Recker, 2021). However, survey research comes with its own set of challenges as it lacks the ability to manipulate independent variables, hindering direct causality establishment (Recker, 2021). Various sources of bias, such as coverage errors, can affect statistical conclusions, prompting evolving research standards in IS to address these concerns (Burleson et al., 2023; Burton-Jones et al., 2021; DeSimone & Harms, 2018). Researchers must consider potential issues like coverage errors, missing data, inattention, outliers, and methodological biases in survey studies. This dissertation addresses these concerns through procedural and statistical measures both before and after data collection, as detailed in section 3.3.

Using standardized questionnaires is advisable for surveys due to the complexity and time involved in developing new measurement instruments (DeVellis, 2016; Recker, 2021). Likert scales, which present declarative statements for participants to rate their agreement at various levels, are commonly used in surveys. However, other scales, such as semantic differential scales, where participants evaluate a stimulus using two opposing adjectives, offer potential sensitivity beyond Likert scales (DeVellis, 2016; Verhagen et al., 2015). Existing measurement instruments, primarily Likert scales, are predominantly used for dependent variables in this dissertation. However, for measuring a digital mindset, **Paper II** develops both Likert and semantic differential scales. The Likert scale formed the basis for subsequent surveys in **Papers II-V**, **VII**, and **VIII**. The development of the survey instrument in this study followed known recommendations and guidelines (DeVellis, 2016; Verhagen et al., 2015) (see Figure 16).

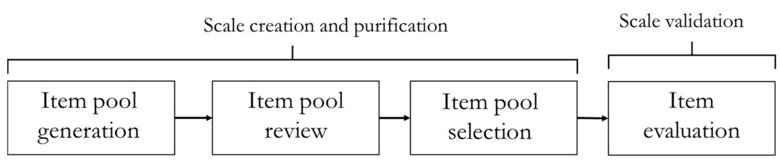


Figure 16. Scale development process and implementation of the process steps in Paper II

During the item pool generation phase, scholars should employ creative and multi-layered approaches to thoroughly cover all aspects of the targeted theoretical construct, encouraging redundancy to capture different perspectives. Items should be concise, clear, and unambiguous, presented both positively and negatively within a scale to counter affirmation bias (DeVellis, 2016). In **Paper II**, the item pool for each thinking pattern of the digital mindset was crafted based on existing literature and a Delphi study, resulting in 4-7 items per pattern.

In the second phase, the item pool undergoes expert review to enhance construct validity and refine item fit. This involves removing or fine-tuning items based on expert feedback regarding clarity and precision. While the final decision rests with the scale developer, the process results in a set of items reviewed and modified by experts (DeVellis, 2016; Verhagen et al., 2015). In **Paper II**, item reviews were integrated into the Delphi study's narrowing down and rating phases. Additionally, a pre-test involving researchers and practitioners resulted in a reviewed pool of 44 items for the Likert scale and 57 items for the semantic differential scale.

Expert reviews and pilot studies are crucial in determining the final set of items for a scale (DeVellis, 2016; Recker, 2021). **Paper II** uses pilot studies involving 69, 62, and 120 participants to finalize the item set.

During the item evaluation phase, the focus is on the validity, reliability, and dimensionality of the scale (DeVellis, 2016; Recker, 2021). In the context of this dissertation, it is determined whether items are grouped together within a thinking pattern and the degree of interrelatedness among thinking patterns. **Paper II** performs a confirmatory factor analysis with a sample of 147 and 142 participants. The factors were correlated with a related construct, IT mindfulness, to assess criterion validity. Furthermore, the scales were correlated with sentence completion results from a sample of 42 participants to provide additional support for content validity.

Surveys on independent and dependent variables are commonly distributed online or administered manually before undergoing analysis. An alternative distribution, which is frequently used within IS research, is recruiting test participants via online crowdsourcing platforms like Amazon Mechanical Turk (mTurk) or Prolific, which have demonstrated similar quality as data collected in organizations (Lowry et al., 2016; Maier et al., 2019). However, a range of configuration measures must be undertaken before, during, and after data collection to mitigate potential biases, such as self-selection and attentiveness, which may be stronger on these platforms (Jia et al., 2017). These measures include prior local restrictions, filtering target approval rates, the inclusion of attention checks during data collection, and emphasizing the significance of the study. Post-study, responses failing to meet the requirements should be excluded. Table 6 summarizes measures for crowdsourced data in this dissertation.

Table 6. Applied quality measures of crowdsourced based data collection in this dissertation based on (Jia et al., 2017)

Timing	Measure	Biased adressed	Rationale
Before	Screen participants and restrict to US located participants	Self-selection	Less fluent non-native participants might produce low-quality data (Feitosa et al., 2015; Steelman et al., 2014)
	Screen participants regarding eligibility (e.g., use of a specific technology at work)	Self-selection	Upfront screening of suitable participants leads to higher quality and at the same time lower costs of the study.
	Offer compensation that align or exceeds minimum wages	Self-selection	Lower payment may lead to longer data collection (Steelman et al., 2014). High payment can also lead workers misrepresenting their identity (Schmidt, 2015).
	Restrict participants to those with high (>95%) approval rates	Attentiveness	Workers with a high approval rate tend to produce higher-quality work (Peer et al., 2014).
	Warn participants that inattentive participants will not be paid	Attentiveness	This warning is likely to capture the attention of workers, as non-payment can have implications for their approval rate and future earnings (Fleischer et al., 2015).
During	Explaining the relevance of the study	Attentiveness	May reduce inattentive responses (Fleischer et al., 2015)
	Embedding quality-control measures, such as attention and comprehension checks	Attentiveness	These checks can result in reduced attention, even though they should not be overly suggestive or explicit, especially for experienced workers (Goodman et al., 2013; Liu & Wronski, 2018).
After	Remove responses that fail the quality checks	Attentiveness Self-selection	Improves data quality (Harms & DeSimone, 2015)
	Remove responses of workers that attended previous studies	Non-independence Self-selection	Can reduce non-independence between samples (Steelman et al., 2014)

Despite quality measures, criticism of crowdsourced data persists. Some of these criticisms can be applicable to data collected within organizations and may even be mitigated through crowdsourced data collection. Convenience sampling can be more pronounced within organizations, often relying on researchers' personal networks or proximity. Power user distortion is less relevant in organizational data but cannot be entirely discounted, as identifying such users is typically easier on crowdsourcing platforms due to their track record of task completions and completion times. Both organizational and crowdsourced studies encounter attentiveness concerns, which can be mitigated by including trap questions in both types of data collection (Lowry et al., 2016). This dissertation employs surveys including natural and crowdsourced data (see Table 7) and features open and closed questions.

Table 7. Survey details, number of participants, and sample source of papers that used surveys.

Paper	Question	Part of the study	N	Sample source
I	What is a digital mindset?	Validate and extend literature findings	50	LinkedIn, Universities, German Companies
II	How can a digital mindset be measured?	Delphi study: Creation and validation of survey items	50 -> 26 -> 17	LinkedIn, Universities, German Companies
		Scale pretests	11 (scale 1)/ 8 (scale 2)	LinkedIn, Universities, German Companies
		Scale pilot-tests	69 (scale 1)/ 62 (scale 2)	Students
			120	Prolific
		Scale evaluation	147 (scale 1)/ 142 (scale 2)	Prolific
		Scale evaluation via comparison to a sentence completion approach	42	Students and practitioners
		Scoring of sentence completion approach results	2	Students and practitioners
III	How is a digital mindset affected by experiences and affects co-creative behavior?	Assess independent and dependent variables	166	Prolific
IV	How does a digital mindset affect affordance perception?	Collect formulated affordances	100	Prolific
		Validate collected affordances	114	Prolific
		Assess independent variable	189	Prolific
V	How does a digital mindset affect IS infusion behavior?	Assess independent and dependent variables	139 (study 1)/ 155 (study 2)	Prolific
VII	How does a digital mindset moderate digital nudging effects on technostress?	Assess independent and dependent variables	214	mTurk
VIII	How does a digital mindset affect technostress?	Assess independent and dependent variables	151	mTurk

Paper I explores the digital mindset concept, including an exploratory survey with 50 experts recruited via LinkedIn and email, responding to open-ended questions for comparison with literature findings.

Paper II develops a survey to measure employees' digital mindset through integrating surveys with open and closed questions into a Delphi study with 50, 26, and 17 experts recruited via LinkedIn and email. For the pre-test, 11 researchers and 8 practitioners gave feedback through a survey with open-ended questions and rated items with closed questions, recruited via email and LinkedIn. In the pilot test, 69 and 62 students and 120 participants from Prolific completed the developed questionnaire. Additionally, in the evaluation phase, 147 and 142 participants were acquired from Prolific, and a sentence completion test with 18 students and 24 practitioners was conducted, evaluated through closed rating questions by a practitioner and researcher.

Paper III aims to investigate the nomological net of employees' digital mindset in the context of the future of work, using the technological context of GenAI tools to examine the influence of different experiences and effects on co-creative behavior with digital technologies. To explore this, a survey with closed questions assessing employees' experiences, digital mindset and co-creative behaviors was conducted with 166 participants from Prolific who met quality criteria and used GenAI tools at least once for work tasks in the last three months.

Paper IV investigates how individuals with varying digital mindset levels perceive affordances differently in the context of Microsoft PowerPoint. A survey was utilized to measure digital mindset, control variables, and explicit affordance perception, the latter with closed questions that required subjects to sort affordances. A survey-based pre-study with open questions collected a set of formulated affordances (n=100), validated by a second sample (n=114) through closed questions using participants from Prolific. The main study comprised 189 participants, all recruited via Prolific, meeting quality criteria, and using Microsoft PowerPoint for work tasks.

Paper V investigates the relationship between employees' digital mindset and IS infusion behavior across different technologies. Using a survey with closed questions, 139 participants who regularly use Microsoft PowerPoint and 155 who use smartphones for work tasks were recruited via Prolific.

Paper VII investigates the effects of digital nudging on hindrance technostress and the moderating effects of employees' digital mindset. Surveys with closed questions were employed as part of the online experiment to gather information on hindrance technostress and employees' digital mindset, with 214 participants recruited via mTurk.

Paper VIII investigates the impact of employees' digital mindset on hindrance technostress effects. The study utilized a survey with closed questions to gather all relevant variables and recruited 151 participants via mTurk.

3.3 Data Analysis

The data collected through the methods described above was analyzed using various data analysis techniques. Coding was apparent in all papers. Numerical data was analyzed using univariate, bivariate, and multivariate methods, primarily to analyze multiple-indicator measures of concepts but also single-item variables.

3.3.1 Coding

Coding can be viewed from two perspectives. In the context of quantitative methods, coding involves converting raw data into numerical formats for subsequent quantitative analysis. For instance, in the case of questionnaires, the answer options displayed on a Likert scale (e.g., from "Totally disagree" to "Totally agree") are transformed into numerical values ranging from 1 to 7. This conversion determines the types of analyses that can be conducted with the data (Recker, 2021). In all the papers within this dissertation that utilize surveys, this coding process was applied to questionnaires, typically on Likert scales with a range of 1-7 to convert them into ordinal scaled data. Interpretive coding becomes necessary in situations lacking a pre-assigned code scheme, ensuring the validity of the coding process. To ensure validity, it is advisable to involve multiple coders and assess agreement concurrently (Recker, 2021). This coding approach was employed in **Paper II** and **Paper IV**.

In **Paper II**, interpretative coding quantifies outcomes from interviews using the sentence completion approach. Responses were rated on a scale from 1 (does not represent) to 5 (fully represents) based on their alignment with specific thinking patterns. To ensure a consistent, valid, and reliable interpretation, two independent coders were engaged to code a total of 924 statements and Kendall's Tau-b was utilized to quantify congruency and, consequently, reliability (refer to section 3.3.2).

In **Paper IV**, interpretative coding is used to assess the innovativeness of 86 Microsoft PowerPoint affordances reported by 114 subjects. Ratings on a scale from 1 (standard use case) to 5 (exotic use case) helped select stimuli corresponding to "canonical" and "non-canonical" affordances.

In addition, the coding of textual data in a qualitative context involves the process of condensing qualitative data into concise and meaningful information (Recker, 2021). Here, a code represents a word or phrase that assigns a summarizing attribute to a piece of language-based data (Saldaña, 2013). This technique involves organizing or synthesizing raw data into conceptual categories through interpretation. This approach was applied to systematically analyze text-based data in **Paper I** and **Paper VII**.

In **Paper I**, a systematic literature analysis is used involving content coding using code filters (Saldaña, 2013) of 21 literature reviews to identify digital innovation-related concepts. This process generated 23 distinct concepts, from which 11 thinking patterns were derived. Additionally, 202 suggestions from an exploratory expert study were coded into 37 thinking patterns and compared with the literature-derived ones.

In **Paper VI**, a systematic literature analysis involved semantically analyzing content from 46 articles using 13 guiding questions. The findings were coded to form overarching content categories.

3.3.2 Validity and Reliability

In quantitative research, two fundamental challenges arise: ensuring that operationalized items accurately represent theoretical constructs, namely *validity*, and guaranteeing consistent and accurate measurements, namely *reliability* (Mertens et al., 2017; Recker, 2021). Validity establishes shared meaning between theoretical constructs and measurement models, and reliability ensures measurements are consistently accurate, crucial for replicability (Recker, 2021). Though analytically distinct, validity presupposes reliability, necessitating researchers to address both qualities (Bell et al., 2019). Table 8 provides an overview of various common tests employed to demonstrate validity and reliability throughout the data analysis in this dissertation, with further elaboration provided below.

Table 8. Validity and reliability assessments and thresholds used this dissertation (Bell et al., 2019; Hair, 2019)

Assessment type		Description	Measure	Threshold	Source
Validity	Content validity	Congruency of the set of measures with the theoretical construct.	Expert panels with rating schemes; usage of previously validated scales; comparison to alternative measures.	-	(Bell et al., 2019; Recker, 2021)
	Convergent validity	Correlation of measures that should be correlated.	Average Variance Extracted (construct level)	>0.5	(Fornell & Larcker, 1981; Hair, 2019)
			Same factor/unidimensional loadings (item level)	>0.5, ideally >0.71	(Hair, 2019)
			Comparison to alternative measures.	-	(Bell et al., 2019; Recker, 2021)
	Discriminant validity	Sufficient differentiation from other (similar) constructs.	Item cross-loadings	Each item should correlate strongly with the intended construct and weakly with other constructs	(Gefen & Straub, 2005; Hair, 2019)
			Fornell-Larcker criterion	Square root of AVE > Inter-construct correlation	
			Heterotrait-monotrait ratio (HTMT)	< 0.9	
	Criterion validity	Comparing the measure to another variable that it should theoretically be associated.	Correlations to previously established measures.	Moderate to high correlations >0.5	(Bell et al., 2019; Cohen, 1988; Wright et al., 2012)
Reliability	Internal consistency	Consistent results of multiple indicators of a construct and constructs	Cronbach's Alpha	>0.7	(Cronbach, 1951; Hair, 2019)
			Composite reliability	>0.7	
	Interrater reliability	Measure consensus between subjective ratings.	Kendall's Tau-b	Moderate to high correlations >0.5	(Cohen, 1988)
			Percentage agreement scores	-	(Recker, 2021)

Content validity ensures that a measurement instrument accurately represents the content of the intended concept, crucial for newly developed instruments (Bell et al., 2019). It can be established by soliciting expert feedback or utilizing existing validated models (Mertens et al., 2017). In **Papers II – V**, **VII**, and **VIII**, established scales were used for all constructs except digital mindset, for which content validity was rigorously ensured throughout the scale development process in **Paper II**. This involved using existing scales as a foundation, refining items through a Delphi study and expert pre-test, and comparing results with a qualitative approach.

Convergent validity confirms correlations between measures intended to correlate with each other (Mertens et al., 2017). Factor loadings or indicator reliability serve as crucial indicators for convergent validity. High loadings within the same factor suggest similarity among items, indicating convergence within the latent construct (Hair, 2019). Indicators of convergent validity should not load onto other constructs within the study, be significant, and exceed 0.5, ideally reaching 0.71. At the construct level, the Average Variance Extracted (AVE), calculated as the mean variance (squared item loading) extracted for the construct items, serves as a summary indicator, revealing how much of the item, on average, is explained by the latent construct. At least 50% (or 0.71^2) of the variance should be explained on average for sufficient convergent validity (AVE > 0.5) (Hair, 2019). Convergent validity can also be demonstrated by comparing results across different measurement instruments targeting the same phenomenon, as seen in the comparison of the questionnaire and sentence completion approach in **Paper II**. In **Papers II-V, VII,** and **VIII**, AVE values for all constructs and item factor loadings met the thresholds.

Discriminant validity ensures that items measuring different constructs are distinct from one another, representing unique aspects (Mertens et al., 2017). This can be confirmed by examining item loadings on alternative constructs (cross-loadings), where high cross-loadings suggest poor discrimination (Hair, 2019). Alternatively, the Fornell-Larcker criterion compares the squared AVE values of a construct with its correlation with other constructs, and it is met when AVE estimates surpass correlations (Hair, 2019). Hence, the variance of the construct is most similar to the variance of its items and not to that of other constructs. Additionally, Henseler et al. (2015) introduced the heterotrait-monotrait (HTMT) ratio, which signifies a lack of discriminant validity when close to 1. For conceptually different constructs, the HTMT value should be below 0.85, and for conceptually similar constructs, below 0.9 (Henseler et al., 2015). In **Papers II-V, VII,** and **VIII**, all included constructs demonstrated adequate discriminant validity, meeting specified threshold values across cross-loadings, the Fornell-Larcker criterion, and the HTMT ratio.

Criterion validity assesses how well a construct aligns with a related concept, involves concurrent and predictive validity. Concurrent validity compares them simultaneously, while predictive validity measures them at different times (Bell et al., 2019). In **Paper II**, the digital mindset's criterion validity was examined by concurrently correlating it with IT mindfulness, a theoretically linked construct (Orosz et al., 2020), demonstrating moderate to high correlations between both scales, substantiating the criterion validity of the developed scale.

Internal consistency evaluates the reliability of measurement instruments by assessing if multiple item measures for the same construct yield consistent scores, indicating coherence (Mertens et al., 2017). Consistency issues often stem from imprecise or ambiguous item phrasing in multi-item measures (Recker, 2021). Cronbach's alpha is widely used for internal consistency, which is based on the split-half method. This method involves randomly dividing the indicators of a construct into two groups and calculating the correlation between group scores, resulting in a correlation coefficient ranging from 0 to 1. A coefficient of 0 indicates no, while a value of 1 indicates high internal consistency. Cronbach's alpha computes the average of these correlation coefficients for all possible split-half groups of a construct. Hence, a Cronbach's alpha value above 0.7 is considered internally consistent (Bell et al., 2019; Hair, 2019). Composite reliability, a more sophisticated measure than Cronbach's alpha, considers the individual indicators' loadings as weighting within split-half groups, offering a more accurate assessment. Both measures are acceptable, though composite reliability is generally preferred. Values should be above 0.7 to demonstrate reliability, but not exceed 0.95, as this indicates strong redundancy and item similarity (Hair, 2019). **Papers II-V, VII** and **VIII** demonstrated satisfactory reliability for all constructs.

Interrater reliability becomes necessary when multiple individuals are involved in coding the same data. Inter-subjective measurement methods are employed to objectify these subjective ratings, producing a numerical representation of the consensus. Methods for calculating interrater reliability include Cohen's coefficient kappa, Pearson's, Spearman's or Kendall's correlation coefficients, or percentage agreement scores (Bell et al., 2019; Recker, 2021). In **Paper II**, Kendall's tau-b was utilized and showed satisfactory similarities (i.e., effect sizes (Cohen, 1988)) in expert ratings for coded responses obtained through the sentence completion approach. Kendall's tau-b was chosen due to the ordinal nature of the available data and because their distribution did not meet the assumptions for parametric tests. **Paper IV** applies a percentage classification of affordances as an approximation by considering the proportion of classifications into the lowest and highest ratings.

3.3.3 Accounting for Common Method Bias

Common method bias (CMB) is a common challenge in cross-sectional survey-based studies (Mertens et al., 2017). It occurs when the data collection process influences response patterns and relationships between constructs more than the actual content of the items. CMB leads to data distortions due to common method variance (CMV), which can result from various factors (Mertens et al., 2017). CMB occurs when multiple independent and dependent variables are surveyed from the same source, with the same methodology, and simultaneously (Podsakoff et al., 2003). Respondents may introduce bias by striving for consistency, desirability, or speculating on the variables being studied. Survey design factors like fixed question stems, uniform response formats, grouping of items, and survey length can also contribute to CMB (Mertens et al., 2017).

Various measures can be implemented to reduce CMB in the study design, and controlling post-hoc statistical methods can be employed (Mertens et al., 2017). Design techniques include temporal separation of measurements, psychological separation, and counterbalancing the order of questions (Podsakoff et al., 2003). **Papers III-V** and **VII** of this dissertation collect data at different time points, and/or use different measurement methods, counterbalancing question blocks and their order, to reduce sources of CMV and, therefore, CMB.

While these design methods are effective in preventing common method variance, post-hoc statistical control methods can also be used to exclude its influence on the results. One such method is Harman's single factor test, which assesses whether a single factor explains more than half of the common variance (Hair, 2019; Harman, 1976). If this is not the case, it is unlikely that common method bias is present. The Harman single factor test has faced mixed opinions in the past. Simulation studies have supported its effectiveness when AVE values and reliabilities are adequate (Fuller et al., 2016). However, recent research claims that it is not able to detect CMB and should be avoided (Podsakoff et al., 2024). Another post-hoc method involves checking variance inflation factors (VIFs) to rule out multicollinearity. Values below 3 suggest the absence of multicollinearity and CMV (Mertens et al., 2017). Additionally, the unmeasured latent marker construct (ULMC) method can be employed post-hoc. This approach involves introducing an unrelated CMB factor into the model, which includes all other model indicators (Liang et al., 2007). All factors are transformed into single factors, and the R^2 with the CMB factor is compared to the R^2 without the CMB factor. If the R^2 with the CMB factor is not significantly higher than the R^2 without it, CMB is unlikely to be an issue. The ULMC approach has been heavily criticized in the past (Chin et al., 2012) and therefore it is important to perform different techniques in research design as well as post-hoc analyses to avoid or at least detect CMB. **Papers III, V,** and **VIII** employ and combine these methods to control post-hoc for CMB.

In conclusion, while post-hoc techniques aid in detecting CMB, it is suggested that procedural changes are more effective in reducing CMB-related issues (Podsakoff et al., 2024). Therefore, almost all papers in this dissertation incorporate both procedural and post-hoc remedies for CMB.

3.3.4 Univariate Analyses

Univariate analysis methods describe the analysis of a single variable and were employed to analyze the collected data, including the use of *frequency tables*, *diagrams*, and *measures of data distribution* and *dispersion* (Recker, 2021).

Frequency tables in **Papers II-V, VII**, and **VIII** present the demographics of the study samples, displaying the number or percentage of subjects within each category or variable of interest (Bell et al., 2019). Charts were employed only in **Paper IV**, where a bar chart was used to visually represent group differences within the data. Measures of central tendency, like the arithmetic mean, median, and mode, summarize value distributions into single values, while measures of dispersion, like the range and standard deviation, quantify the variation (Bell et al., 2019). These were utilized across **Papers II-V, VII**, and **VIII** to characterize data distributions.

3.3.5 Bivariate Analyses

Bivariate analysis methods explore the relationship between two variables, assessing whether changes in one variable correspond to changes in another, to identify similarities in the variations (Recker, 2021).

Bivariate analyses represent the simplest form of multivariate analyses, employing correlation coefficients, students t-tests for group comparisons, simple linear regression, and analysis of (co-)variances (AN(C)OVA) for this purpose. The choice of method depends on the research question's objectives and the characteristics of the two variables (Bell et al., 2019; Mertens et al., 2017). Correlation analyses, an independent t-test, and an ANCOVA were used in this dissertation, which are explained in the following.

Correlations

Correlation coefficients are used to quantify the relationship between two variables. Pearson's r is suitable when an approximately linear relationship is assumed and indicates strength of the correlation as a value between -1 and 1, calculated from the covariance divided by the product of the two variable's standard deviations. Values closer to -1 or 1 indicate stronger correlations, with the sign indicating the direction. For datasets that do not meet assumptions of normal distribution or possess different scale levels, alternative tests like Kendall's Tau-B or Spearman's Rho can be utilized (Mertens et al., 2017). Cohen's effect sizes were used in this dissertation to interpret correlation strengths, categorizing effect sizes as small (< 0.3), moderate (between 0.3 and 0.5), or strong (> 0.5) (Cohen, 1988). **Paper II** used Pearson's correlation to analyze the relationship between digital mindset cognitions and IT mindfulness. Kendall's Tau was employed for inter-rater reliability. In **Paper IV**, Pearson correlation was used to show the association between digital mindset and implicit/explicit affordance perceptions.

T-test

Another common method for comparing two variables or test groups is the student t-test, which assesses whether the mean value of a target variable significantly differs between two groups (Mertens et al., 2017). The t-test determines the disparity between the averages of the two groups and compares it to the average disparity in the sample relative to the mean, yielding a t-statistic, which can be referenced in a t-test table to find associated probabilities (p-values) for confidence intervals[10]. Three types of t-tests can be used: *the independent-samples t-test*, the *paired-samples t-test*, and the *one-sample t-test*[11] (Mertens et al., 2017). The *independent-samples t-test* assesses the mean values of two groups that have not been influenced by each other. The *paired-samples t-test* evaluates the mean values of the same sample on two separate occasions. The *one-sample t-test* compares the mean of a single group with either a reference group or a predetermined standard value. Figure 17 illustrates the three types of t-tests.

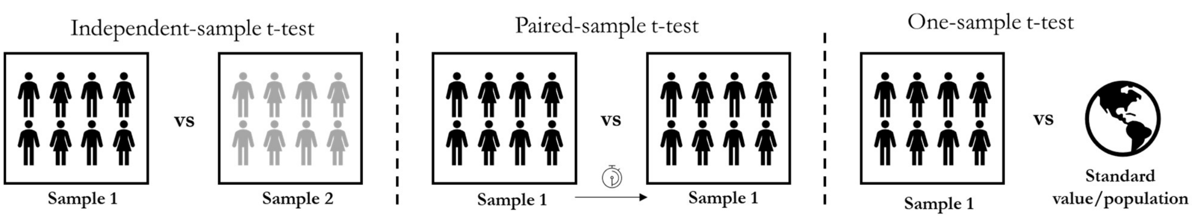


Figure 17. Different types of t-tests

Paper IV utilizes multiple independent-sample t-tests to compare mean differences in implicit and explicit canonical and non-canonical affordance perceptions between groups with low (30th percentile) and high digital mindsets (70th percentile). Assumptions for t-tests, such as homogeneity of variance and normal distribution, were verified (Mertens et al., 2017). One-sided t-tests were then conducted to determine if variables significantly differ for individuals with high digital mindset levels.

Analyses of (Co-)Variances

An alternative method for group comparisons is the analysis of variances (ANOVA). In this dissertation, an ANOVA was used to compare two groups in **Paper IV** and three groups in **Paper VII**. ANOVA models assess both the mean and variance, examining group differences based on a grouping variable. For this purpose, the F-statistic is calculated, quantifying the amount of variance of the dependent variable explained by group membership in contrast to the amount of variance that cannot be explained by the group membership. A low F-value (around 1) indicates minimal explanatory power of

[10] Modern statistical software packages automatically calculate the probability values, eliminating the need for researchers to manually refer to a t-test table.
[11] For datasets that do not follow a normal distribution, non-parametric test, such as the Mann-Whitney U test can be employed.

the grouping variable, while a larger F-statistic signals significant differences between the samples. The effect size, denoted as eta squared (η^2 or PES), reveals the portion of variance in the dependent variable explained by the grouping variable ANOVA does not determine causality or directionality; these are determined by research design, such as random assignment in experiments (Mertens et al., 2017).

ANCOVA incorporates covariates to explore grouping variable effects while controlling for covariate-induced group differences. This refutes rival theories suggesting results are due to other variables, providing a more accurate understanding of the relationship between variables. In **Paper IV**, ANCOVAs were used, considering control variables including technology usage, age, gender, and IT-specific traits like PIIT and IT mindfulness.

3.3.6 Multivariate Analysis

Multivariate analysis involves statistical techniques that examine the relationships between multiple variables simultaneously, going beyond simple group comparisons or linear regression (Mertens et al., 2017). Unlike group comparisons or simple linear regression, multivariate approaches assess how two or more independent variables correlate with a dependent variable, for example, using multiple regression models (Recker, 2021).

Structural equation models (SEM) are preferred for investigating complex theoretical models characterized by interrelated variables, including both dependent and independent variables, mediating or moderating relationships, and latent variables operationalized through multiple data points. SEMs conduct multiple regression equations simultaneously, allowing for the simultaneous analysis of multiple independent and dependent variables (Hair, 2019; Mertens et al., 2017). Survey-based data were collected for complex models with multiple latent variables acting as both dependent and independent variables. Hence, this dissertation applies SEM as the preferred method for analysis, as elaborated in the following sections.

SEMs consist of two models that represent the theory that is under investigation: the *measurement model* and the *structural model*. The *measurement model* delineates the connection between latent constructs, also known as latent variables, and their indicators. Latent constructs represent theoretical concepts that can only be assessed indirectly through multiple indicators (e.g., items) addressing various aspects of a concept. Exogenous constructs describe independent latent variables in a model, while endogenous constructs describe dependent variables (Hair, 2019). For instance, combinatorial thinking is a latent construct that cannot be directly observed. To capture such complex theoretical concepts effectively, a set of items is used. Such a set of items was developed in **Paper II**, each addressing different facets of the construct.

This set of items can reflect or shape the latent variable. Reflective items of a latent variable imply that the latent variable influences the indicators, sharing a common cause and exhibiting internal consistency. Conversely, formative items suggest that indicators causally shape the latent variable, with no conceptual similarity required among items and no expected internal consistency. Consequently, formative items should not be dropped. A first-order model consists of a latent variable and its indicators. Higher-order factor models extend this structure, incorporating multiple levels of latent variables, which can be formatively or reflectively related. In the context of employees' digital mindset in the context of digital innovation, three reflective-reflective second-order constructs represent different thinking patterns reflected by items, while cognitions are reflected through various thinking patterns. Higher-order constructs are utilized in **Papers II – V, VII,** and **VIII**. These papers focus on reflective constructs, with the exception of **Paper V**, which incorporates a reflective-formative-formative construct related to adaptive system use.

The *structural model* delineates connections among latent constructs through paths represented by arrows, indicating both dependency and correlation relationships. It focuses on the interrelationships between constructs. It determines whether a construct is exogenous (independent) or endogenous (dependent) (Hair, 2019; Mertens et al., 2017). Figure 18 illustrates a SEM, the measurement and structural model, different higher-order constructs, and relationships. When analyzing a structural equation model, both the measurement model and the structural model are assessed.

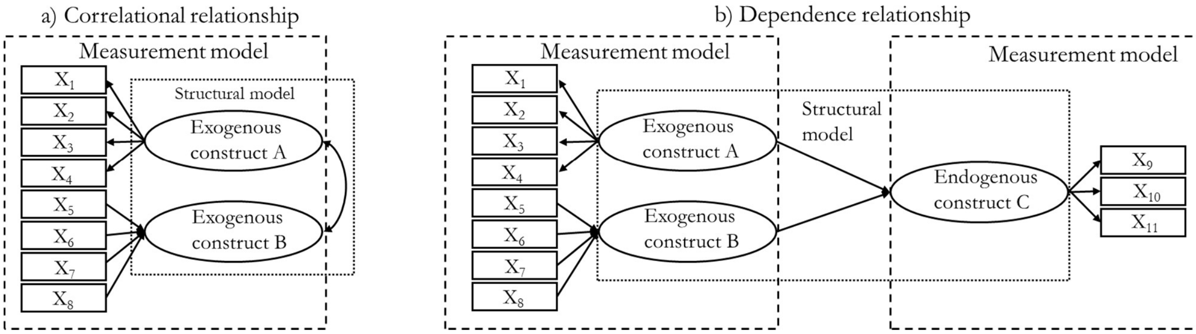


Figure 18. Visual representation of measurement and structural model relationships in a simple SEM model

There are two primary approaches for SEMs: covariance-based SEM (CB-SEM) and variance-based Partial Least Squares structural equation modeling (PLS-SEM) (Jöreskog & Sörbom, 1982). In general, CB-SEM aims to explain established theories without a primary focus on explained variance in the dependent variables by estimating a new covariance matrix that is not significantly different from the originally observed one (Hair, 2019; Hair et al., 2017). CB-SEM relies on the common variance in the data, excluding specific and error variance. This omission of specific variance may lead to the loss of valuable information for explaining dependent variables. PLS-SEM is more suitable for exploratory research, with a focus on the explained variance in the dependent variables. In PLS-SEM, the total variance is considered, allowing error variance to contribute to explaining the dependent variable. This approach maximizes the explained variance in the dependent variable. In general, both methods are complementary rather than competitive and can be employed to answer similar research questions (Dash & Paul, 2021). CB-SEM is typically utilized for explanatory or confirmatory research objectives of theories, with stricter data requirements compared to PLS-SEM. PLS-SEM, on the other hand, is more suitable for exploratory and predictive research and can handle formative indicators. Additionally, PLS-SEM can work with smaller sample sizes, while CB-SEM necessitates larger samples. According to various recommendations, the choice between CB-SEM and PLS-SEM depends on the research goals, overall data characteristics, data distribution, type of scales (formative or reflective), sample sizes, and the presence and type of higher-order constructs. Table 9 provides a summary of recommendations based on (Gefen et al., 2011; Hair et al., 2017).

Table 9. Recommendations for using PLS-SEM and CB-SEM based on (Gefen et al., 2011; Hair et al., 2017)

	PLS	CB	Paper				
			II	III	V	VII	VIII
Objective = prediction	X				X		
Objective = exploratory research or theory development	X			X	X	X	X
Objective = explanation		X	X	X		X	X
Objective = explanation and prediction	X						
Reflective measurement model specification	X	X	X	X	X	X	X
Formative measurement model specification	X						
Metric data	X	X	X	X	X	X	X
Non-metric data	X						
Smaller sample size – N = < 100	X						
Larger sample sizes – N = > 100	X	X	X	X	X	X	X
Higher order constructs = two 1st order constructs	X						
Higher order constructs = three of more 1st order constructs	X	X	X	X	X	X	X
Normally distributed data	X	X	X	X	X	X	X
Non-normally distributed data	X						

As the table shows, the choice between CB-SEM and PLS-SEM for the papers in this dissertation is primarily driven by the research objectives. CB-SEM, implemented in **Papers II**, **VII,** and **VIII** using IBM SPSS Amos 29, is used for theory testing. In **Paper II**, the goal is to validate the composition of thinking patterns and cognitions related to the digital mindset. **Paper VII** examines an established theory on the effects of IS characteristics on technostress, adding the digital mindset within this context.

Paper VIII examines an established theory on the effects of technostress on technostrains, investigating the digital mindset within this context.

PLS-SEM, implemented in **Paper III** and **V** using SmartPLS 4, is employed for exploratory and predictive research. **Paper III** explores the nomological net of the digital mindset. The main aim of **Paper V** is to predict the explanatory power of a digital mindset in IS infusion, integrating the UTAUT theory into this context and introducing a digital mindset as a new predictor. Evaluation of the SEMs in both CB-SEM and PLS-SEM involves assessing the measurement model and the structural model.

To evaluate the *measurement model*, validity and reliability need to be examined (Dash & Paul, 2021; Hair, 2019). Convergent validity was assessed through unidimensionality, with loadings exceeding 0.71, as well as by confirming AVE values greater than 0.5. Subsequently, discriminant validity was examined using multiple criteria, including item cross-loadings, the Fornell-Larcker criterion (ensuring that the square root of AVE exceeded the inter-construct correlation), and HTMT values (<0.9). The next step involved assessing the reliability of the constructs. This encompassed the examination of internal consistency, with Cronbach's alpha exceeding 0.7 and composite reliability surpassing the threshold of 0.7 (see 3.3.2 and Table 8 for details).

In CB-SEM, alongside validity and reliability assessments, the model's overall fit is typically evaluated. Fit indices play a crucial role in gauging the degree to which the covariance matrix of the hypothesized model aligns with the sample's covariance matrix, essentially answering the question of "how well does my model fit the data" (Mertens et al., 2017, p. 47). Several criteria are employed to determine the overall model fit. Chi-square by degrees of freedom, with values below 3 indicating a good model fit, offers an initial indication. This assessment should be interpreted with other fit indices. The goodness-of-fit Statistic (GFI), aiming for values exceeding 0.90, estimates the proportion of variance explained by the projected population covariance. The adjusted GFI (AGFI) adjusts this metric with degrees of freedom and should also exceed 0.90. The Root Mean Square Error of Approximation (RMSEA), often considered the most informative fit index, should be below 0.07. Standardized Root Mean Square Residuals (SRMSR) are expected to be less than 0.08 and ideally 0.05, and the Comparative Fit Index (CFI) should surpass 0.90. Additionally, the Akaike Information Criterion (AIC) can be utilized for direct model comparisons, assisting in finding the optimal balance between model complexity and fit; here, lower values indicate better fit (Wright et al., 2012). Table 10 summarizes the model fit indices. All measurement models across the various papers in this study successfully met these criteria.

Table 10. Model fit indices and thresholds used in this dissertation

Fit index	Suggested threshold	Source
χ^2/df	<3	(Gefen et al., 2000)
GFI	>0.90	(Gefen et al., 2000)
AGFI	>0.90 excellent, >0.80 acceptable	(Gefen et al., 2000)
RMSEA	<0.07	(Hu & Bentler, 1999)
SRMSR	<0.05 excellent <0.08 acceptable	(Hu & Bentler, 1999)
CFI	>0.90	(Hu & Bentler, 1999)
AIC	The lower the better	(Wright et al., 2012)

When evaluating the *structural model*, several key factors are examined: the standardized beta coefficients, their significance levels (P-values), the coefficient of determination (R^2), and the effect size (f^2) (Hair, 2019). Beta coefficients, which range from -1 to +1, indicate the degree to which one unit of the independent variable influences one unit of the dependent variable, i.e., the relationship between two latent variables. Significance levels of 0.05, 0.01, and 0.001 are typically used to assess the statistical significance of these relationships. In CB-SEM, statistical significance is automatically provided, while PLS-SEM employs bootstrapping with 5,000 samples for significance testing (Hair et al., 2017). Furthermore, the coefficient of determination (R^2) is considered, offering insights into predictive power by revealing how much of the dependent variable's variance is explained by the independent variable. R^2 values fall within the 0-1 range (or 0-100%). The interpretation of this value depends highly on the model's complexity and the constructs under investigation. To facilitate interpretation, the effect size (f^2) was also reported and assessed using the common threshold for effect sizes. Effect sizes above 0.02 are categorized as small, those above 0.15 as medium, and those above 0.35 as large (Cohen, 1988). In addition to the assessment of these direct paths between variables, indirect paths, created through mediation effects and moderation effects, i.e., interaction effects of variables, were also investigated.

Mediation effects refer to situations where one or more mediator variables provide a more comprehensive explanation for the relationship between two variables. They indicate that the influence of an independent variable X on a dependent variable Y is better understood when considering a mediator variable M. This mediator variable can exert varying effects on the relationship. If the direct impact between X and Y remains significant even after incorporating M into the model, it indicates partial mediation. If the inclusion of the mediator variable renders the path between X and Y in the model no longer significant, it signifies full mediation. To calculate the indirect effect of X on Y through M, the paths of X -> M and M -> Y are multiplied (Hair, 2019). A finer distinction can be made between complementary mediation (indirect and direct effects with the same sign) and competitive mediation (indirect and direct effects with different signs) (Zhao et al., 2010). Mediation effects were examined in **Papers III** and **V**. Besides acting as mediators, variables can also serve as moderators.

Moderation refers to the phenomenon where the impact of a variable X on another variable Y is contingent upon a moderating variable M (Hair, 2019). It implies that the strength of the relationship between two variables is influenced by the presence of a moderation variable M, meaning that the effects of X on Y may vary depending on the levels of M; higher values of M can result in stronger effects of X on Y. In **Papers VII** and**VIII**, employees' digital mindset was investigated as a continuous moderating variable, while in **Paper V**, the entire research model underwent moderation through a multi-group analysis, aiming to examine differences in effects based on the type of technology (Microsoft PowerPoint vs. smartphones).

3.4 Summary

In summary, this dissertation employed a diverse array of quantitative and qualitative research methods and analytical techniques across its papers. **Paper I** is a multi-method approach and combines systematic literature analysis with an expert survey featuring open questions to define and conceptualize the digital mindset; **Paper II** follows traditional scale development methods and a Delphi study to operationalize the digital mindset, validated quantitatively with CB-SEM and correlation analyses. Additionally, a qualitative sentence completion approach is employed and correlated with quantitative questionnaire data; **Paper III** uses PLS-SEM to examine the nomological net of employees' digital mindset using survey data in the context of GenAI tools; **Paper IV** conducts a survey-based study combined with IAT results using t-tests and ANCOVA to explore the relationship between employees' digital mindset and affordance perception of Microsoft PowerPoint; **Paper V** uses survey-based data and PLS-SEM to investigate the impact of employees' digital mindset on IS infusion behavior in the context of two technologies: smartphones and Microsoft PowerPoint; **Paper VI** is a systematic scoping literature review and analyzes the IS literature to investigate the state of research on exaptation, a specific IS infusion behavior. The review systematically codes and summarizes the findings; **Paper VII** is an online experiment including survey-based data that examines the moderating effects of employees' digital mindset on digital nudging effects on technostress using one-way ANOVA and CB-SEM; **Paper VIII** utilizes CB-SEM with survey data to investigate the impact of employees' digital mindset on their technostress experience.

4 Main Research Results

The diverse research approaches and methods employed have yielded varying findings, collectively enhancing our understanding of the digital mindset and its implications for employees. The first chapter, encompassing **Papers I-III**, contributes to addressing the overarching research question by aiming for a better understanding of the digital mindset construct itself. These studies shed light on the concept of a digital mindset, defining it as a collection of 11 distinct thinking patterns that fall into three coexisting cognitions and offering two survey tools to measure the concept. Furthermore, these results show evidence for the effects of online experiences with digital innovation on these cognitions and (mediation) effects of the digital mindset cognitions on co-creative behavior with digital technologies.

In the second chapter, comprising **Papers IV-VI**, it is delved deeper into employees' digital mindset within the context of IS infusion behaviors. These studies highlight that employees with a digital mindset both subconsciously and consciously perceive more innovative usage possibilities of a specific digital technology they use at work. They also positively influence beliefs and expectations regarding innovative behaviors and indirectly steer innovative usage behaviors through more IT-specific traits, where the mediation depends on the technology scope. The results also indicate the underrepresentation of these specific IS infusion behaviors investigated in the context of exaptation, which are often erroneously grouped with simpler innovative usage behaviors despite their distinct requirements.

The third chapter encompassing **Papers VII** and **VIII** contributes to the overarching research question by investigating the impact of a digital mindset on negative outcomes that employees experience during their work with new digital technologies or processes, specifically technostress. It demonstrates, on the one hand, that hindrance technostress can be reduced through digital nudging and that employees' digital mindset accelerates this effect. Further, results show that employees' level of digital mindset positively influences their ability to transform hindrance technostressors into technostrain. Additionally, it leads employees to be more satisfied with their job and consider their job performance to be better, regardless of the presence of stressors. Table 11 provides a concise overview of each paper's main results and how they contribute to addressing various research questions and objectives, ultimately helping us gain insights into the overarching research question.

Table 11. Overview of all paper results and how they contribute to the different research questions; DM: Digital mindset

Chapter #	Paper #	**What is the digital mindset and why should organizations consider it within the context of digital innovation?**				
		RO1: Understanding the digital mindset		RO2: Understanding how employees digital mindset can foster IS infusion behaviors		RO3: Understanding how employees DM can mitigate technostress
		RQ1: How can the DM be conceptualized and operationalized?	RQ2: How can employees digital mindset be developed and how does it affect behaviors relevant in the future of work?	RQ3: How have specific IS infusion behaviors been investigated in IS?	RQ4: What is the role of employees DM for IS infusion behaviors?	RQ5: What is the role of employees DM in mitigating technostress?
Chapter I	I	• DM is collection of cognitive schemas regarding digital technologies, expressed differently • DM as 11 thinking patterns in the digital innovation context				
Chapter I	II	• Groups thinking patterns in 3 cognitions • Reveals Likert and semantic differential scale	• All three cognitions are correlated with IT mindfulness			
Chapter I	III		*Technology:* GenAI tools •DM affects collaboration with GenAI tools •DM is affected by digital innovation experience in online communitites and private contexts • DM mediates effects of experiences		•DM affects collaboration with GenAI tools •DM mediates effects of experiences on collaboration with GenAI tools	
Chapter II	IV	*Focus:* creative cognition *Technology:* PowerPoint • Measurements correlate with different perceptions	*Focus:* creative cognition *Technology:* PowerPoint • DM correlates with ○ PIIT ○ IT mindfulness		*Focus:* creative cognition *Technology:* PowerPoint • DM correlates with Implicit/explicit non-canonical affordance perception	
Chapter II	V		*Focus:* creative cognition *Technology:* PowerPoint/Smartphones • DM affects ○ PIIT ○ IT mindfulness • Effects are stronger in contexts of narrow than broad IT		*Focus:* creative cognition *Technology:* PowerPoint/Smartphones • DM affects ○ Performance expectancy ○ Effort expectancy ○ Social influence ○ Facilitating conditions • DM affects IS infusion mediated by ○ PIIT ○ IT mindfulness • Mediation varies with technology scope	
Chapter II	VI			*Focus:* Exaptation • Literature uses overarching concepts Most studies are conceptual		
Chapter II	VII					*Focus:* creative cognition • DM moderates digital nudging effects on technostress
Chapter III	VIII					*Focus:* creative cognition • DM moderates technostressors on ○ Job satisfaction ○ Job performance ○ Turnover intention • DM affects ○ Job satisfaction ○ Job performance

4.1 Chapter I: Conceptualization, Operationalization, and Nomological Net of the Digital Mindset

Chapter I aims for a better understanding of the digital mindset concept, answering the question of how a digital mindset can be conceptualized and operationalized, and its nomological net, comprising **Papers I**, **II**, and **III**.

4.1.1 Paper I: A Cognitive Conveyor for Digital Innovation - Definition and Conceptualization of the Digital Mindset[12][13]

In the IS literature, the concept of a "digital mindset" has been frequently referenced as vital for employees across various aspects of digitalization. However, the field lacks robust definitions or conceptualizations that would enable further exploration and theory development. **Paper I** aims to define the "digital mindset" and conceptualize it with a particular focus on its relevance in the context of digital innovation. It uses a literature-based approach for the definition and a combination of a literature review and an exploratory expert survey.

The conceptual study involved the analysis of 16 literature reviews and 5 recent qualitative articles, aiming to identify relevant characteristics, concepts, traits, phenomena, or components of digital innovation. This effort resulted in the identification of 172 concepts, which were subsequently distilled into 23 key concepts. Thinking patterns corresponding to these concepts were formulated, leading to the aggregation of 9 distinct thinking patterns. In the next phase, 50 experts in the field of digital innovation contributed by suggesting up to 5 relevant thinking patterns. These inputs, comprising 202 suggestions, were then condensed into 37 thinking patterns and mapped onto the existing list, resulting in the addition of only two thinking patterns.

Drawing from the literature on "mindset" and definitions of the term "digital," a general definition of a digital mindset emerged, defining it as accumulated knowledge and experiences that shape thinking patterns, expressed through cognitive processes, filters, and beliefs of individuals, representing how individuals make sense of digital technologies, their use, application, and consequences in individual, organizational, and societal contexts, leading to supportive response patterns for tasks that occur in these contexts. Figure 19 showcases the final 11 thinking patterns and their respective definitions, presenting the derived thinking patterns that are relevant in the context of digital innovation.

Paper I bridges the gap in previous IS literature that referred to the importance of a digital mindset but fell short in providing adequate definitions or conceptualizations, furnishing the IS literature with a foundational point of reference in the form of a comprehensive definition, achieved through an integrative approach and linked impartially to the concept of digitalization. The integrative perspective underscores that, from a psychological standpoint, a digital mindset shares the fundamental attribute of being shaped by accumulated knowledge and experiences, expressed in various ways. By contextualizing this concept within the domain of digital innovation, **Paper I** responds to RQ1 by advancing prior vague definitions and conceptualization attempts, providing a definition and conceptualization of 11 thinking patterns, and serving as a starting point and groundwork for empirical research. To enable such endeavors, the conceptualization was used in the development of the measurement model discussed in **Paper II**, which follows.

[12] Previously published as: Hildebrandt Y., & Beimborn, D. (2022) "A Cognitive Conveyor for Digital Innovation – Definition and Conceptualization of the Digital Mindset" in the proceedings of the 17th International Conference on Wirtschaftsinformatik, February 2022, Nürnberg, Germany

[13] Previously published as: Hildebrandt Y., & Beimborn, D. (2021) "Ambiguous, Misinterpreted, But Essential: Conceptualization of the "Digital Mindset" in the proceedings of the 81st Academy of Management Conference, Virtual Event

Thinking pattern	Description
Disruptive thinking	Continuously questioning existing solutions and imagining how digital technologies could induce alternative scenarios, including fundamental pivots.
Combinatorial thinking	Continuously integrating the combinatorial characteristics of digital technologies in solution finding to broaden the potential solution space.
Generative thinking	Continuously thinking in ways that foster and include solution repurposing by integrating abstraction and modularity during development.
Risk-affine thinking	Continuous readiness of individuals to take calculated risks regarding digital technologies and business domains.
Digital-oriented thinking	Continuously thinking in open-minded and affine ways towards using and applying digital technologies to sense exploitation and exploration possibilities.
Platform thinking	Continuously thinking in ways that apply the platform concept and its belonging phenomena to traditional tasks, products, or businesses through digital technologies.
Data-driven thinking	Continuously recognizing data's potential and considering these in decision-making or product development.
Exponential thinking	Continuous recognition and awareness of scalable and exponential characteristics of digital technologies.
Iterative thinking	Continuously thinking in the agile manifesto principles means thinking in flexible, adaptable, and uncertain ways.
Collaborative thinking	Continuous openness for communication, cooperation, and collaboration to support problem-solving, including awareness about inter- or intradisciplinary synergy effects.
Resilient thinking	Continuous tolerance for failure, thinking of failure experiences as learnings, and, in general, the cognitive ability to recover quickly from failures.

Figure 19. Conceptualization and descriptions of thinking patterns relevant in the context of digital innovation

4.1.2 Paper II: Measuring the Digital Mindset: Development and Validation of a Multidimensional Scale[14][15][16]

Previous literature that mentions the digital mindset frequently and emphasizes its effects on employees but has predominantly remained descriptive or conceptual (Allen, 2020; Leonardi & Neeley, 2022; Solberg et al., 2020). These studies have lacked the inclusion of measurement models necessary to investigate the practical impact of a digital mindset. **Paper II** aims for the development of measurement scales for the digital mindset, building upon the findings of **Paper I** and conducting three studies.

In the first study, a literature-based approach is combined with a Delphi study involving three phases, with participation from 50, 26, and 17 experts, respectively. The outcome of this effort is the development of two distinct types of scales: a Likert scale and a semantic differential scale. Both scales underwent refinement through expert pre-testing involving 11 and 8 specialists, followed by pilot surveys involving 69 and 62 participants in the initial round and 120 participants in the revision round. The second study involves the validation of these scales through a survey administered to 147 and 142 participants, employing a CB-SEM. This step assesses the validity of various multidimensional configurations of the identified thinking patterns, determining model fits for each. The third study involves further validation efforts. The finalized multidimensional concept and questionnaires were correlated with a related IT-specific trait, IT mindfulness, using data from the second study. Additionally, the questionnaire results are correlated with interview results, involving 42 participants, to provide validation.

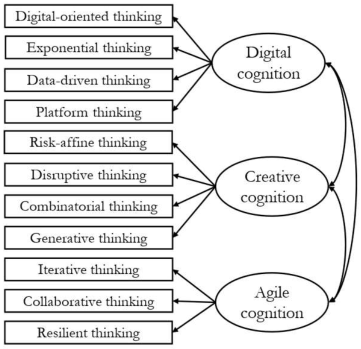
The results have yielded a 39-item Likert scale and a 39-item semantic differential scale. They also suggest that the 11 thinking patterns are not confined to a single digital mindset construct but are distributed among three coexisting and correlated higher-level constructs, respectively coined as agile, creative, and digital cognition. Figure 20 shows the final multidimensional conceptualization, which showed the best model fit and a comparison to fits of other rival models. Table 12 presents the items of the Likert scale[17].

[14] Previously published as: Hildebrandt Y., Beimborn D. (forthcoming) "Measuring the Digital Mindset: Development and Validation of a Multidimensional Scale" in the The DATA BASE for Advances in Information Systems, forthcoming

[15] Previously published as: Hildebrandt Y., Valta M., Beimborn D. (2021) "The Intangible Key for Digitalization: Conceptualizing and Measuring the "Digital Mindset"" in the proceedings of the 2021 Computers and People Research Conference, 89-91

[16] Previously published as: Hildebrandt Y., Beimborn D. (2022) "Quantifying the Digital Innovation Mindset: Development of a Measurement Instrument" in the proceedings of the 2022 Computers and People Research Conference, 1-9

[17] Only the items of the Likert scale are presented here as they were used for the other studies throughout the dissertation. See Paper II for the items of the semantic differential scale.



M2b

Model #	χ^2	df	χ^2/df	CFI	RMSEA	SRMR	AIC
Likert scale (n = 147)							
M1a	913.7	717	1.27	.942	.044	.063	1283.8
M1b	968.4	760	1.27	.938	.044	.071	1252.4
M2a	950.5	756	1.26	.942	.042	.070	1242.5
M2b	971.3	758	1.28	.937	.044	.072	**1177.3**
M3a	967.5	760	1.27	.939	.043	.071	1252.5
M3b	967.0	759	1.27	.938	.044	.071	1253.1
Semantic differential scale (n = 142)							
M1a	903.9	670	1.35	.925	.049	.069	1283.9
M1b	1020.5	715	1.43	.906	.054	.090	1310.5
M2a	999.4	715	1.39	.912	.052	.089	1209.4
M2b	986.6	711	1.39	.915	.052	.092	**1204.6**
M3a	1028.6	716	1.44	.904	.055	.089	1236.6
M3b	1030.4	717	1.44	.904	.055	.089	1236.4

Figure 20. Final multidimensional model and model fit comparisons

Table 12. Items of the developed Likert scale

Item #	Statement
Digital-oriented thinking	
DigOr1	"I always see the benefits of trying out new digital products or services."
DigOr2	"I believe that new digital products or services should always be tried out."
DigOr3	"I believe that one should always be open-minded with regard to new digital products or services."
DigOr4	"I always perceive new digital products or services with curiosity."
Exponential thinking	
Expo2	"I always have the long-term exponential growth projections of digital technologies in mind."
Expo3	"I believe that digital technologies are developing slowly in the beginning, followed by extreme growth in the future."
Expo4	"I always think of the future growth of digital technologies as an exponential curve."
Data-driven thinking	
Data1	"I always see the generated data from new digital products or services as a main business resource."
Data2	"I always think of collecting as much data as possible to ground my decisions."
Data3	"When I think about new digital products or services, I always think of the data involved and its potentials."
Data4	"Looking at data, I always see the foundation of decision-making."
Platform thinking	
Platf1	"I always think about how traditional business models could be transformed into digital platform business models."
Platf2	"I always consider how the concept of digital platforms could be applied when looking at traditional business models."
Platf3	"I always recognize the underlying mechanisms of digital platforms (e.g., network effects)."
Platf4	"I always recognize how products and services could serve as digital platforms."
Risk-affine thinking	
Risk1	"I believe choosing risky options always helps to be successful."
Risk2	"I always would consider working on a high potential project, even if the probability of failure is high."
Risk3	"I believe that the potential revenue of choosing a risky option is always worth it, even if the probability of loss is high."
Risk4	"I always would consider risky options when making decisions in a professional context."
Disruptive thinking	
Disrupt2	"I always recognize how a new digital product or service could replace established solutions."
Disrupt3	"I always see potentials for existing business models being replaced by a disruptive digital products or services."
Disrupt4	"I always see potential for digital products or services to transform entire markets."
Combinatorial thinking	
Comb1	"I always think about combining different (digital) components when solving problems."
Comb3	"When I tackle problems, I always think about combining existing (digital) solutions."
Comb4	"I always notice that digital products consist of different (digital) components."
Generative thinking	
Gen1	"If I developed a digital product or service, I would always make sure that it could be very variably used for different unanticipated use cases."
Gen2	"If I developed a new digital product or service, I would always provide possibilities for alternative use cases."
Gen3	"When using digital products or services, I always think about what else I could use them for besides their intended functions."
Gen4	"I always see potential new use cases for digital products or services that go beyond their intended use."
Iterative thinking	
Iterat2	"I think during a project it always should be possible to respond to changing requirements."
Iterat3	"I believe it should be generally left room for requirement changes during a project."
Iterat4	"During a project I always think about reacting to potential changes instead of constantly focusing on the existing plan."
Collaborative thinking	
Collab1	"I believe collaboration beyond my area of expertise is always helpful when solving problems."
Collab2	"I always think about how interdisciplinary collaborations could help to realize projects."
Collab3	"When realizing projects, I always think of collaboration instead of lone working as my preferred method of work.
Collab4	"I believe it is always helpful to work together on projects or goals."
Resilient thinking	
Resil1	"I believe it is always helpful to overcome stressful events easily."
Resil3	"During stressful events, I always think of methods to recover quickly."
Resil4	"After hard times, I always think of how I could bounce back quickly."

In summary, **Paper II** is the first systematic attempt to operationalize the widely referenced and mentioned digital mindset concept. Hence, this study enriches the IS literature and responds to RQ1 by providing a robust measurement model that enables empirical investigations into how employees' mindsets influence various facets of digital innovation. **Paper II** responds to RQ1 by deepening the conceptualization of employees' digital mindset. It reveals that the diverse conceptualized ways of thinking, previously ascribed all to the digital mindset, do not constitute a singular overarching construct but are distributed among three cognitions, namely the agile, creative, and digital cognition. Consequently, a high digital mindset means that individuals possess a high level of agile, creative, and digital cognition, which typically exhibit correlation but whose relevance may vary with the situation and tasks at hand. **Paper II** demonstrates significant correlations between these three cognitions and IT mindfulness and therefore also responds to RQ2, which is further elaborated on in **Paper III**.

4.1.3 Paper III: Gearing Up the Workforce for a Digital Future: The Role of Employees' Digital Mindset[18]

Organizations must optimize their workforce to address new occupational requirements caused by fast-evolving digital technological developments (Weritz, 2022). Rather than focusing solely on finding the most highly skilled workers, organizations should consider other factors that can enhance their workforce. Research suggests that as digital technologies like GenAI become more widespread and intuitive in the future workplace, understanding employees' perceptions of these technologies through a theory of mind will be increasingly crucial (Feuerriegel et al., 2024; Richter & Richter, 2024). In other words, organizations need to "[…] focus on mindset – not skill set" (Forbes 2020) and employees' digital mindset is said to be the key in the future of work (Gartner 2024; Leonardi and Neeley 2022). **Paper III** seeks to address these calls by exploring the nomological net of employees' digital mindset in the context of the future of work, using a three-wave survey study and PLS-SEM.

Various definitions of mindset refer to the underlying schemas and cognitive structures of individuals (French, 2016). Utilizing assumptions from schema theory, this study hypothesizes that *active* prior experiences with digital innovation are associated with the cognitions of a digital mindset. The existing literature indicates that experiences in online communities or private contexts may be particularly relevant, besides experiences made at work (Petter et al. 2018). Further, the literature highlights that new co-creative environments will be especially significant in the future of work, requiring new cognitive aspects to consider (Feuerriegel et al., 2024; Richter & Richter, 2024). Thus, **Paper III** examines the relationship between active experiences with digital innovation in work settings, private lives, and online communities and employees' digital mindset cognitions and the impact of digital mindset cognitions on co-creation with digital technology, specifically focusing on GenAI tools due to their current relevance (see Figure 21).

A survey was conducted, and 166 full-time employees met all quality criteria across all three data collection points. The data was analyzed using PLS-SEM, and a post-hoc analysis was conducted to further elaborate on non-significant paths. The findings reveal that active participation in online communities related to digital innovation positively impacts all cognitions of the digital mindset, meaning that they develop those schemas even when they lack direct personal experience. Employees who engage in digital innovation at work tend to develop creative cognition, although expected effects on digital and agile cognition were not observed. Private experiences with digital innovation were linked to increased participation in online communities and experiences with digital solutions at work. The analysis also showed that employees with higher digital and creative cognition are more likely to collaborate with GenAI tools at work. However, while agile cognition was not directly related to GenAI collaboration (see Table 13), post-hoc analyses showed it played an indirect role by enhancing digital and creative cognition, ultimately supporting GenAI tool collaboration. Lastly, the results show that employees' digital mindset cognitions mediate the relationship of experiences, meaning these cognitions better explain why employees collaborate with GenAI tools than the experiences alone.

[18] Manuscript resubmitted to: Journal of the Association of Information Systems

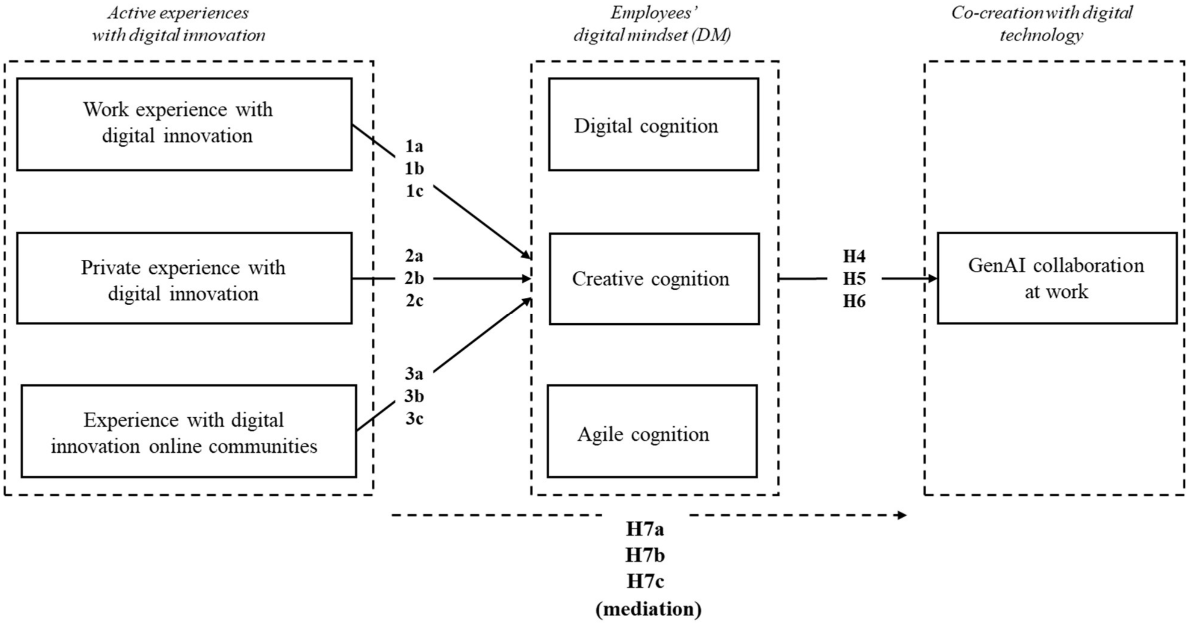


Figure 21. Research model of Paper III

Table 13. Results for the full model in Paper III

Full Model IVs: \ DV:		**Digital Cognition**	**Creative Cognition**	**Agile Cognition**	**GenAI Collaboration**
Work Experience with DI		0.125	**0.277***	0.076	0.121
Private Experience with DI		0.094	0.099	0.078	-0.027
DI Experience Online Communities		**0.284*****	**0.274*****	**0.293*****	0.059
Digital Cognition					**0.374*****
Creative Cognition					**0.335*****
Agile Cognition					-0.034
Controls	Age	0.192	0.134	0.218	0.003
	Gender	0.062	0.089	0.124	0.069
	Education	0.020	-0.022	-0.024	-0.001
	Time in Current Position	**0.200***	0.037	0.059	**-0.219****
	Work Experience	-0.061	-0.095	-0.116	-0.019
R^2		0.265	0.319	0.186	0.417
ΔR^2 compared to controls - only model		0.175	0.289	0.144	0.387
Notes: (standardized ß; *: $p < 0.05$; **: $p < 0.01$ ***: $p< 0.001$); DI: Digital Innovation; IV: Independent Variable; DV: Dependent Variable					

In summary, **Paper III** enhances the understanding of the digital mindset by showing that it is closely related to preceding online and partly work experiences with digital innovation. The digital mindset is linked to how employees co-create with digital technologies, and different cognitions of the digital mindset may relate to those behaviors in various ways, including direct and indirect relationships. This broader perspective enhances our understanding of how cognitive factors are connected to employee actions in the context of technological advancements, having significant implications for organizations that aim to enhance employee development and optimize their workforce. Employees' digital mindset provides a deeper understanding of why they exhibit more relevant behaviors for future work, which organizations can utilize to optimize their recruitment strategies. Consequently, **Paper III** addresses RQ2 by empirically demonstrating that experiences with digital innovation influence the digital mindset and how it, in turn, influences relevant interaction with digital technologies. Additionally, as collaboration with GenAI tools can also be interpreted as IS infusion behavior, **Paper III** addresses RQ4 by highlighting the positive relationship of employees' digital mindset with IS infusion behaviors.

4.2 Chapter II: Effects of Employees' Digital Mindset on IS Infusion Behaviors

Papers I-III of Chapter I primarily focus on the conceptualization of the mindset concept itself. Subsequent papers (**Papers IV – VI**) in Chapter II shift towards a deeper exploration of IS infusion behaviors, highlighting the pivotal role of a digital mindset in fostering these behaviors. Specifically, they address how IS infusion behaviors have been examined in past literature and the significance of employees' digital mindset in this context, with a particular emphasis on creative cognition and the software environment of Microsoft PowerPoint.

4.2.1 Paper IV: Affordance Perception Through a Digital Mindset: A Dual Process Theory Perspective[19][20]

Prior research primarily provides insights into which affordances exist for different technologies (Karahanna et al., 2018) and how affordances can be actualized (Haag et al., 2022). Although affordance perception is a precondition for their actualization, it has received relatively little attention (Lehrig et al., 2017). In the context of Microsoft PowerPoint, **Paper IV** investigates how affordance perceptions differ based on different digital mindset levels, specifically focusing on the creative cognition, using the dual process theory of human cognition (implicit vs. explicit perception) (Gawronski & Creighton, 2013) and two types of affordances, namely non-canonical and canonical affordances. **Paper IV** conducts an online survey-based prestudy, two IATs, a sorting approach, and a survey. The data was analyzed using correlations, t-tests, and ANCOVA.

Paper IV theorizes that employees with high digital mindset levels implicitly perceive more non-canonical affordances, but not canonical affordances. Analogously, it is hypothesized that individuals with a high digital mindset perceive more explicit non-canonical affordances but not canonical ones. Furthermore, a correlation between implicit and explicit perceptions is also assumed based on the foundations of the dual process theory.

Paper IV conducted a prestudy to collect (n=100) and validate (n=114) non-canonical and canonical affordances for Microsoft PowerPoint. Subsequently, a four-phase online study with 189 professional users of Microsoft PowerPoint was conducted, including two IATs to measure implicit perception, two sorting approaches to measure explicit perception, and a survey to measure employees' digital mindset. Correlation, t-tests and ANCOVA analyses revealed that individuals with a high expression of a digital mindset demonstrate significantly higher levels of implicit as well as explicit non-canonical affordance perception. Further, high levels of implicit non-canonical affordance perception are related to high levels of explicit perception of those same affordances (see Table 14 and Table 15).

In summary, **Paper IV** introduces an implicit perspective on affordance perception and shows that the influence of individual differences on affordance perception is not universal but depends on the type of affordance. Furthermore, **Paper IV** shows that the perception of innovative (non-canonical) affordances, as a precondition for their actualization and therefore IS infusion, can be fostered by developable IT-specific but technology-unspecific traits such as a digital mindset and thus provides answers to RQ4. Furthermore, the findings provide answers to RQ1 and RQ2, as they confirm that the mindset Likert scale can indeed be used as a proxy for perceptions and confirm correlations with the control variables of PIIT and IT mindfulness. While **Paper IV** provided insights on the relationship of a digital mindset on affordance perceptions, **Paper V** elaborates further on the role of a digital mindset for their actualization, respectively, actual IS infusion behavior.

[19] Previously published as: Hildebrandt Y., Beimborn D., "Affordance Perception Through a Digital Mindset: A Dual Process Theory Perspective" in the proceedings of the 44th International Conference on Information Systems, Hyderabad, India (Best Paper Nomination)
[20] Previously published as: Hildebrandt Y., Beimborn D., "Effects of the Digital Mindset on Affordance Perceptions" in the proceedings of the 2023 Computers and People Research Conference, Pomona, California, US (Poster Session)

Table 14. Mean Comparisons by Groups

Compared Groups	*Mean Contrast*	*Difference*	*t*	*p value*
Outcome Variable: Implicit Non-Canonical Affordance Perception (INCAP)				
Low vs. High Digital Mindset	**.514 vs. .801**	**.281**	**-3.943**	**<.001**
Low vs. High ENCAP	**.569 vs. .694**	**.125**	**-2.087**	**.038**
Outcome Variable: Explicit Non-Canonical Affordance Perception (ENCAP)				
Low vs. High Digital Mindset	**.703 vs. .888**	**.185**	**-3.333**	**<.001**
Low vs. High INCAP	**.769 vs. .901**	**.132**	**-2.626**	**.010**
Outcome Variable: Implicit Canonical Affordance Perception (ICAP)				
Low vs. High Digital Mindset	.707 vs. .650	.057	.654	.515
Low vs. High ECAP	.656 vs. .666	.009	-.054	.957
Outcome Variable: Explicit Canonical Affordance Perception (ECAP)				
Low vs. High Digital Mindset	.995 vs. .997	.002	-.660	.510
Low vs. High ECAP	.989 vs. .995	.006	-.841	.402

Table 15. ANCOVA tests

Outcome Variable	Source	DF	MS	F	p	PES (effect size)
Implicit Non-Canonical Affordance Perception (INCAP)	Digital Mindset	1	1.38	10.09	.002	.092
	ENCAP	1	.835	5.86	.017	.055
Explicit Non-Canonical Affordance Perception (ENCAP)	Digital Mindset	1	.695	7.79	.006	.072
	INCAP	1	.325	4.43	.038	.040
Implicit Canonical Affordance Perception (ICAP)	Digital Mindset	1	.222	1.09	.297	.011
	ECAP	1	.003	.017	.896	.000
Explicit Canonical Affordance Perception (ECAP)	Digital Mindset	1	.001	1.39	.242	.014
	ICAP	1	.000	.305	.582	.003

4.2.2 Paper V: IT-Specific Traits and IS Infusion Behaviors: Effects of a Digital Mindset[21]

Previous literature assumes that IS infusion behaviors, from an individual point of view, are primarily determined by IT-specific and behavior-specific traits, such as PIIT and IT mindfulness (Tams & Dulipovici, 2022; Thatcher et al., 2018), which are based on overarching broad personality traits that are relatively stable and difficult to develop over time. **Paper V** challenges this assumption by investigating how employees' digital mindset, focusing on creative cognition, both directly and indirectly affects such IT-specific traits and following behaviors in the context of narrow and broad IT. It uses the UTAUT and integrates PIIT, IT mindfulness, and digital mindset as predictors to explain adaptive system use, a more multidimensional construct of IS infusion than previously investigated constructs, specifically of Microsoft PowerPoint (i.e., narrow IT) and smartphones (i.e., broad IT). **Paper V** conducts a four-wave online survey with two samples, and the results were analyzed using PLS-SEM.

Paper V develops a research model rooted in the UTAUT, adapting it to the context of IS infusion. It posits, on one hand, that a digital mindset exerts a positive influence on conventional UTAUT predictors, encompassing expectations regarding IS infusion behavior (i.e., performance expectancy, effort expectancy, social influence, facilitating conditions) (Venkatesh et al., 2003). Simultaneously, it theorizes the impact of newer predictors, including IT-specific traits like PIIT, IT mindfulness, and digital mindset on both the intention for and the actual implementation of IS infusion behavior. In line with the findings of **Paper III**, it hypothesizes that digital mindset effects are mediated by PIIT and IT mindfulness.

To explore these relationships, **Paper V** carries out a four-wave online survey centered around the use of Microsoft PowerPoint (n=139) and smartphones (n=155) for work-related tasks. The research model is evaluated using PLS-SEM. The findings indicate that employees' digital mindset exerts a positive influence on all the traditional UTAUT predictors. However, the effects are more pronounced in narrower IT contexts. Similar outcomes emerge concerning the impact on PIIT and IT mindfulness. In both technological contexts, no direct influence of a digital mindset on the intention or actual implementation of IS infusion behavior is observed. Instead, the results revealed divergent indirect effects through other IT-specific traits. In the context of narrow IT (i.e., Microsoft PowerPoint), IT mindfulness mediates the effects of employees' digital mindset, whereas in the context of broad IT (i.e.,

[21] Manuscript submitted to: Computers in Human Behavior.

smartphones), PIIT mediates these effects (see Table 16).

In summary, **Paper V** provides valuable insights by demonstrating that, by using adaptive system use to approach IS infusion behaviors, IT-specific traits exert an influence not only on whether individuals will explore new system features but also on how they utilize and adapt existing features, and these effects tend to be more prominent in the context of narrow IT as opposed to broad IT. Employees' digital mindset indirectly impacts IS infusion behaviors, with the specific technology scope determining which traits serve as intermediaries, responding to RQ4. Furthermore, digital mindset plays a pivotal role in shaping individuals' behavioral inclinations and expectations concerning digital technologies, which responds to RQ2.

Table 16. Overview of all tested hypotheses in Paper V; DM: Digital mindset; PE: Performance expectancy; EE: Effort expectancy; SI: Social influence; FC: Facilitating conditions; PIIT: Personal innovativeness with IT; ITM: IT mindfulness; BIX: Behavioral intention to explore; ASU: Adaptive system use; MSP: Microsoft PowerPoint; SMA: Smartphones

Hypotheses	MS PowerPoint Sample	Smartphone Sam ple	Difference (MSP SMA)
H1a: DM → PE	✓	✓	**0.235***
H1b: DM → EE	✓	✓	0.094
H1c: DM → SI	✓	✓	0.211
H1d: DM → FC	✓	✓	0.041
H2a: DM → PIIT	✓	✓	**0.174***
H2b: DM → ITM	✓	✓	**0.231***
H3: DM → BIX	×	×	-0.026
H4: DM → ASU	×	×	0.103
H5: DM → PIIT → ASU DM → PIIT → BIX → ASU	× ×	× ✓	0.064 **-0.051***
H6: DM → ITM → ASU DM → ITM → BIX → ASU	✓ ✓	× ×	0.060 0.013
Established relationships of the UTAUT			
PE → BIX	✓	✓	-0.004
EE → BIX	×	×	-0.032
SI → BIX	✓	×	0.158
FC → ASU	×	×	0.160
PIIT → BIX	×	✓	**-0.252***
ITM → BIX	✓	✓	0.092
PIIT → ASU	×	×	0.086
ITM → ASU	✓	×	0.071
BIX → ASU	✓	✓	-0.171

4.2.3 Paper VI: Hunting Darwin's Counterpart: Tracing the Exaptation Phenomenon in IS Research[22]

Exaptation can be viewed as a particular form of harnessing the potential of IS by reconfiguring the functions of existing artifacts. Prior IS research has emphasized the need for incorporating exaptation theory as digital technologies form dynamic problem-solution pairs (Nambisan et al., 2017). This integration is vital for elucidating how, why, and when digital technologies can be repurposed effectively. At the same time, similar concepts like software reuse (Vitharana et al., 2010), enhanced IT use (Bagayogo et al., 2014), or feature repurposing (Sun, 2012) have already been used, making the current state of research blurry and systematic links to the previous literature difficult. **Paper VI** addresses this issue by conducting a scoping literature review, presenting the existing state of research and structure of the IS literature concerning the phenomenon of exaptation.

The literature review in **Paper VI** encompassed a comprehensive search, using 23 synonyms related to exaptation, including more generic constructs. The search was conducted across 22 different outlets, yielding a final sample of 46 relevant articles, which were organized into clusters and categories for further examination.

[22] Previously published as: Hildebrandt Y. (2022) "Hunting Darwin's Counterpart: Tracing the Exaptation Phenomenon in IS Research" in the proceedings of the 17th International Conference on Wirtschaftsinformatik, February 2022, Nürnberg, Germany

The results show that a large part of the literature considers higher-level phenomena that include exaptation but does not consider it separately. On the other hand, there are multidimensional phenomena that include exaptation as a distinct construct, but explicit studies are rare. Further, the literature on clearly delimited phenomena such as feature repurposing or poaching explicitly investigates the phenomenon, but is, for the most part, conceptual and allows few empirical conclusions (see Table 17).

The content analysis revealed a complex nature of exaptation and the repurposing of digital technologies, demonstrating that both technical resources and various other resources can be coopted[23] regarding diverse attributes. It also underscored that exaptation can be conceptualized as a multi-stage process. Furthermore, the analysis showed that most studies emphasize the pivotal role of human attributes and cognitive differences for the exaptation process as they are essential factors that lead to exaptations but also influence their complexity. The literature emphasizes that the character and likelihood of exaptations are contingent upon a combination of social and organizational environmental factors, the intrinsic nature of the artifact, and the characteristics of the task. In terms of the effects of exaptation, it suggests a spectrum of both negative and positive consequences, encompassing economic aspects, performance outcomes, and human behavior.

Table 17. Identified research cluster in Paper VII

Research Cluster	N	Concept	Subconcept	Exemplary References
1: Concepts that include exaptation, but do not distinguish between subconcepts	18	Software Reuse	-	(Frakes & Fox, 1995)
		Innovative IT Use		(Rahrovani & Pinsonneault, 2020)
		IT Adaptation		(Kashefi et al., 2015)
2: Concepts that include exaptation and distinguish an exaptation subconcept	14	Adaptive System Use	Feature Repurposing	(Sun, 2012)
		Forks	Pseudoforks	(Andersen & Ingram, 2019)
		Innovative IT Use	Repurposing	(Ebner et al., 2019)
		Post Adoption Behavior	Feature Extension	(Jasperson et al., 2005)
3: Concepts that are explicit exaptation	9	-	Unanticipated Software Use	(Singletary et al., 2002)
			Repurposing	(Nambisan et al., 2017)
			Second Life Application	(Klör et al., 2015)
			Poaching	(Clemons & Hitt, 2004)
4: Research on exaptation	2	-	Exaptation	(Chan & Lim, 2020)
				(Ebel et al., 2014)
5: Phenomena that describe exaptation, but do not use a specific term	3	-	-	(Hardaway & Will, 1997)
				(Huang, 2001)
				(Strickland, 1997)

In summary, **Paper VI** contributes to addressing RQ3 by offering a comprehensive overview of various levels, layers, and facets of exaptation research within the existing IS literature. Through the research clusters and drawn conclusions it shows that the area of explicit research on exaptation, being a special form of IS infusion behavior, is still severely underrepresented and in need of further empirical research.

4.3 CHAPTER III: EMPLOYEES' DIGITAL MINDSET AS A MITIGATING FACTOR FOR TECHNOSTRESS

Papers IV-VI of Chapter II focused on better understanding the role of employees' digital mindset in fostering IS infusion behaviors. Finally, **Paper VII** and **VIII** of Chapter III focus on the role of employees' digital mindset in addressing negative consequences. With continuous digitization, employees in the realm of digital innovation face a constant influx of new digital technologies and processes, precipitating associated stress (Ragu-Nathan et al., 2008). Hence, these papers aim for a better understanding of its role in mitigating technostress. Specifically, they answer the research question of how employees' digital mindset can moderate effects of IS design on technostress and how it can mitigate technostress effects, using primarily thinking patterns from creative cognition. In **Paper VII**, the term

[23] To „coopt" describes the verbal expression of exaption.

IS use stress is used synonymously to technostress.

4.3.1 Paper VII: Mitigating IS Use Stress: The Role of Digital Nudging and Digital Mindset[24]

Recent findings suggest that digital nudging, which involves user interface design principles that influence users' decision-making predictably without prohibiting options or providing economic incentives (Weinmann et al., 2016), might be an interesting IS design aspect to consider for mitigating IS use stress (Tarafdar et al., 2019). Existing research indicates that IS use stress and digital nudging are influenced by users' individual characteristics (Srivastava et al., 2015; Ingendahl et al., 2021). **Paper VII** seeks to develop an understanding of how the implementation of digital nudging principles in IS design influences users' perceptions of IS use stressors.

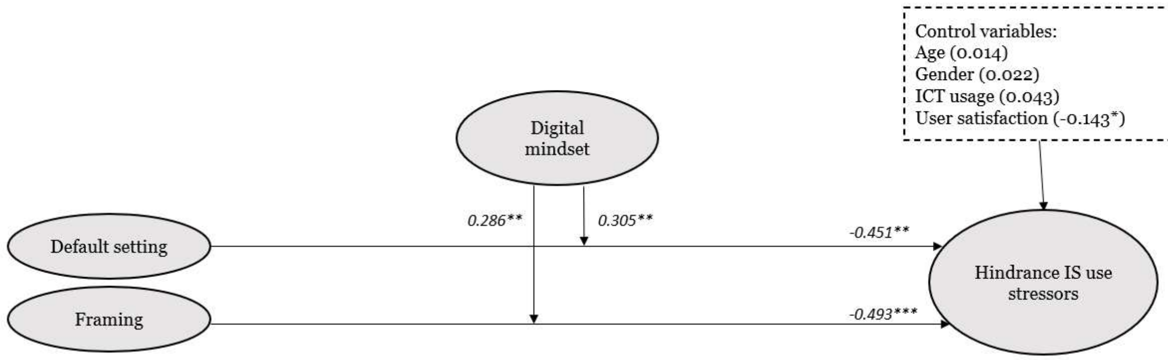


Figure 22. Results of Paper VII

Paper VII uses the transactional model of stress to theorize that digital nudges reduce perceived hindrance IS use stressors, while assuming that a digital mindset moderates these effects. To answer the research question, an online experiment with a follow-up questionnaire was conducted, involving 214 participants. Participants were randomly assigned to either a framing nudge condition, a default setting condition, or a control group with no nudges. Data were analyzed using one-way ANOVA and multiple regression analysis to test the hypotheses. The study found that framing and default setting nudges significantly reduced hindrance IS use stress, with participants in these conditions reporting lower stress levels; moreover, individuals with a high digital mindset experienced an even greater reduction in stress from these nudges.

In summary, **Paper VII** reveals that employees' digital mindset accelerates the effectiveness of reducing the effects of digital nudges on hindrance IS use stress, providing answers to RQ5.

4.3.2 Paper VIII: Fostering the Digital Mindset to Mitigate Technostress: An Empirical Study of Empowering Individuals for Using Digital Technologies[25][26]

Previous literature has shown that technostress has adverse effects on employees' job performance and increases their intentions to leave their current positions, ultimately impacting organizational success negatively. **Paper VIII** explores the role of employees' digital mindset in shaping their responses (i.e., technostrains) to technostressors, focusing primarily on the thinking patterns of the creative cognition. It uses an online survey and CB-SEM for data analysis.

Paper VIII uses the transactional model of stress to theorize that perceived technostressors negatively affect job performance and job satisfaction and positively affect turnover intention (i.e., technostrains), while assuming that a digital mindset moderates these effects. Additionally, direct positive effects of employees' digital mindset on job satisfaction and job performance, as well as a negative effect on employees' turnover intention are hypothesized. Based on previous findings it is also assumed that job satisfaction increases job performance and decreases turnover intention.

[24] Manuscript currently in preparation for submission.
[25] Previously published as: Valta M., Hildebrandt Y., & Maier, C. (forthcoming) "Embracing the Digital Mindset to Overcome Technostress: An Empirical Study of Empowering Individuals for Using Digital Technologies" in Internet Research (forthcoming)
[26] Previously published as: Valta M., Hildebrandt Y., & Maier, C. (2022) "Reducing Technostress: The Role of the Digital Mindset" in the proceedings of the twenty-eighth Americas Conference on Information Systems (AMCIS), Minneapolis, Minnesota, US

Paper VIII conducted an online survey among 151 employees who regularly use digital technologies and encounter various technostressors in their daily work, which was analyzed using CB-SEM. The findings reveal that employees' digital mindset influences technostress. Employees with high levels of digital mindset react with less severe effects on perceived technostressors. Further, employees with high levels of digital mindset perform well and are satisfied with their job (see Figure 23).

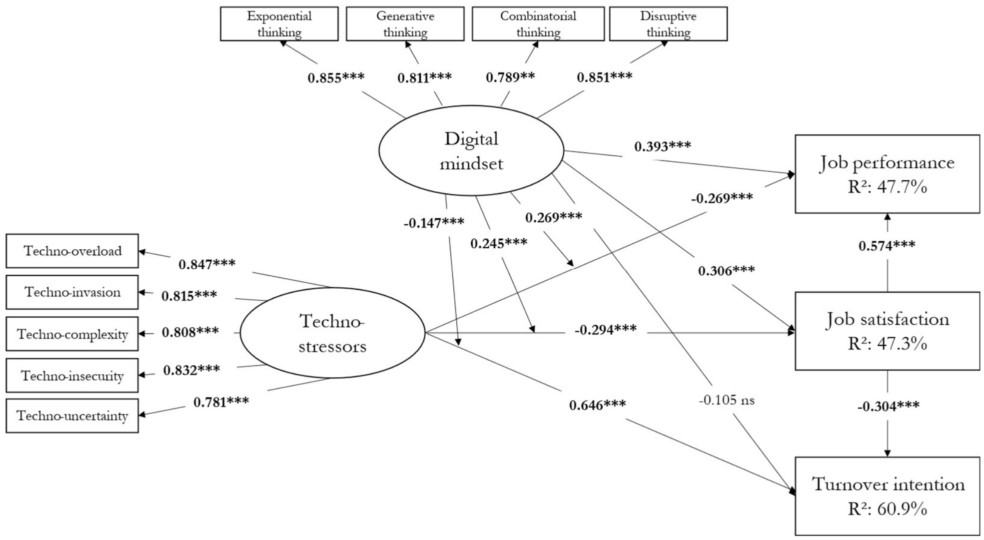


Figure 23. Results of Paper VIII

In summary, **Paper VIII** reveals that employees' digital mindset buffers the adverse effects of technostressors and directly influences psychological and behavioral reactions to technostressors, providing answers to RQ5.

5 CONTRIBUTIONS

The results of the paper extend the current state of knowledge through various theoretical contributions and, therefore, amalgamate into an overall oeuvre, which is presented in this section. In addition, this section presents recommendations for practitioners.

5.1 CONTRIBUTIONS TO LITERATURE

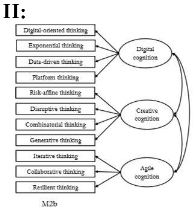
This dissertation includes three chapters, each dedicated to pursuing a specific overarching research objective.

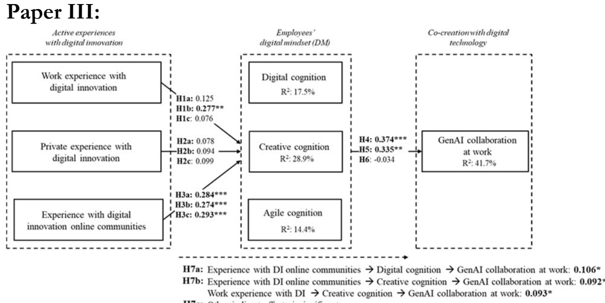
5.1.1 Contributions of Chapter I: Conceptualization, Operationalization, and Nomological Net of the Digital Mindset

The focus of the three papers is to generate new insights into the digital mindset concept itself. Within the IS literature, the concept of a digital mindset or a new mindset for digital technologies among employees is frequently referred to as a critical factor for organizations when facing different aspects of digitalization and to appropriately prepare their workforce for a digital future (Bhattacharyya et al., 2020; Lorenz & Buchwald, 2023; Weritz, 2022). At the same time, there was no definition, conceptual approach, or measurement of what constitutes such a mindset from both a psychological and content-related perspective, which are the prerequisites for further empirical investigations and theory development (Gregor, 2006). This lack of clarity and references to psychological literature about mindsets makes it harder to do real-world research on the often-suggested importance of this concept, what it really means, and what its qualities are. **Papers I** and **II** lay the foundation for further theory development and contribute a general definition and multidimensional conceptualization for the context of digital innovation. **Paper III** extends the existing knowledge by highlighting the nomological net and providing evidence for the digital mindset as a mediator for the effects of experiences on how employees interact with digital technologies. An overview of these contributions is given in Table 18. They are described in more detail below.

Table 18. Overview of contributions of Chapter I

<table>
<tr><th>Existing literature…</th><th>The results show…</th><th>The results add the new knowledge that…</th></tr>
<tr><td>
• …frequently mentions a digital mindset as important for digitalization
• …provides no definitions of a digital mindset in the IS literature
• …showed related concept definitions (e.g., agile mindset) or approaches from related disciplines neglect psychological foundations
</td><td>
Paper I:
…a digital mindset is defined as “A digital mindset describes a collection of cognitive schemas, or thinking patterns, accumulated knowledge and experience, regarding concepts and aspects of digitalization that express themselves as cognitive filters, processes and beliefs and represent how individuals make sense of digital technologies, their use, application, and consequences in individual, organizational, and societal contexts”
Paper II:
• …a digital mindset can be distinguished from related constructs based on its underlying psychological concept, conceptual breadth, malleability, and situational variance
</td><td>
…a digital mindset can be classified as a malleable and situationally invariant IT-specific trait and describes a collection of cognitive schemas regarding different aspects of digitalization that are psychologically expressed differently
</td></tr>
<tr><td>
• …showed conceptualizations of mindsets in IS research emphasized on digital transformation
• …lacks a comprehensive conceptualization of a digital mindset
• …would only let scholars assess a digital mindset by combining different constructs with overlapping and diverging definitions
</td><td>
Paper I:


<table>
<tr><th>Thinking pattern</th><th>Description</th></tr>
<tr><td>Disruptive thinking</td><td>Continuously questioning existing solutions and imagining how digital technologies could induce alternative scenarios, including fundamental pivots.</td></tr>
<tr><td>Combinatorial thinking</td><td>Continuously integrating the combinatorial characteristics of digital technologies in solution finding to broaden the potential solution space.</td></tr>
<tr><td>Generative thinking</td><td>Continuously thinking in ways that foster and include solution repurposing by integrating abstraction and modularity during development.</td></tr>
<tr><td>Risk-affine thinking</td><td>Continuous readiness of individuals to take calculated risks regarding digital technologies and business domains.</td></tr>
<tr><td>Digital-oriented thinking</td><td>Continuously thinking in open-minded and affine ways towards using and applying digital technologies to sense exploitation and exploration possibilities.</td></tr>
<tr><td>Platform thinking</td><td>Continuously thinking in ways that apply the platform concept and its belonging phenomena to traditional tasks, products, or businesses through digital technologies.</td></tr>
<tr><td>Data-driven thinking</td><td>Continuously recognizing data's potential and considering these in decision-making or product development.</td></tr>
<tr><td>Exponential thinking</td><td>Continuous recognition and awareness of scalable and exponential characteristics of digital technologies.</td></tr>
<tr><td>Iterative thinking</td><td>Continuously thinking in the agile manifesto principles means thinking in flexible, adaptable, and uncertain ways.</td></tr>
<tr><td>Collaborative thinking</td><td>Continuous openness for communication, cooperation, and collaboration to support problem-solving, including awareness about inter- or intradisciplinary synergy effects.</td></tr>
<tr><td>Resilient thinking</td><td>Continuous tolerance for failure, thinking of failure experiences as learnings, and, in general, the cognitive ability to recover quickly from failures.</td></tr>
</table>
Paper II:


<table>
<tr><th colspan="8">Likert scale (n = 147)</th></tr>
<tr><th>Model #</th><th>χ^2</th><th>df</th><th>χ^2/df</th><th>CFI</th><th>RMSEA</th><th>SRMR</th><th>AIC</th></tr>
<tr><td>M1a</td><td>913.7</td><td>717</td><td>1.27</td><td>.942</td><td>.044</td><td>.063</td><td>1283.8</td></tr>
<tr><td>M1b</td><td>968.4</td><td>760</td><td>1.27</td><td>.938</td><td>.044</td><td>.071</td><td>1252.4</td></tr>
<tr><td>M2a</td><td>950.5</td><td>756</td><td>1.26</td><td>.942</td><td>.042</td><td>.070</td><td>1242.5</td></tr>
<tr><td>M2b</td><td>971.3</td><td>758</td><td>1.28</td><td>.937</td><td>.044</td><td>.072</td><td>1177.3</td></tr>
<tr><td>M3a</td><td>967.5</td><td>760</td><td>1.27</td><td>.939</td><td>.043</td><td>.071</td><td>1252.5</td></tr>
<tr><td>M3b</td><td>967.0</td><td>759</td><td>1.27</td><td>.938</td><td>.044</td><td>.071</td><td>1253.1</td></tr>
<tr><th colspan="8">Semantic differential scale (n = 142)</th></tr>
<tr><td>M1a</td><td>903.9</td><td>670</td><td>1.35</td><td>.925</td><td>.049</td><td>.069</td><td>1283.9</td></tr>
<tr><td>M1b</td><td>1020.5</td><td>715</td><td>1.43</td><td>.906</td><td>.054</td><td>.090</td><td>1310.5</td></tr>
<tr><td>M2a</td><td>999.4</td><td>715</td><td>1.39</td><td>.912</td><td>.052</td><td>.089</td><td>1209.4</td></tr>
<tr><td>M2b</td><td>986.6</td><td>711</td><td>1.39</td><td>.915</td><td>.052</td><td>.092</td><td>1204.6</td></tr>
<tr><td>M3a</td><td>1028.6</td><td>716</td><td>1.44</td><td>.904</td><td>.055</td><td>.089</td><td>1236.6</td></tr>
<tr><td>M3b</td><td>1030.4</td><td>717</td><td>1.44</td><td>.904</td><td>.055</td><td>.089</td><td>1236.4</td></tr>
</table>
</td><td>
…, in the context of digital innovation, employees’ digital mindset is not to be understood as a single construct but three coexisting multidimensional constructs, respectively cognitions
</td></tr>
<tr><td>
• …lacks empirical operationalization of the digital but also related mindsets
• …does not enable verification of influence factors, effects, and in general the anticipated relevance of such mindsets
</td><td>
Paper II:
• …a validated 39-item Likert scale
• …a validated 39-item semantic differential scale
Paper III:
• …employees digital mindset shows hypothesized effects within a nomological net, indicating nomological validity of the scales
Paper IV:
• …survey measurements correlate with implicit measurements
</td><td>
…employees’ digital mindset can be measured using two questionnaire-based approaches, whereas the choice depends on the measurement context
</td></tr>
<tr><td>
• …predominantly mentions a digital mindset as a factor that influences potential benefits for organizations
• …hardly mentions how such a mindset can be developed or build
• …indicates that in the future of work and co-creative environments, mindsets become more relevant
</td><td>
Paper III:


</td><td>
…digital mindset is positively related to employees’ co-creation with digital technologies
…employees’ digital mindset helps us better understand why certain employees with different experiences across the entire workforce co-create with digital technologies
… the digital mindset is significantly related to private (online) experiences with digital innovation, not just workplace experiences
</td></tr>
</table>

A digital mindset can be classified as a malleable and situationally invariant IT-specific trait that describes a collection of cognitive schemas based on accumulated knowledge and experience regarding different aspects of digitalization that are psychologically expressed differently.

Paper I contributes a previously missing definition: a digital mindset essentially encompasses experience and knowledge pertaining to digital innovation and digital transformation as components of digitalization, which can manifest and be observed in three different ways. This definition integrates prior IS literature that mentioned a digital mindset in different contexts by encompassing the wide range of aspects that come along with digitalization (Demirkan et al., 2016; Hund et al., 2021). Moreover, it extends existing findings regarding context-specific mindsets by acknowledging the disparate interpretations of mindsets in psychological literature and diverse perspectives on mindsets (French, 2016). By presenting a general and context-agnostic definition, **Paper I** adds to the literature a clearer lens and frame of reference for recognizing and distinguishing what qualifies as a digital mindset extending qualitative works that mentioned a digital mindset (Davison & Ou, 2017; Ohain von, 2019), enabling more adequate results for future research endeavors. Additionally, it resolves previous inconsistencies and contradictions that have existed between IS approaches and definitions regarding digital mindsets (Mordi & Schoop, 2020) and psychological literature (French, 2016). Additionally, it extends management and psychological literature by incorporating the digital context into the existing discourse on mindsets (e.g., globalization or stress) (Gupta & Govindarajan, 2002; Huebschmann & Sheets, 2020), in addition to self-related mindsets (e.g., growth mindset) (Dweck & Yeager, 2019). Thus, **Paper I** contributes significantly to both IS and psychological literature by providing an inclusive definition for understanding a digital mindset.

Additionally, **Paper II** contributes through a theoretical delineation and classification of the digital mindset specifically in the context of digital innovation, providing researchers with a classification of how it aligns with other existing traits and mindsets in the literature (e.g., IT mindfulness, PIIT, computer self-efficacy, individual creativity). Hence, **Paper II** contributes to existing research on IT-specific traits (Davis & Yi, 2012; Thatcher et al., 2018) by theoretically positioning the digital mindset in IS research and adding it as an IT-specific trait. **Paper III** enhances this definition by including the theoretical perspective of cognitive schemas that enhances these previous definitions and conceptualizations.

In the context of digital innovation, employees' digital mindset is not to be understood as a single construct but as three multidimensional coexisting constructs.

Paper I advances beyond existing concepts by pioneering a comprehensive and multidimensional conceptualization of employees' digital mindset, encompassing 11 distinct thinking patterns important for aspects that arise with different tasks in the context of digital innovation. By doing so, **Paper I** extends prior indications of a digital mindset's relevance (Davison & Ou, 2017; Grover et al., 2022), complementing these with a comprehensive description that allows further research. While previous works described a digital mindset in the context of digital transformation (Solberg et al., 2020), **Paper I** extends the literature by formulating a more detailed understanding of the concept in the complementary context of digital innovation. **Paper II** contributes by theoretically analyzing how the conceptualization overlaps with content aspects of previously existing related (and conceptualized) mindset concepts (Eilers et al., 2022; Imran & Gregor, 2019; Kahn, 2018) that contain aspects of digital innovation but standardizes them in terms of their psychological view of what a mindset is. Hence, the developed multidimensional construct enables researchers to investigate the relevant thinking patterns for tasks in digital innovation without combining different (partly not compatible) mindset concepts and thus distorting the validity and consistency of results. Additionally, the conceptualization, combined with the description of thinking patterns and underlying mindset definition, affords researchers the ability to theorize potential relationships.

Paper II contributes with a crucial insight—that a digital mindset should not be perceived as a monolithic construct encompassing all thinking patterns. These findings are in line with prior indications that indicate multidimensionality of a digital mindset (Leonardi & Neeley, 2022), but argue that it should be viewed as comprising three distinct cognitions that group closely related thinking patterns rather than a singular construct. Although these cognitions and their associated thinking patterns exhibit correlations, they may not all be equally pertinent and required at the same time for every task within the domain of digital innovation, suggesting future studies to investigate single cognitions that might particularly correspond to aspects of specific tasks. Simultaneously, this conceptualization suggests that, when viewing employees' digital mindset globally, a high level of digital mindset implies the concurrent presence of high levels of all three cognitions. However, the distinction within three cognitions suggests that when analyzing relationships of the digital mindset of employees and a specific aspect, behavior, or task of digital innovation, a single cognition with corresponding thinking patterns can adequately serve as a proxy. **Paper III** and the post-hoc result add to this understanding that effects of employees' digital mindset cognitions might differ, and interaction effects between cognitions should be considered with the investigation of specific behaviors or tasks.

Employees' digital mindset can be measured using two questionnaire-based approaches, whereas the choice depends on the measurement context.

Paper II makes a notable contribution to the IS literature by introducing two measurement instruments: a Likert scale and a semantic differential scale. It demonstrates that both scales can effectively capture the multidimensional nature of employees' digital mindset. By providing valuable guidance on various properties and criteria relevant to these measurement instruments, **Paper II** adds to the provision of the mere measurement scales by recommending that future studies exploring employees' digital mindset should consider their specific survey objectives when selecting the appropriate measurement instrument. These findings bear significance beyond the scope of IS literature, as they mark the first instance of a measurement instrument considering the diverse expressions of mindsets, aligning with the diverse psychological perspectives (Dweck & Yeager, 2019; French, 2016; Gollwitzer, 2012; Rhinesmith, 1992). Therefore, scholars from the psychological or management disciplines can use the measurement development process as a guideline to operationalize other context-specific mindsets that integrate these mindset perspectives. **Paper III** strengthens the credibility of the measurement instrument through further assessments of nomological validity. In turn, **Paper IV** extends these results by offering evidence of disparate implicit perceptions, therefore aligning with the existing research that emphasizes that implicit phenomena, such as a digital mindset, can be discerned through explicit measurements. Hence, the combined insights derived from **Paper II** and conclusions from **Papers III** and **IV** empower future researchers to conduct robust and valid empirical studies on employees' digital mindset.

Employees' digital mindset helps us better understand why certain employees co-create with digital technologies.

Paper III shows that employees' digital mindset cognitions are positively related with employees' co-creation behaviors with digital technologies. Hence, it can serve as an essential cognitive explanatory factor for why employees work differently due to future technological advancements. Additionally, the results help us understand why employees' prior experiences lead to those behaviors. It is not merely the experiences themselves, but the cognitive schemas developed through these experiences that result in behavior beneficial to the organization. With these insights, **Paper III** builds on existing work that already suggests other factors besides skills for the IT workforce (Chen et al., 2022; Petter et al., 2018) by demonstrating employees' digital mindset as a factor that is relevant for the entire workforce. Furthermore, **Paper III** connects to previous works that indicate theoretically that employees' digital mindset will be a crucial factor for the future workforce (Leonardi & Neeley, 2022; Ohain von, 2019; Weritz, 2022; Zhao et al., 2023) and provides empirical evidence that it explains why some employees are more proactive and innovative in their use of these technologies, going beyond what can be attributed to skills or experiences alone. It contributes to the existing literature by proposing employees' digital mindset as a new relevant factor that determines human capital of organizations, which future researchers and theoretical models should consider when aiming for a better understanding of what factors can optimize an organization's entire workforce for the future of work.

Employees' digital mindset is primarily related to private (online) experiences with digital innovation.

Paper III shows that private experiences with digital innovation are significantly related to the formation of the cognitions associated with employees' digital mindset, especially their experiences in online communities. The post-hoc analysis further revealed that it is irrelevant whether individuals experiment with digital innovations privately or engage with such topics in online communities, as these experiences are closely related. These findings align with the literature on the future of work, which has shown that non-work-related experiences are relevant for skills in the IT workforce (Chen et al., 2022; Petter et al., 2018), extending this relevance of private experiences (both online and offline) also to cognitive aspects like employees' digital mindset. Additionally, these findings extend the conceptual work on the digital mindset, which theorized the influence of such experiences, supporting those theoretical claims with empirical evidence. Therefore, **Paper III** provides evidence for the potential of employees' mindset to change, as such experiences can be actively shaped through active training and interventions, adding those experiences to the nomological net of employees' digital mindset. Hence, **Paper III** contributes to the existing literature by broadening the nomological net and the theory of the digital mindset, adding experiences with digital innovation as a related factor.

Relationships between digital mindset cognitions and behaviors can vary, and the interplay between different cognitions should be considered.

Paper II suggests that employees' digital mindset can be measured through three cognitions and indicates that not all cognitions may be relevant for every behavior (Hildebrandt & Beimborn, forthcoming). This leads to the assumption that some cognitions may be entirely irrelevant for certain behaviors and can therefore be omitted from the research model based on theoretical considerations. Results and post-hoc analyses of **Paper III** show that research models including the cognitions of the digital mindset should also consider different relationships between these cognitions. Thus, these findings align with the existing literature, which has already indicated that different aspects and cognitions of a digital mindset may be important depending on the context and that not every cognition is necessarily relevant. However, **Paper III** specifies this assumption that some cognitions have a stronger direct relationship with certain behaviors, while others might only have an indirect relationship. Hence, we add to this understanding by suggesting that, depending on the dependent variable, relationships between cognitions should also be considered, and researchers should test for these effects to accurately understand the relevance and role of digital mindset cognitions for behaviors.

5.1.2 Contributions of Chapter II: Effects of Employees' Digital Mindset on IS Infusion Behaviors

Various studies describe a digital mindset as necessary for employees to leverage digital opportunities and create new value through digital technologies in companies (Davison & Ou, 2017; Korotkova et al., 2023) or indicate that individuals with a digital mindset perceive different usage possibilities of digital technologies (Tour, 2015), while there is no empirical evidence. Hence, the existing literature suggests that such a mindset has a direct influence on employees' use of digital technologies, without evidence that these effects exist. **Paper IV** provides new knowledge on affordances that are relevant in the IS infusion context and how employees' digital mindset changes their perception, a precondition for IS infusion behaviors. **Paper V** extends existing knowledge by providing statistical evidence and variations of digital mindset effects for IS infusion behavior in the context of other IT-specific traits using UTAUT. **Paper VI** adds to the literature an overview that integrates and condenses existing findings on exaptation as a specific IS infusion behavior, providing hints for fruitful future research avenues. An overview of these contributions is given in Table 19, and they are described in more detail below.

Table 19. Overview of contributions of Chapter II

<table>
<tr><th>Existing literature…</th><th>The results show…</th><th>The results add the new knowledge that…</th></tr>
<tr>
<td rowspan="3">…showed affordance perception received little attention
…showed prior works view affordance perception solely as a deliberate reasoning process
…assumes that IT-specific traits whose expression varys with the technology at hand affect affordance perception, no matter the affordance innovativeness
…indicates relationships between a digital mindset and affordances</td>
<td rowspan="3">Paper IV:
<table>
<tr><th>Compared Groups</th><th>Mean Contrast</th><th>Difference</th><th>t</th><th>p-value</th></tr>
<tr><td colspan="5">Outcome Variable: Implicit Non-Canonical Affordance Perception (INCAP)</td></tr>
<tr><td>Low vs. High Digital Mindset</td><td>.514 vs. .801</td><td>.281</td><td>-3.943</td><td><.001</td></tr>
<tr><td>Low vs. High ENCAP</td><td>.569 vs. .694</td><td>.125</td><td>-2.087</td><td>.038</td></tr>
<tr><td colspan="5">Outcome Variable: Explicit Non-Canonical Affordance Perception (ENCAP)</td></tr>
<tr><td>Low vs. High Digital Mindset</td><td>.703 vs. .888</td><td>.185</td><td>-3.333</td><td><.001</td></tr>
<tr><td>Low vs. High INCAP</td><td>.769 vs. .901</td><td>.132</td><td>-2.626</td><td>.010</td></tr>
<tr><td colspan="5">Outcome Variable: Implicit Canonical Affordance Perception (ICAP)</td></tr>
<tr><td>Low vs. High Digital Mindset</td><td>.707 vs. .650</td><td>.057</td><td>.654</td><td>.515</td></tr>
<tr><td>Low vs. High ECAP</td><td>.656 vs. .666</td><td>.009</td><td>-.054</td><td>.957</td></tr>
<tr><td colspan="5">Outcome Variable: Explicit Canonical Affordance Perception (ECAP)</td></tr>
<tr><td>Low vs. High Digital Mindset</td><td>.995 vs. .997</td><td>.002</td><td>-.660</td><td>.510</td></tr>
<tr><td>Low vs. High ECAP</td><td>.989 vs. .995</td><td>.006</td><td>-.841</td><td>.402</td></tr>
</table>
</td>
<td>…employees with different digital mindset levels interpret – consciously and unconsciously - differently how digital technologies can be used</td>
</tr>
<tr><td>…affordance perception consists of conscious deliberation and unconscious association and the impact of individual differences depends on whether an affordance is well-known or rather innovative</td></tr>
<tr><td>…affordance perception of a specific digital technology can be leveraged by malleable IT-specific traits that are independent from the technology at hand</td></tr>
</table>

<table>
<tr><th>Existing literature…</th><th>The results show…</th><th>The results add the new knowledge that…</th></tr>
<tr><td rowspan="2">…assumes that IS infusion behaviors are primarily determined by IT-specific traits
…concludes it requires fundamental personality changes to individually foster IS infusion behaviors
…asserts employees' digital mindset a crucial role for IS infusion behaviors but lacks substantial empirical evidence
...investigated trait effects on IS infusion behaviors primarily on a system level</td><td rowspan="2">Paper III: see Table 18
Paper V:
<table>
<tr><th>Hypotheses</th><th>MS PowerPoint Sample</th><th>Smartphone Sample</th><th>Difference (MSP – SMA)</th></tr>
<tr><td>H1a: DM → PE</td><td>✓</td><td>✓</td><td>0.235*</td></tr>
<tr><td>H1b: DM → EE</td><td>✓</td><td>✓</td><td>0.094</td></tr>
<tr><td>H1c: DM → SI</td><td>✓</td><td>✓</td><td>0.211</td></tr>
<tr><td>H1d: DM → FC</td><td>✓</td><td>✓</td><td>0.041</td></tr>
<tr><td>H2a: DM → PIIT</td><td>✓</td><td>✓</td><td>0.174*</td></tr>
<tr><td>H2b: DM → ITM</td><td>✓</td><td>✓</td><td>0.231*</td></tr>
<tr><td>H3: DM → BIX</td><td>×</td><td>×</td><td>-0.026</td></tr>
<tr><td>H4: DM → ASU</td><td>×</td><td>×</td><td>0.103</td></tr>
<tr><td>H5: DM → PIIT → ASU
DM → PIIT → BIX → ASU</td><td>×
×</td><td>×
✓</td><td>0.064
-0.051*</td></tr>
<tr><td>H6: DM → ITM → ASU
DM → ITM → BIX → ASU</td><td>✓
✓</td><td>×
×</td><td>0.060
0.013</td></tr>
<tr><td colspan="3">Established relationships of the UTAUT</td><td></td></tr>
<tr><td>PE → BIX</td><td>✓</td><td>✓</td><td>-0.004</td></tr>
<tr><td>EE → BIX</td><td>×</td><td>×</td><td>-0.032</td></tr>
<tr><td>SI → BIX</td><td>✓</td><td>×</td><td>0.158</td></tr>
<tr><td>FC → ASU</td><td>×</td><td>×</td><td>0.160</td></tr>
<tr><td>PIIT → BIX</td><td>×</td><td>✓</td><td>-0.252*</td></tr>
<tr><td>ITM → BIX</td><td>✓</td><td>✓</td><td>0.092</td></tr>
<tr><td>PIIT → ASU</td><td>×</td><td>×</td><td>0.086</td></tr>
<tr><td>ITM → ASU</td><td>✓</td><td>×</td><td>0.071</td></tr>
<tr><td>BIX → ASU</td><td>✓</td><td>✓</td><td>-0.171</td></tr>
</table></td><td>…employees' digital mindset directly influences technology-specific expectations and indirectly influences IS infusion behaviors through underlying narrow traits</td></tr>
<tr><td>…the technology scope determines IT-specific trait effects on infusing IS features and determines mediation effects of IT-specific traits of higher-level traits</td></tr>
<tr><td>… showed IS infusion behaviors differ
…showed innovation literature adapted "exaptation"
…showed IS research used similar terms, but lacks an overview</td><td>Paper VI:
…previous studies do not investigate exaptation specifically and are conceptual
…technical resources and other resources were coopted in the past literature
…exaptations are depend on individual, social, and organizational factors, the artifact, and task</td><td>…repurposive IS infusion behaviors can pertain multiple technical and non-technical layers, are seldom investigated specifically in IS research and should be investigated from a social, organizational, technical, and especially individual perspective</td></tr>
</table>

Employees with different digital mindset levels perceive – consciously and unconsciously – differently regarding how digital technologies can be used.

Paper IV extends previous works that referenced a new or digital mindset or formulated it as an outcome for sensing digital innovations (Andersen & Ross, 2016; Chan et al., 2019) and new potential products and services (Davison & Ou, 2017) by providing empirical evidence that employees with different levels of digital mindset perceive more innovative affordances both consciously and unconsciously than employees with a low digital mindset. The results thus confirm findings from previous research on mindsets and perceptions (Keller & Gollwitzer, 2017; Weinstein & Lyon, 1999) and confirm these for a digital mindset. In addition, it contributes to previous research on a digital mindset and provides statistical evidence of links between affordances and a digital mindset (Solberg et al., 2020; Tour, 2015) by showing that employees' digital mindset has significant explanatory power for differences in affordance perception, even alongside other behavioral IT-specific traits such as PIIT or IT mindfulness. From these findings, we gain a deeper understanding of the connection between a digital mindset and IS infusion behavior, having the evidence that it expands the breadth of perceived innovative uses, which enhances the chances of perceiving suitable IS infusion behaviors that can be effectively implemented. This inclusion and the evidence of effects of a digital mindset on affordance perception help to show that such a mindset influences the cognitive upstream processes of use behavior (i.e., perception of potential usages), which significantly influence subsequent use, which should be considered in future research on the influence of mindsets on behavior and can advance the theorization between employees' digital mindset and use behaviors. The insights about the effects on implicit affordance perception especially provide a better understanding of its role for IS infusion, as they indicate that these different perceptions are evident in situations where employees may have no time for deliberate thinking, such as high-pressure or overload situations. Hence, the results add new knowledge that employees' digital mindset can play a significant role when facing situations where IS infusion is demanded with having time to think (e.g., idea creation in innovation labs) and where such IS infusion behaviors are demanded quickly (e.g., problems in everyday tasks). This finding is useful for future research investigating divergent IS infusion behaviors in different organizational contexts and scenarios. The examination from both implicit and explicit perspectives also adds evidence for the validity of the measurement instrument in **Paper II**.

Besides this better understanding of how employees' digital mindset can facilitate IS infusion, the findings also hold contributions to affordance research in IS in general.

Affordance perception consists of conscious deliberation and unconscious association and the impact of individual differences depends on whether an affordance is well-known or rather innovative.

On the one hand, they extend the previous findings that have primarily focused on the existence (Karahanna et al., 2018) and actualization (Haag et al., 2022) of affordances by focusing on affordance perception to better understand how the interaction between these steps differs across individuals. Second, it extends the previous primarily qualitative studies on affordance perception (Lehrig et al., 2019; Osmundsen et al., 2022) and also quantitative findings (Lehrig et al., 2017) by (1) introducing two types of affordance perception (i.e., implicit and explicit) and (2) differing between two types of affordances (i.e., canonical and non-canonical). By showing that affordance perception and especially the influences of individual traits depend on the type of affordances, **Paper IV** provides a more comprehensive explanation of how individuals perceive affordances across various scenarios, each demanding varying levels of cognitive effort. These results enrich affordance theory, signifying that affordance perception encompasses both conscious deliberation and unconscious associations, which are also subject to influence and development. This becomes particularly pertinent for future studies that delve into affordance perception in situations where conscious deliberation may not be feasible. By demonstrating that the impact of individual differences varies based on the type and nature of an affordance, **Paper IV** challenges earlier findings that presumed these influences to be universally applicable to affordances (Lehrig et al., 2017), advising future studies to consider different types of affordances to draw adequate conclusions. Hence, the results of **Paper IV** improve our understanding of why different existing affordances are perceived differently and help future studies adequately formulate and theorize individual influences on affordance perception.

Affordance perceptions of a specific digital technology can be leveraged by malleable IT-specific traits that are independent of the technology at hand.

In addition, these findings also extend existing research on the influence of IT-specific traits on affordance perception (Lehrig et al., 2019), which only investigated traits whose characteristics are dependent on the technology investigated (e.g., computer self-efficacy). The proven effects of a digital mindset on different perceptions of the possible uses of digital technologies extend these findings and show that traits whose characteristics are technology-independent and can be trained influence the perception of the affordances of a specific technology (i.e., Microsoft PowerPoint). These results improve our understanding of affordance perception as they show that this perception can be fostered independently of technology and help future studies strengthen the theoretical understanding of influences on affordance perceptions.

Employees' digital mindset directly influences technology-specific expectations and beliefs, narrow IT-specific traits, and indirectly influences IS infusion behaviors through underlying narrow traits.

The findings from **Paper V** extend research concerning context-specific mindsets and their impact on behavioral tendencies (Samuel & Warner, 2021; Smith & Capuzzi, 2019), prior research that referenced or named employees' digital mindset as an important individual difference (Korotkova et al., 2023; Leonardi & Neeley, 2022), and previous findings within this dissertation that showed influence on the way digital technologies are perceived (see **Paper IV**) and correlations to other IT-specific traits (see **Paper II**). The results extend these findings by providing statistical evidence for the effects of employees' digital mindset on inclinations for IT-specific behaviors and beliefs and expectations concerning IS infusion behaviors. With this new knowledge, we gain a deeper understanding of why individuals exhibit divergent behavioral tendencies in IT-contexts, distinct from their broader personality traits, providing future studies with a more nuanced understanding regarding the dynamics and theoretical underpinnings of IT-specific traits that are not contingent on general personality. This adds new knowledge about the digital mindset's role in IS infusion behaviors, showing that it not only enhances the perception of opportunities for IT use (see **Paper IV**) but also reinforces established predictors.

Demonstrating these effects also extends the previous IT adoption and use literature (cf. Venkatesh et al., 2003), which calls for a stronger inclusion of IT-specific traits to understand the mechanisms of UTAUT predictors (Blut et al., 2022). They provide a better understanding of how beliefs about the target use of a target technology emerge and show that accumulated knowledge and experiences that concern neither the specific behavior (e.g., IS infusion behavior) nor the specific technology (e.g., Microsoft PowerPoint), but the totality of related phenomena, characteristics, and consequences (e.g., digital mindset) can influence beliefs about a target behavior. These findings help future studies understand and theorize how and why users have different expectations of possible (innovative) uses of IT. Future scholars can better understand and theorize how such predictors can be influenced independently of technology to understand why individuals exhibit IS infusion behaviors across various technologies.

Papers III and **V** also prove previous indications for the relevance of employees' digital mindset (El Sawy et al., 2016; Leonardi & Neeley, 2022) and extend findings of the influences of context-specific mindsets on employee behavior in organizations (Al-Ghazali et al., 2022; Eilers et al., 2022) by demonstrating effects of employees' digital mindset on IS infusion behaviors through effects on more narrow IT-specific traits. **Paper V** also shows that the effects of a digital mindset are transmitted differently depending on the technology. Thus, through these findings, **Papers III** and **V** add new knowledge and evidence that a digital mindset fosters IS infusion behaviors not only by perceiving more of such possibilities (see **Paper IV**) but also by influencing tendencies toward IT-specific behaviors that lead to an increased intention for and actual use of such possibilities. This will help future studies better theorize the influences of context-specific mindsets on IT usage behaviors by considering dynamic or stable IT-specific traits depending on technology.

Besides contributing to our understanding of how employees' digital mindset can foster IS infusion behaviors, these findings add new knowledge regarding the general effects of IT-specific traits on IS infusion behaviors.

The technology scope determines the general effects of IT-specific trait effects on infusing IS features and determines the mediation effects of IT-specific traits of higher-level traits.

Paper V expands existing literature concerning individual effects on IS infusion behaviors (Carter et al., 2020; Singletary et al., 2002; Thatcher et al., 2018) by demonstrating that the influences of behavioral IT-specific traits on IS infusion behaviors at the feature level are rather indirect by using a comprehensive construct as a proxy for IS infusion that goes beyond mere trying of new features (i.e., adaptive system use). Consequently, **Paper V** complements earlier findings on IS infusion behaviors on the macro level (i.e., system level) by enhancing our comprehension of the micro-level dynamics of IS infusion (i.e., feature level) and showing that behavioral IT-specific traits exert influence not only on exploratory behaviors but also on the repurposing of features. Findings regarding indirect influences via an individual's intention are in line with the general theory of planned behavior (Ajzen, 1991). Additionally, these findings expand upon prior research by providing deeper insights into the impact of individual influences on IS infusion behaviors across various technologies (Carter et al., 2020). Unlike studies conducted at the system level (Carter et al., 2020; Thatcher et al., 2018), **Paper V** reveals that the impacts of IT-specific traits on IS infusion behaviors at the feature level exhibit a more pronounced effect in the context of narrow IT as opposed to broad IT. **Paper V** adds new knowledge by highlighting that dynamic IT-specific traits do not consistently exert the strongest influence on IT usage, contrasting existing assumptions (Davis & Yi, 2012; Thatcher et al., 2018). Instead, it demonstrates the pivotal role of the technology type in determining which individual inclinations affect behavior and subsequently mediate higher-level effects. Hence, the findings of **Paper V** lead to a better understanding of how different IT-specific traits influence IS infusion behavior in different contexts, helping future studies to understand and explore the (hierarchical) theoretical relationships between IT-specific traits and IS infusion behaviors more adequately.

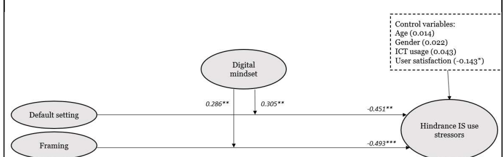
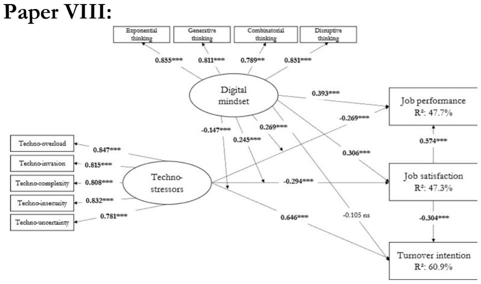
Repurposive IS infusion behaviors can pertain multiple technical and non-technical layers, are rarely investigated specifically in IS research and should be investigated from a social, organizational, technical, and especially individual perspective.

Paper VI extends the IS infusion literature by highlighting that many of the existing overarching constructs do not distinguish between specific behaviors within general IS infusion behaviors, such as exaptation. Additionally, it extends previous literature on exaptation (Andriani et al., 2017) by delineating the landscape of research on exaptation in the IS discipline. It elucidates the available findings and conceptual studies concerning the phenomenon of exaptation, including findings of studies that use congruent concepts that deal with repurposing IT, as well as its various influencing factors and effects. Such an overview links to previous calls within the IS research community for more extensive exploration of exaptation (Holmström, 2018; Hund et al., 2019). Further, these findings also extend previous research that summarized research on general IS infusion behaviors (Hassandoust et al., 2016) by enabling a are more granular view on a specific IS infusion behavior. Hence, **Paper VI** not only adds to the literature a comprehensive overview of existing findings, often encapsulated under different terminologies, but also enhances our understanding of the interconnections and delineation between related constructs in IS research and exaptation. It also contributes to understanding the role of a digital mindset in the context of IS infusion by indicating specific cognitive differences among employees to be important and providing a fruitful research avenue for these behaviors. Hence, the results of **Paper VI** serve as a valuable reference point for future studies on specific IS infusion behaviors through providing an overview and hints for fruitful avenues.

5.1.3 Contributions of Chapter III: Employees' Digital Mindset as a Mitigating Factor for Technostress

The continuous influx of novel digital technologies and their integration and exposure in the workplace also lead to negative consequences for employees, specifically technostress (Ragu-Nathan et al., 2008). Within the IS literature, it has been shown that individual differences can exert diverse influences on technostress and its subsequent manifestation in behavioral reactions (Srivastava et al., 2015). Additionally, IT-specific traits that are intricately linked to technology, such as IT mindfulness, mitigate this stress (Maier et al., 2019). Additionally, recent findings suggest that changes in the IS design may help mitigate technostress (Tarafdar et al., 2019). At the same time, stress literature has provided insights into the role of mindsets in moderating the impact of stress on various outcomes (Casper et al., 2017; Huebschmann & Sheets, 2020). **Papers VII** and **VIII** provide new knowledge on the role of employees' digital mindset as a technology-independent trait in mitigating technostress (see Table 20).

Table 20. Overview of contributions of chapter III

<table>
<tr><th>Existing literature…</th><th>The results show…</th><th>The results add the new knowledge that…</th></tr>
<tr><td>•… points out that the design of IS is a scarcely investigated IS characteristic that may influence perceived technostressors
•…suggests that the effectiveness of digital nudges varies depending on users' individual characteristics</td><td>Paper VII:

</td><td>… IS design features that incorporate framing or default setting nudges minimize technostress
…employees' digital mindset impacts the effectiveness of digital nudging in mitigating technostress
… perceived technostress depends on visual stimuli users encounter through the design of IS and individuals IT-specific traits that change their perceptions and interpretations</td></tr>
<tr><td rowspan="2">• …emphasize the importance of individual differences for technostress
• …showed that mindsets regarding stress moderate effects of stressors on strain
• …assumes responses to technostress are solely moderated by cardinal traits
•…assumes responses to stress are solely influenced by their interpretation regarding stress but not regarding stress' sources</td><td rowspan="2">Paper VIII:

</td><td>…employees' digital mindset reduces the translation of technostressors into adverse effects and directly reduces technostrain</td></tr>
<tr><td>…IT-specific traits are an effective mechanism to mitigate how individuals translate technostressors into technostrain</td></tr>
</table>

IS design features that incorporate framing or default setting nudges minimize hinderance technostressors.

Paper VII extends previous research on IS characteristics that focused on the mere presence of IT (Suh and Lee, 2017) and its dynamic evolution over time (e.g., through updates) (Ayyagari et al., 2011), which are challenging to alter for individuals and organizations in the digital era. **Paper VII** introduces IS design as a changeable characteristic that impacts the perception of technostressors. Unlike static IT features, IS design encompasses deliberate design elements and configurations, enabling adjustments to enhance the user experience (Märtin et al., 2023). The findings of **Paper VII** empirically demonstrate that IS design significantly affects perceived technostress and that specific design features, such as default settings and framing as digital nudges, can mitigate perceived hindrance technostressors. Hence, **Paper VII** contributes to the technopstress literature by identifying IS design as a modifiable characteristic that influences technostressors.

Employees' digital mindset impacts the effectiveness of digital nudging in mitigating technostress.

Previous research has highlighted that various individual traits are pertinent in the context of technostress, including broad personality traits (Srivastava et al., 2015), behavior-specific traits like mindfulness (Pflügner et al., 2021), and IT-specific traits such as personal innovativeness in IT or computer self-efficacy (Maier et al., 2019; Tams et al., 2018). **Paper VII** extends existing research by demonstrating that dynamic IT-specific traits, which influence general IS sensemaking and are not tied to specific behaviors, are also relevant. Additionally, prior studies have shown mixed results regarding the impact of individual characteristics on the effectiveness of digital nudging (Ingendahl et al., 2021; Ridder et al., 2022). **Paper VII** extends those findings by showing that a digital mindset positively influences the effectiveness of digital nudges in reducing perceived hindrance technostressors. Specifically, design features such as default settings and framing help mitigate feelings of being overwhelmed by technological complexity and information, especially for individuals with a high digital mindset. Hence, **Paper VII** contributes to the technostress literature by showing that dynamic IT-specific traits can enhance our understanding of how digital nudging affects perceived technostress. These results align with previous findings on the influence of personality traits on technostress (Maier et al., 2019).

Perceived technostress depends on the visual stimuli users encounter through the design of IS and individuals' IT-specific traits that change their perceptions and interpretations of these stimuli.

Taken together, the findings of **Paper VII** empirically prove that concrete IS characteristics reduce technostressors while also demonstrating that individual IT-specific traits, such as the digital mindset, influence the effectiveness of digital nudging in alleviating technostress. Together, these findings also do have broader implications for the literature on technostress and contribute that the perceived technostress depends on the visual stimuli users encounter through the design of IS, as well as their perceptions and interpretations of these stimuli, as reflected by their digital mindset. Therefore, the findings of **Paper VII** emphasize that research on technostress and digital nudging must consider both the user and the IS in conjunction rather than focusing solely on one or the other.

Employees' digital mindset reduces the translation of technostressors into adverse effects and directly reduces technostrain.

Paper VIII extends previous research that referenced the digital mindset as a positive factor of employees for organizations to adequately participate in a digital society or respond to negative effects created by digital technologies (Allen, 2020; Vial, 2019; Zhao et al., 2023) by demonstrating empirical evidence that it can not only foster IT use behaviors beneficial for the organization (see Chapter II or references in (Davison & Ou, 2017; Leonardi & Neeley, 2022)) but can also be beneficial for individuals by mitigating the negative consequences of technostress, resulting in being much more satisfied in their jobs and perceiving themselves as performing better. Hence, besides contributing by revealing employees' digital mindset as a mitigating factor for technostress, these results also add new knowledge in the form of empirical evidence for positive factors relevant for organizational success, such as employee job performance or satisfaction. The results extend the general research on mindsets and stress, proving that not only the interpretation of stress (i.e., stress mindsets) (Huebschmann & Sheets, 2020), but also the interpretation of the underlying sources of stress (i.e., digital technologies) can mitigate stress. The findings thus provide a better understanding of the role that digital mindset plays in employees' experience of technostress and offer future studies a better understanding of how adverse effects of technostress evolve by integrating employees' digital mindset as a moderating variable. These findings also extend the existing technostress literature.

IT-specific traits are an effective mechanism to mitigate how individuals translate technostressors into technostrain.

The illustrated findings regarding digital mindset effects in **Paper VIII** also have broader implications for previous findings regarding technostress (Srivastava et al., 2015) by revealing that dynamic IT-specific traits can reduce the influence of technostressors on technostrain and directly reduce technostrain. Hence, **Paper VIII** adds dynamic IT-specific traits as new effective mechanisms to mitigate how individuals translate technostressors into technostrain, confirming existing research that emphasizes the importance of dynamic factors when studying technostress (Maier et al., 2019). These findings extend previous research that assumed that individual factors, such as personality traits (Maier et al., 2019) or self-control (Whelan et al., 2022), enable employees to proactively seek new opportunities in dealing with technostress by demonstrating that dynamic IT-specific traits that change how individuals interpret digital technologies act as buffers that can passively filter threats, such as technostressors. Therefore, the findings provide a better understanding of how individuals can proactively and passively reduce the adverse effects of technostress.

5.1.4 Oeuvre: Answering the Overall Research Question

Literature has frequently discussed and indicated the necessity of a digital mindset among employees in the future of work, as organizations rely on it to create new value with digital technologies and stay competitive. Nevertheless, descriptions, references, and claims for the importance of this concept are insufficient, ambiguous, or lack empirical substantiation. This led to the central research question of this dissertation: *What is the digital mindset and why should organizations consider employees' digital mindset within the context of digital innovation?*

The digital mindset describes a collection of cognitive schemas, respectively habitual patterns of thought and, therefore, can be classified as an IT-specific trait. The cognitive schemas, or thinking patterns, describe accumulated knowledge and experiences regarding various aspects of digitalization that express themselves in the form of beliefs, cognitive filters and processes that support individuals in situations where they are confronted with these aspects. The digital mindset is changeable (e.g., through experiences with digital innovation), its expression is technology independent, and it affects relevant behaviors in the future of work. Conceptualized for employees in the context of digital innovation, it is not to be understood as a superordinate construct, but rather as three independent coexisting cognitions that group 11 thinking patterns that can be approximated using survey scales.

Organizations should consider employees' digital mindset in the context of digital innovation for two reasons. Firstly, it positively affects IS infusion behaviors, which is essential for organizations operating within the realm of digital innovation. Higher digital mindset levels indirectly help employees to harness the potential of digital technologies by enhancing their ability to perceive a substantially wider range of possibilities for how digital technologies could be used beyond known use cases and determine how innovative the perceived possibilities are. At the same time, it leads to more optimistic expectations towards the implementation of such potential uses and a stronger development of more specific IT-specific behavioral inclinations, which ultimately lead to a greater degree of implementation of the identified potentials. Further, it positively affects perceptions of how delegation can take place with digital technologies, increasing co-creation behaviors with such technologies. Secondly, it *indirectly* and *directly* leads to a healthier perceived work environment as employees with a digital mindset are better at managing the technostress effects created by the constant use and integration of digital innovations in organizations and see themselves at more productive and satisfied at work.

Addressing this research question represents a substantial contribution to the field of individual IS research on individual differences and their effects on behavior. Together, the results expand existing literature and established theoretical models or enhance the understanding of their mechanisms and components. For organizational research, the insights could be used to contribute to a better understanding of unobservable components of organizational culture (Schein, 1990), to better understand, for example, the interplay between the internal organizational environment and digital innovation actions to, in the end, lead to digital innovation outcomes within organizations (Kohli & Melville, 2019).

5.2 RECOMMENDATIONS FOR PRACTICE

Taken together, the findings of this dissertation lead to several recommendations for practitioners in organizations that face digital innovation challenges.

Tailor the digital mindset requirements to the area of employees' activity.

The multidimensional conceptualization of the digital mindset and the related empirical findings highlight thematic groupings of thinking patterns, revealing that not all are relevant for each specific behavior. Hence, a one-size-fits-all digital mindset approach may yield ineffective outcomes. Instead, it is crucial to precisely define situations and activities employees encounter regularly and then identify the most relevant cognitions and thinking patterns for driving value through digital innovations. This may further vary across hierarchical levels, departments, and operational relevance. For example, strategic roles like CEO or CIO may require an emphasis on digital cognition to effectively integrate digital phenomena into innovative strategies. Conversely, subordinate departments like innovation management may benefit more from prioritizing creative cognition for contributing to these strategic goals through creative problem-solving with digital technologies. At the operational level, the agile cognition may be more pertinent for implementation approaches of these ideas through trial and error of different specific technologies or collaborating with partners or other departments. On the other hand, departments possess different criticalities for the operational business process and therefore diverge in their required digital mindset. For example, while sales departments may benefit from creative or agile thinking of employees to leverage new technologies for digital sales channels for market expansion, departments responsible for critical processes in finance, such as payment transactions or accounting, may prioritize digital cognition and even profit from avoiding other cognitions.

Call to action: Map typical activities with specific thinking patterns, utilizing existing job descriptions. This targeted approach will ensure that mindset development initiatives or employee allocations are tailored to the unique needs and objectives of each department and contribute to the effective leverage of digital innovation.

Implement customized and continuous digital mindset development strategies[27].

Digital mindset and its cognitive schemas are affected by previous experience with digital innovation. To leverage these results, managers should implement not just standalone but a variety of developmental opportunities to nurture specific required thinking patterns and cognitions via active involvement in specific digital innovation activities. Informative and, especially, involving measures should be utilized to firmly establish and embed identified relevant cognitions and thinking patterns. To foster thinking patterns from the creative cognition, organizations can combine informative content, such as case studies, and readings from established digital innovation curricula (e.g., modules I to III from (Fichman et al., 2014) with a focus on digital innovation characteristics and discovery), integrate with recent frameworks (Henfridsson et al., 2018) and entrench this knowledge by design science workshops using Lego® Serious Play®[28] or educational microcontroller sets like Arduino[29]. For digital cognition, leveraging content from the digital innovation curriculum (e.g., all modules from (Fichman et al., 2014) focusing on emerging IT, IT-enabled business trends, platforms, or implications of Moore's law) can be augmented with practical workshops on platform approaches, AI applications, or data analytics. For agile cognition, existing agile software development methods and their value should be continuously taught (Mishra &

[27] This recommendation relies on the theoretical definition and conceptualization of a digital mindset, assuming malleability based on existing mindset research that proves the impact of training and interventions.
[28] https://www.lego.com/en-us/themes/serious-play
[29] https://www.arduino.cc/education

Mishra, 2011), also using practical exercises or playful activities like agile cooking[30].

Call to action: Establish a pool of informative and involving methods tailored to specific cognitions or groups of thinking patterns. From this pool, craft individualized, involving, and combined digital mindset development programs based on the identified needs of employees.

Integrate and combine digital mindset surveys with existing personality assessments.

The results of this dissertation show that a digital mindset can be measured using a questionnaire and other personality traits are important to consider. Organizations, particularly their HR departments, should incorporate digital mindset measurement into their employee profiling practices. Utilizing a sensitive semantic differential questionnaire, along with insights from general personality traits, should be used to ensure a high response rate, effectively assess digital mindset profiles, and gauge mindset developments based on the previously indicated development strategies. Once specific mindset profiles are developed for different roles and an organization's digital innovation objectives for these roles are established, integrating these measurements can aid in evaluating the fit of both existing and new employees. However, the integration of such measurements and the associated digital mindset profiles of employees should not replace existing personality assessments but rather complement them. While personality profiles can offer initial insights into certain cognitions, they also provide valuable information about other pertinent IT-specific traits (Davis & Yi, 2012), thereby facilitating the anticipation of desired behaviors.

Call to action: Implement a digital mindset semantic differential scale for both new hires and existing employees. Integrate this measurement with assessments of other personality traits to anticipate conducive employee behavior for digital innovation objectives.

Prioritize and cultivate a digital mindset for conceptual roles to effectively create digital innovations.

The findings indicate that a digital mindset primarily enhances employees' ability to perceive diverse problem-solving approaches in the context of digital innovation, albeit exerting a less direct influence on actual use behaviors in this context. For organizations, this underscores the value of nurturing employees' digital mindset, particularly in conceptual and strategic roles or for employees often participating in conceptual project phases concerning digital innovations for or within the organization. Drawing from the example above, a digital mindset can significantly make a difference for strategic roles to envision unconventional digital strategies for new products, services, or change programs that come along with such digital innovations, while enabling tactical roles to devise innovative implementation concepts and corresponding activities for employees. Moreover, at the operational level, a digital mindset can foster positive expectations regarding implementation behaviors and activities and therefore enhance their intention and execution. As a consequence, for companies with the goal of digital innovation, a digital mindset is particularly important in roles with these conceptual fields of activity and should be addressed primarily in order to quickly and effectively benefit from its effects.

Call to action: Prioritize employee fit analyses in the company with conceptual and strategic roles, where a digital mindset holds the greatest impact. Progress sequentially to operational-level employees to maximize all benefits.

Anticipate and foster behavioral effects through complementary traits alongside a digital mindset.

The findings suggest that a digital mindset, when combined with other IT-specific traits, facilitates the implementation of perceived digital innovation opportunities. To foster and anticipate employees' proactive value generation and digital innovation, organizations must also consider IT-specific behavioral tendencies (that can vary with the technology), which are more precise predictors for intention and action. While a digital mindset generally drives these tendencies, it is up to the companies to create an environment conducive to their expression and development. For instance, if managers aim to enhance employees' utilization of existing technologies for new value creation, as examined in this dissertation,

[30] https://agile-kitchen.com/

a digital mindset will drive relevant behavioral tendencies and expectations that are more predictive for the actual intention and action, but companies need to ensure that employees have sufficient experience in using the specific technology so that employees pass these effects on through a stronger presence and interest in using this specific technology (Thatcher et al., 2018). In the case of relatively broad and open technologies, organizations must provide ramifications to enable individuals to express their willingness to explore and experiment within this technology (i.e., PIIT).

Call to action: Take a realistic expectation regarding the effects of employees' digital mindset. Identify ways to promote IT-specific tendencies that support the desired behavior when interacting with IT.

Consider a digital mindset also for alleviating negative effects of digital innovations.

The findings suggest that employees' digital mindset mitigates the adverse effects of stress induced by digital technologies and increases overall job satisfaction and perceived productivity. While previous recommendations focused on fostering a stronger digital mindset to advance organizational goals of innovating digitally, this recommendation addresses mitigating the side effects experienced by employees in such endeavors. For example, managers must be careful not to lose long-established employees and non-IT-savvy employees, and addressing a digital mindset can also play an important role for employees whose activities may not contribute directly to a firm's digital innovation endeavors but who are also affected by these endeavors through the new or increased use of digital technologies and may experience stress or decreased well-being in general. For example, a newly developed and implemented digital service could also lead to changes and greater technology use and exposure for employees in critical financial processes, and a digital mindset could mitigate the resulting negative effects and thus contribute to the success of an organization's digital innovation internally as well as externally through a better working atmosphere and increased well-being.

Call to action: Identify potentially negatively affected employees who are newly or previously exposed to heavy technology use. Consider these employees in digital mindset assessments and development strategies.

6 Limitations

Like any research endeavor, this dissertation possesses limitations arising from sampling, type of measurement and analysis, and used theoretical assumptions.

The findings across all papers in this dissertation are limited due to restricted scopes in terms of analyzed literature (**Paper I** and **VI**), participant characteristics (**Papers I-V**, **VII**, and **VIII**), or technologies (**Papers IV** and **V**). The digital mindset conceptualization and developed thinking patterns in **Paper I** are constrained by the focus on IS studies specifically focusing on new or emphasized characteristics of digital innovation and the narrow selection of knowledge workers in the expert survey. Hence, the digital mindset conceptualization developed and used within this dissertation might primarily reflect what new or emphasized ways of thinking are required for situations and tasks knowledge workers are faced with and may neglect concepts that are still relevant or primarily pertain to manual workers. A broader examination, including insights from general innovation literature, human computer interaction, or a more diverse sample of workers, might have revealed additional thinking patterns. Furthermore, the sampling focus of the empirical studies on technologies predominantly used by knowledge workers, such as Microsoft PowerPoint (**Paper IV**) or GenAI tools (**Paper III**), showed to be especially appropriate to gauge digital innovation behaviors (Ciriello et al., 2015) but held limitations regarding the generalization of the results. While some papers in this dissertation attempt to mitigate these limitations by examining broader effects (**Papers VII** and **VIII**) or including different technologies (**Paper V**), samples focusing on technologies more closely integrated into primary processes (e.g., ERP systems) could offer more nuanced insights on digital mindset influences.

Another limitation of the empirical investigations (**Papers III-V, VII,** and **VIII**) is the exclusive focus on the creative cognition aspect of the construct, excluding the other cognitions that in part are psychologically expressed differently (cf. **Paper II**). While this focus can be justified by the investigated behaviors that focused on how individuals use digital technologies, and these thinking patterns specifically reflect their new properties (Yoo et al., 2010), this reduces the breadth of findings. For instance, the influence of agile cognition on behavior might differ, with potentially stronger direct effects on behavior and less influence on perception of agile possibilities as its expression is less pronounced through cognitive filters but rather processes and beliefs. Hence, studies exploring alternative cognitions and thinking patterns may yield different conclusions.

Along with this, limitations also arise from the primary focus on IS infusion behaviors as the dependent variable (**Papers III-VI**), although **Papers VII** and **VIII** aim to mitigate this limitation by examining the effects of a digital mindset on other relevant behaviors. However, digital innovation encompasses diverse phases and stages (Fichman et al., 2014; Kohli & Melville, 2019), and employee roles possess different hierarchical levels and require behaviors beyond innovative use and perception, potentially influenced differently by individual differences, that can contribute to an organization's digital innovation endeavors. As also exemplified in section 5.2, these different processes may also lead to simultaneously different IT implementation stages and, therefore, demanded adoption or use may be affected differently by the digital cognition. Hence, future studies should explore various roles, settings, and phases of digital innovation, as well as corresponding behaviors combined with different cognitions to fully grasp how individual behavior is affected by a digital mindset.

Also, limitations inherent to the data collection and analysis methods emerge, particularly regarding the inferred causality regarding the effects of digital mindset (**Papers III-V, VII,** and **VIII**). While this dissertation largely conducts multi-wave surveys to reduce confounding biases for inferred relationships between dependent and independent variables (**Papers III-V),** it mainly conducts surveys using self-reported observational methods for independent and dependent variables (i.e., surveys), which cannot establish causality per se but only determine whether the correlation fits the theoretical arguments (Bell et al., 2019; Recker, 2021). Although efforts are made to complement self-reported data with other methods such as IATs (**Paper IV**) and also experimental settings (**Paper VII**) addressing the weaknesses of self-reported data, true cause-and-effect analysis of digital mindset effects necessitates experimental settings and alternative measurement methods. Longitudinal studies conducted in controlled settings, comparing groups subjected to digital mindset interventions with control groups, combined with neuropsychological assessments, are essential for enhancing the validity regarding a digital mindset's causality in perceptual and behavioral changes. Additionally, primarily linear effects are theorized, although configurational approaches in the context of trait effects have been shown to be important (Pflügner et al. 2021; Emmerich et al. 2022). Configurational approaches could reveal direct effects of a digital mindset within specific trait configurations, providing deeper insights into its impact.

Another weakness is the primary focus on the effects of a digital mindset while neglecting factors influencing its formation. **Paper III** of this dissertation provides initial insights on the effects of experiences on employees' digital mindset and although the malleability mindsets is theoretically supported by related constructs (Burgoyne et al., 2018; Burnette et al., 2023), recommendations regarding developments and impacts on a digital mindset should be approached with caution, as different intervention mechanisms might have different effects. Future research, employing similar longitudinal observational and neuropsychological methods as recommended before, is needed to assess the efficacy of interventions over time and confirm the potential for targeted malleability to justify measures in organizations.

Finally, there are theoretical limitations inherent in the theories used to explain the behavior and effects of a digital mindset. Following the previous literature on related mindsets, a digital mindset is considered in the context of other existing individual traits and thus intertwines habitual traits of thought with those of behavior, leading to arguments about hierarchical effects (**Papers II** and **V**). To avoid incorrect conclusions based on similar broad but different types of traits, future studies should also theorize and test possible separate hierarchical approaches of habitual patterns of behaviors (e.g., openness - PIIT – IT mindfulness), thoughts (cognitive style - digital mindset - performance expectation), and emotions (e.g., anxiety - computer anxiety – specific technology phobia) to also better address general limitations of trait theory that fall short in explanations why traits evolve. Furthermore, various parts of this dissertation argue for the investigation of effects on how individuals use a software (**Papers III, IV,** and **V**) although research shows that it would be more appropriate to argue that the intention for the use is influenced, which has high explanatory power but the actual behavior is often influenced by situational factors, such as characteristics of the specific task and/or system (Sun, 2012). Although incident-based reports were used to measure behavior that actually occurred (**Paper V**), future studies should either examine the effects under the same conditions (cf. experimental approaches with laboratory conditions) or take into consideration different task characteristics and system characteristics. Finally, the dissertation (**Papers VII** and **VIII**) focused on the hindrance perspective of technostress, neglecting the possibility that stressors may also be perceived as challenging (Maier et al., 2021). Future research should explore how a digital mindset might moderate or directly influence the type of technostress appraisal, considering both hindrance and challenge perspectives.

7 Future Research

Taking into account the aforementioned limitations and contributions, this dissertation will hopefully serve as a starting point for further research into employees' digital mindset. Table 21 outlines prospective research endeavors aimed at delving deeper into the influence factors, conceptualization, and impacts of a digital mindset. In each of the following sections, one potential research project from the respective areas is outlined as an example (grey rows).

Table 21. Future research avenues

	Potential contribution	Potentially based on own and (others) works	Potential research design	Potential data collection and analysis	Potential interesting research questions
Digital Mindset Development	Better understanding of the interplay of traits and a digital mindset	**Paper II, III**; (Davis & Yi, 2012; Maier, 2012; Markon, 2009)	Explanation/Exploration; quantitative, statistical, field data, cross-sectional, analysis	Survey, SEM	What are the correlations between a digital mindset and other habitual patterns of thought, behaviors, and emotions, regardless of context?
	Better understanding how mindsets develop across different contexts	**Paper I,II, III**; (Dong & Kang, 2022; Oyserman, 2011; Rogers, 2001)	Explanation/Exploration; quantitative or qualitative, statistical or cases, field data, cross-sectional analysis	Survey, SEM; Interviews, deductive coding, QCA	How do demographic, cultural, and familial factors impact the development and manifestation of a digital mindset?
	Better understanding how established non-digital content or techniques can have an impact	**Paper I, II, III**; (Dweck & Yeager, 2019)	Explanation/Exploration; quantitative and/or qualitative, statistical, field data or cases, cross-sectional, analysis	Mixed-method; surveys and interviews	What is the role of non-digital innovative experiences and knowledge in shaping a digital mindset?
	Better understanding how different (combined) measures can affect a digital mindset	**Paper I, II, III**; (Limeri et al., 2020; Park et al., 2020)	Explanation; quantitative, statistical, laboratory, longitudinal, analysis and/or design	Experiments, group comparisons, linear regressions, QCA	How do interventions, training programs, or other measures affect digital mindsets? Which combinations of development strategies yield the most substantial influence?
	Better understanding how a digital mindset evolves without specific development measures	**Paper I, II, III**; (Limeri et al., 2020)	Explanation; quantitative, statistical, field or laboratory, cross-sectional or longitudinal, analysis	Multi-sample surveys, group comparisons, experiments, SEM	How does the organizational context, including IT versus non-IT environments and software usage, influence and/or facilitate the formation and evolution of a digital mindset?
	Better understanding how existing educational strategies prepare future workforce; Creating a digital mindset curriculum	**Paper I, II, III**; (Blake Hylton et al., 2020; Cui, 2021; Cui & Bell, 2022)	Exploration; qualitative and quantitative, case or statistical, field, cross-sectional, analysis and design	Mixed-method: Curricula coding, surveys, SEM, correlations, QCA, design science	Which components of school or university curricula reflect specific cognitive patterns associated with a digital mindset? How can a digital mindset curriculum be designed? To what extent does the depth of technical education contribute to fostering a digital mindset?
Digital Mindset Concept	Better understanding of trait and mindset interdependencies; developing alternative hierarchies	**Paper III;** (Davis & Yi, 2012; Markon, 2009)	Explanation; quantitative, statistical, field data, cross-sectional, analysis	Surveys, SEM, model comparisons	Where can a digital mindset be located within other (IT-specific) traits (behavioral, thought, emotional) and mindset concepts?
	Better understanding objectively distinguishing characteristics of individuals with different (digital) mindsets	**Paper II;** (Lutz et al., 2023; Riedl et al., 2020)	Explanation/Exploration; quantitative and qualitative, statistical, laboratory data, cross-sectional, analysis	Surveys combined with brain activity measurements (EEG, fMRI)	How can a digital mindset be defined from a neuropsychological perspective? Can mindset perspectives also be distinguished neuropsychologically? How can a digital mindset be measured from a neuropsychological perspective?

	Potential contribution	Potentially based on own and (others) works	Potential research design	Potential data collection and analysis	Potential interesting research questions
	Better understanding of which aspects of employees' digital mindset are relevant at what digital innovation stages for organizations	**Paper II;** (Kohli & Melville, 2019)	Exploration; qualitative, cases, field, cross-sectional and/or longitudinal, analysis	Interviews, deductive coding of digital innovation phases and employee demands	What digital mindset cognitions are relevant for what organizational phases of digital innovations?
	Better understanding criteria that determine different demands for a digital mindset	**Paper II;** (Allen, 2020; Goldmann et al., 2022; Solberg et al., 2020)	Exploration; qualitative and quantiative, statistical and cases, field, cross-sectional, analysis	Job descriptions, interviews, surveys, coding and/or correlations	How do employees' required and actual digital mindset differ along role types, hierarchies, departments, worker types?
	Better understanding location within psy-	**Paper II;** (Karahanna et al., 1999;	and qualitative, case and atory, longitudinal, analy-	Literature analysis; rate, skin conductance, fEMG for further effect analyses	What is the role of a digital mindset within other psychological states and concepts (e.g., flow, cognitive fit, cognitive dissonance, mental models)?
	Better understanding discriminance and overlaps of a digital mindset for the digital innovation context	**Paper I;** (Allen, 2020; Goldmann et al., 2022; Solberg et al., 2020)	Exploration; qualitative, cases, field, cross-sectional, analysis	Interviews, literature, coding	How can a digital mindset be conceptualized for other than organizational digital innovation contexts (e.g., digital transformation but also societal contexts)?
	Better understanding how digital mindsets of users should be considered when designing IS and linking IS and HCI theory	**Paper I, II**; (Fallman, 2003; Shneiderman, 2000, 2007)	Exploration; qualitative, cases, field, cross-sectional, analysis	Interviews, literature analysis	What is the role of digital mindset for IS designers and innovation by design?
Digital Mindset Effects	how digital mindset effects are dependent on employees' roles, tasks, or contexts	**Paper V**; (Keller & Gollwitzer, 2017; Kouzes & Posner,	quantitative, statistical, field, cross-sectional,	Multi-sample survey, multi-group comparisons, SEM or group comparisons using surveys with pupil dilation, heart rate, skin	How do digital mindset effects on relevant behaviors differ across hierarchies, roles, departments, or tasks of
		Paper II, V; (French, 2016)			How do digital mindset effects on behavior vary across different cogni-
	Better understanding situational differences that affect mindset impacts	**Paper V, VI;** (Imran & Gregor, 2019; Tour, 2015)	Explanation/Exploration; quantitative, statistical, field or laboratory, cross-sectional or longitudinal, analysis	Multi-sample surveys, SEM or group comparisons using surveys with pupil dilation, heart rate, skin conductance, fEMG	What is the role of the technology experience or maturity for digital mindset effects on behavior?
	Better understanding buffering effects of mindsets	**Paper VIII**; (Carter et al., 2020; Miron-Spektor et al., 2018; Trepte et al., 2020)	Explanation/Exploration; quantitative, statistical, field or laboratory, cross-sectional or longitudinal, analysis	Surveys, SEM, group comparisons, or experiments including surveys and hormone or nervous system measures	What is the role of a digital mindset for other negative effects of digital innovations (e.g., technological paradoxes, identity threats, privacy)?
	Better understanding of mindset effects on perceptions and following behavior	**Paper IV**; (Keller & Gollwitzer, 2017; Sun, 2012)	Explanation/Exploration; quantitative, statistical, field data, cross-sectional, analysis	Surveys, eye-tracking, SEM	What is the role of a digital mindset for situational influence factors on behavior (e.g., perceived task complexity)?
	Better understanding in which situations mindsets show the most relevance	**Paper VI;** (Emmerich et al., 2022; Pflügner et al. 2021)	Exploration; quantitative, statistical, field data, cross-sectional, analysis	Survey, cluster analysis, fsQCA,	How can configurations of digital mindset cognitions/thinking patterns affect employees' behaviors relevant for organizational digital innovation?
					How can configurations of other traits and a digital mindset affect employees' behaviors relevant for organizational digital innovation?
	Better understanding how mindsets form organizational culture (or vice versa)	**Paper II**; (Grover et al., 2022; Schein, 1990)	Exploration; qualitative and quantitative, cases and statistical, field, cross-sectional, analysis	Interviews, surveys, coding	What is the role of employees' digital mindset for organizations' digital innovation culture?
	Better understanding of how a digital mindset affects actual digital innovation of organizations	**Paper VI**; (Henfridsson et al., 2018; Kohli & Melville, 2019)	Explanation; quantitative, statistical, field data, cross-sectional, analysis	Macro-level: Surveys combined with objective data (e.g., patents); Micro-level: scenario-based group comparisons	What is the role of a digital mindset for organizations' digital innovation outcomes?
	Understanding different effects of mindsets on technostress	**Paper VIII**; (Maier et al., 2021)	Explanation; quantitative, statistical, field data, cross-sectional, analysis	Surveys, SEM, group comparisons, or experiments including hormone or nervous system measures.	What is the role of employees' digital mindset for stress appraisal?

7.1 Digital Mindset Development

The most important area for future research that has been neglected so far pertains to the factors influencing the development of employees' digital mindset. Interesting avenues can include the professional, educational, or personal backgrounds of individuals and the extent to which these backgrounds shaped their digital mindset over time. Further, future research that increases our understanding regarding the malleability of mindset as posited in theory is crucial, along with identifying effective measures and their temporal efficacy in fostering digital mindset changes. A particularly interesting research question for subsequent research is therefore *how interventions, training programs, or other measures influence a digital mindset and which combinations of these measures may achieve the greatest effects*. Answers to this question are interesting to better understand the nature of the malleability of the construct and thus its position in relation to other individual differences and, above all, interesting for employees and organizations to be able to develop appropriate curricula or development strategies. A future research project should utilize established content guidelines regarding digital innovation to develop diverse training methods (Fichman et al., 2014), varying in content, interactivity, duration, and frequency. To establish and gauge the causality of interventions, a longitudinal experimental design is recommended, incorporating control groups unexposed to any training methods. Ideally, this study should encompass different treatment groups varying in the diversity, frequency, and duration of training methods, while the control group remains untreated. Post-training assessments of a digital mindset, other mindsets, and (IT-specific) traits should be conducted after an appropriate interval to mitigate bias. In the analysis, both longitudinal comparisons within the group, ANCOVA analyses integrating control variables, and the digital mindset values across the groups should be compared. The findings of such a study will contribute empirically to the practitioner recommendations but also build upon existing research on development for context-specific mindsets (Limeri et al., 2020; Park et al., 2020) and will lay the groundwork for designing optimal digital mindset trainings.

7.2 Digital Mindset Concept

In addition to its theoretical definition and conceptualization, future research endeavors should aim to deepen our understanding of the digital mindset concept itself. This includes potential classifications, investigations in comparison to other traits and conceptualizations across different contexts, a more nuanced comprehension of adapted conceptualizations requisite for specific roles, and support from neuropsychological evidence. Furthermore, elucidating the question of *what role a digital mindset plays in the context of other psychological states and concepts that play a role in task performance* is of particular interest for better theorization and further empirical studies. Answers to these inquiries are pivotal for advancing theorization, discerning causal pathways, and identifying pivotal research directions. A prospective research project should start with a two-stage literature review to inform subsequent empirical investigations following the guidelines in (Pare et al., 2015). The initial stage entails extracting psychological states and cognitive theories (e.g., flow, cognitive fit, cognitive load, mental models) relevant to task performance investigated in the psychological literature to delineate pertinent definitions, conceptual scopes, and differentiators from mindsets. Subsequently, it should be identified how these concepts were investigated within the IS literature, thereby extracting valuable insights and models pertinent to findings regarding the digital innovation context. Synthesizing these theories, concepts, and findings, alongside insights gleaned from reviews of IT-specific traits and mindsets, deepens the theoretical foundation of a digital mindset and in general mindsets in IS research. This synthesis not only elucidates the positioning, boundaries, and intersections of a digital mindset but also provides a succinct framework for theorizing its effects on other pertinent concepts. Extending previous works that apply those concepts (Karahanna et al., 1999), the findings of such an analysis provide additional indications of how investigations into the digital mindset advance our understanding of its implications on cognitive processing in the IS context.

7.3 Digital Mindset Effects

The limitations identified in this dissertation offer fertile ground for further research in exploring additional dimensions of a digital mindset's impact. Beyond delving deeper into its effects on task perception and system properties, future inquiries could adopt configurational approaches, potentially also incorporating other individual traits, further probe mitigation of other negative effects, and examine its relationship to organizational concepts. However, providing further insights into digital mindset's role in shaping behavior is of particular interest beyond the focus of this dissertation on IS infusion behaviors and creative cognition. Answering the question of *how digital mindset effects vary across hierarchies, roles, departments, and task types, contingent upon differing cognitions,* represents a crucial avenue for investigation. Such a study promises valuable insights into whether indirect effects are prevalent universally or if employees' digital mindset (or a specific cognition configuration) holds particular significance in specific organizational contexts or for particular behaviors. To explore this question comprehensively, a multi-sample survey approach is recommended, gathering data from employees across strategic (e.g., CIO, managerial) and operational levels, alongside corresponding behavioral assessments necessitating similar cognitions. For instance, a comparative analysis could be conducted between conceptual roles and implementation roles within a digital innovation lab. In addition, other cognitions and corresponding behaviors should be investigated, such as digital cognition and data analysis, cloud platform utilization, and agile cognition in project management settings. The results of such comparisons expand our understanding of how a digital mindset and its various aspects can help to explain different behaviors and extend previous research on context-specific mindsets and their effects on behavior (Kouzes & Posner, 2019).

8 CONCLUSION

The goal of this dissertation was to advance the theoretical understanding of the digital mindset and provide empirical evidence. In doing so, this dissertation asks and answers the question of what the digital mindset is and why organizations should consider employees' digital mindset within the context of digital innovation. The collection of eight papers focuses on elucidating the essence of employees' digital mindset, its impact on IS infusion behaviors, and its role in mitigating technostress. They define the digital mindset as a collection of cognitive schemas that are formed through accumulated knowledge and experiences of digital technologies and their consequences, which are expressed in different psychological ways. The digital mindset is conceptualized in the context of digital innovation as 3 cognitions that group 11 thinking patterns and can be measured using questionnaires. They also show that it primarily influences the perception of the possibilities of digital technologies and promotes IS infusion behavior by raising expectations and other IT-specific traits. Finally, employees' digital mindset can also mitigate technostress by accelerating reducing influences, buffering negative effects, and generally promoting the perception of one's own satisfaction and productivity at work.

Picking up the initial quotes, this dissertation helps both practitioners and academics understand what really lays behind the digital mindset and how it "[…] *will future-proof you, your career, and your organization*" (Leonardi & Neeley, 2022, p. 1). It provides empirical evidence that organizations require to "[…] *focus on mindset—not skill set […]*" (Forbes, 2020), as employees' digital mindset enables them to harness the potential and buffer negative effects of digital technologies at work, encouraging further research into this construct.

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APPENDIX

Table 22. Overview of investigated mindset concepts in related disciplines

Mindset Concept	Underlying Mindset Perspective	Relevant Empirical Findings in Work Contexts	Exemplary References
Growth Mindset	Beliefs	Positive influence on GPA; positively influences entrepreneurial action at work; reduces stress at work	(Dweck, 2006; Dweck et al., 1995; Kim et al., 2022; Morris et al., 2023; Murphy & Dweck, 2016)
Zero-Sum Mindset	No specific	Mindsets moderate the outcomes of jobcrafting	(Dong et al., 2023)
Leadership Mindset	No specific	Leadership mindset of employees positively influences organizational resilience	(Zhang et al., 2023)
Paradox Mindset	Filters, Beliefs	Paradox mindset directly and indirectly enhances work engagement; positively affects individual ambidexterity and absorptive capacity; positively affects innovative work behavior	(Y. Liu et al., 2020; Miron-Spektor et al., 2018; Snehvrat et al., 2022; Yin, 2023)
Deliberative/Implemental Mindset	Processes	Deliberative and implemental mindset enhances planning performances, and procedure selection	(Gollwitzer, 2012; Gollwitzer et al., 1990; Rixom & Plumlee, 2023)
Entrepreneurial Mindset	Beliefs, Processes, Filters	Entrepreneurial mindset of employees is positively correlated with work performance; significantly affects entrepreneurial intentions; is formed by entrepreneurial education	(Abun et al., 2022; Cui & Bell, 2022; Davis et al., 2016; Mathisen & Arnulf, 2012; Naumann, 2017)
Work Growth Mindset	Beliefs	Employees help coworkers more after participating in a work growth mindset intervention; growth mindset makes employees more other-oriented and likely to help, but that this effect relies on the extent to which the helping opportunities can be seen as enabling both self- and other-development	(Rogers et al., 2023)
Temporal Mindset	Filters	Temporal mindsets of decision makers affect how firms align to crisis	(Pérez-Nordtvedt et al., 2023)
Stress Mindset	Beliefs	Mobile messaging conversational agents affects stress mindsets of employees; Leaders stress mindset affects their perception of employee well-being and leadership behavior; leads to personal growth and engagement employees in business; moderate the effects of work challenge stressors on work-to-family conflicts and distress; affects coping efforts	(Allan, 2023; Casper et al., 2017; Chen & Hou, 2021; Huebschmann & Sheets, 2020; Kaluza et al., 2022)
Global Mindset	Filters, Processes	Personality traits are antecedents, and job-related factors are antecedents; Affects innovative work behavior and indirectly performance at work; international training and education have a high contribution towards the development of managers' global mindsets	(Andresen & Bergdolt, 2021; Gupta & Govindarajan, 2002; Rhinesmith, 1992; Wollenberg et al., 2020)
Domestic Mindset	Beliefs, Processes, Filters	Domestic mindsets foster early international commitment	(Nadkarni et al., 2011; Nadkarni & Perez, 2007)
Strength Mindset	Beliefs	Strength mindset positively relates to positive affect and job performance; positive affect was found to significantly mediate the relationship of strengths mindset with task performance and innovative behavior	(Ding & Liu, 2023)
Digital Mindset	Beliefs, Filters	-	(Allen, 2020; Solberg et al., 2020; Tour, 2015)

Table 23. Overview of investigated mindset concepts in the senior scholars IS premier outlets, extended by ICIS and ECIS as relevant conferences

Mindset Concept	Explicitely investigated, referenced, or an outcome?	Relevant statements or findings	References
No specific	Referenced	Information systems design should consider varying mindsets of people that interact with the system to fulfill their needs.	(Bhattacharyya et al., 2020)
	Referenced	Social influence can change the mindsets of individuals.	(Sedera et al., 2017)
	Referenced/Outcome	New digital phenomena, such as cloud computing create new challenges and tasks that require the development of new mindsets.	(Schneckenberg et al., 2021)
	Referenced	Mindset is used synonymously with mindfulness.	(Thatcher et al., 2018)
	Explicitely	Mindset of employees is a part of organizational digital data stream readiness and provides appropriate cognitive filters for being more apt to select and interpret available and collected data for decision making; as a part of digital data stream readiness, it affects process process efficiency and product effectiveness, which mediate its effects on the competitive advantage of a firm.	(Raguseo et al., 2021)
	Referenced	Different mindsets influence how individuals are influenced by recommendations of strong or weak ties	
	Referenced	Mindset constraints reduce perceived benefits of IS/IT.	(Lin & Pervan, 2003)
	Referenced	New mindsets are required to work adequately in the digital age.	(Aroles et al., 2021)
	Outcome	Different mindset of employees is required to fit the bi-modal IT world as these worlds collaborate.	(Toutaoui et al., 2022)
	Outcome	Changing the mindset of many business managers and front-line staff is often a more formidable task compared to implementing structural and organizational changes.	(Peppard, 2001)
	Outcome	Education and training play a pivotal role in fostering a mindset shift; training camps designed for entrepreneurs, aiming shifted thought patterns and enthusiasm for digital transformation.	(Li et al., 2018)
	Outcome	Transitioning from product-oriented to service-oriented business models necessitates a shift of employees' and management mindset.	(Kranz et al., 2016)
	Outcome	Huge investments in training and education enabled the development of new mindsets that are required for data analytics, including thinking in analytic ways, fostering knowledge exchange and group connectedness.	(Someh et al., 2023)
	Outcome	New mindsets of employees are important in software platform contexts.	(Li et al., 2021)
	Outcome	Changes in employees' mindset are important for successful digital entrepreneurship.	(Li et al., 2016)
	Outcome	Employees require the willingness to change their existing mindset for implementing EDI's successfully.	(Teo et al., 1997)
	Referenced	Mindsets are distinct viewpoints that determines how an individual engages events or views reality. If commonly held concepts change fundamentally, revolutionary mindset changes, or mindshifts, occur.	(Armstrong & Hardgrave, 2007)
	Outcome	Digital transformation requires a mindset shift of emplyees	(Nolte et al., 2020)
	Outcome	Within most organizations, hindrances to digital transformation typically stem not from a lack of knowledge but rather from the mindset of employees, regardless of their role or hierarchical position.	(Bitzer et al., 2021)
	Outcome	Fresh mindsets of employees are required to ensure a continuous influx of innovative ideas for new products and services and facilitate effective collaboration among both internal and external stakeholders.	(Andersen & Ross, 2016)
	Outcome	The success of a digital strategy relies on the mindset of the organization's leader.	(Canhoto et al., 2021)
Agile mindset	Outcome	Agile mindset is important to adapt agile development methodologies	(Cao et al., 2009)
	Outcome	Agile processes in the age of digital transformation require completely new mindsets	(Ramesh et al., 2017)
	Referenced	Is required for agile adoption	(Ciriello et al., 2022)
	Referenced	Agile mindset are beliefs about organizational structures; Agile Mindset is a part of digital agility	(Salmela et al., 2022)
	Explicit	Three combinations of personality traits influence the agile mindset	(Emmerich et al., 2022)
	Outcome	One of the main soft factors that hinder the success of digital transformation	(Fuchs & Hess, 2018)
	Explicit	Agile Mindset is a mindset based on the values and principles of the Agile Manifesto, whose main characteristics are trust, responsibility and ownership, continuous improvement, a willingness to learn, openness and a willingness to continually adapt and grow. It is underpinned by specific personal attributes on the individual level and an enabling environment on the organisational level.	(Mordi & Schoop, 2020)
	Referenced	Is required to change an organisations culture and for large-scale agile transformation	(Carroll et al., 2023)
	Outcome	Agile mindsets are required to scale agility	(Limaj & Bernroider, 2022)
Analytical mindset	Outcome	The ability to leverage big data depends on an analytical mindset. Managers accustomed to making decisions on gut feelings may not feel comfortable with data and, worse, may discard important data basedon their intuition.	(Lyytinen & Grover, 2017)
Platform mindset	Referenced	Platform mindsets are required to improve performance gains from digital transformation.	(Benitez et al., 2022)
Paradox mindset	Outcome	Paradox tensions of digital technologies require leaders to adopt a new mindset.	(Schneider, 2020)
Closed managerial mindset	Outcome	Cognitive flexibility and considering deviations as normal or tolerating minor failures and defects of managers is essential for surprising business decisions.	(Eastburn & Boland, 2015)
Common mindset	Outcome	Common mindset is required for successful DevOps	(Wiedemann et al., 2023)
Consumer mindset	Explicit	Consumers can be clustered along their consumers mindset (regarding risk, trust, extravagance, opinion leadership, generosity, adventurousness, and price consciousness);	(Roßnagel et al., 2014)

		is used as a control variable and influences willingness to pay for a system	
Process-oriented mindset	Explicit	Process-oriented knowledge is required to change individuals' mindsets; business process management system use significantly affects the process-oriented mindset of employees	(Kettenbohrer et al., 2016)
Service-oriented mindset	Outcome	A service-oriented mindset of employees is required for digital transformation initiatives.	(Klopper et al., 2022)
Data-driven mindset	Outcome	Data-driven mindset influences the impact of big data into business value	(Oesterreich et al., 2022)
Entrepreneurial mindset	Referenced	Describes constantly seeking new opportunities and being inspired by trends such as the blockchain, augmented/virtual reality, bots, Internet of Things, big data analytics, and artificial intelligence, leads to even more and faster screening and adoption of new technologies into the business model.	(Steininger, 2019)
	Referenced	Research is required why strategic configuration work requires an entrepreneurial mindset, that embraces failure, desire to engage in job crafting, and hacker mentality and resilience.	(Baptista et al., 2020)
Experimental mindset	Referenced	Experimental mindset is required across the organization to facilitate change; these differences in mindsets alter how individuals perceive digital transformation initiatives in different way; different user groups perceive same digital technologies differently based on their frame of reference; similarly, digital transformation processes may be perceived differently.	(Noesgaard et al., 2023)
Growth mindset	Explicit	Growth mindsets regarding the own IT project management ability promotes IT project escalation and this effect is partially mediated by anticipated regret about project failureand anticipated likelihood of project success.	(Lee et al., 2021)
Growth/technology mindset	Explicit	Digital transformation readiness consists of growth mindset and technology mindset. Different archetypes exist of champion digital transformer (high-growth mindset and proactive technology mindset), emerging digital transformer (medium-growth mindset and reactive technology mindset), and aspiring digital transformer (low-growth mindset and passive technology mindset); these archetypes respectively different mindsets increase the management and sustenance of digital transformation efforts.	(Shirish et al., 2023)
Workplace-oriented mindset	Explicit	Professionalism represents the mindset with which one views their own profession. This mindset encompasses a collection of interrelated beliefs concerning a profession and its societal role, encompassing notions of public service, self-regulation, professional autonomy, professional identity, and a sense of vocation. The dimensions of professionalism, in turn, have been observed to influence a wide array of attitudes and organizational outcomes, such as performance, job satisfaction, commitment, and motivation. Over time, embeddedness can influence the development of mindsets oriented toward one's career and profession. Consequently, these mindsets can serve as conduits through which embeddedness exerts its impact on behavior and workplace experiences.	(Dinger et al., 2022)
Hedonic and Utilitarian mindset	Outcome	Hedonic mindsets lead individuals to be less likely able to detect fake news	(Lutz et al., 2023; Moravec et al., 2020)
Individual and collective mindset	Referenced	Individual traits lead individuals to mindsets that motivate people to attain desired identity goals and avoiding undesired ones; individual mindset describes pursuing goals that serve the own identity, collective mindset describes goals that connect oneself with group members.	(Li et al., 2021)
Information mindset	Outcome	Information mindset, describing viewing information as central for the business model and the value of IT, is required to creature new IT business capabilities.	(Kohli & Grover, 2008)
Innovation/innovative mindset	Outcome	Institutional changes change the mindset of employees regarding innovation processes as they are faster, more collaborative, and focused on integrated solutions; they excel in the use of IT to develop new solutions and solve specific problems with a fast development cycle.	(Klein & Braido, 2023)
	Outcome	An innovative leadership mindset leads to faster adoption of distributed ledger technologies; lack of innovative mindset is a major hurdle for alignment the business model in a decentralized manner	(Toufaily et al., 2021)
	Referenced	SMEs that possess an innovative mindset are often able to align their processes and innovate their business models and outperform companies that do not have an innovative mindset.	(Cranmer et al., 2021)
	Referenced	The innovative mindset of employees should be supported to increase the capability of a firm to be innovative.	(Tang et al., 2013)
	Outcome	Top management employees of organizations require an innovative mindset to sense industry trends and developments to response adequately to disruptive digital innovations.	(Chan et al., 2019)
IT mindset	Referenced	IT mindsets of teachers are required to offer high quality IT training and design stimulating IT-based curricula.	(Wei et al., 2011)
Digital mindset	Referenced	Only when both the digital mindset of the corporate management and the digital infrastructure are in place will the organization be competent to analyse the substantial data generated from customer transactions and leverage findings to create and manage new products and service.	(Davison & Ou, 2017)
	Outcomes	Digital mindset of companies, reflecting risk-taking, innovation fostering, and collaborative work environments reflect the biggest challenge for companies, particularly traditional ones.	(Grover, 2022)
	Referenced	The purpose of a CDO is triggering digital initiatives to accerlate the organization towards a digital mindset.	(Lorenz & Buchwald, 2023)
	Outcome	As more digitalization takes place, more people adopt a digital mindset.	(Grover et al., 2022)
	Outcome	Acceptance and trust regarding technological hypes requires trust influencers that promote digital mindsets through familiarization with and acceptance of technology	(Korotkova et al., 2023)
	Outcome	The digital mindset is part of digital capability: digital capability emphasises the process	(Zhao et al., 2023)

		of building the knowledge, skills, and mindsets that are required for individuals to participate in a digital society, highlighting the continuous actions that are shaped by the wider learning environment. Digital capability is developed by individuals through continuous actions in the social environment.	
	Outcome	A digital mindset of employees is required to convert a company into a digital company.	(Lucas & Goh, 2009)
	Outcome	In the context of digital transformation, organizational leaders must work to ensure that their organizations develop a digital mindset while being capable of responding to the disruptions associated with the use of digital technologies.	(Vial, 2019)
	Outcome	Acquiring individuals with different mindsets from the digital space can reduce tensions from following different innovation logics that occur through M&A.	(Hildebrandt et al., 2015)
	Outcome	The digital mindset is an essential leader's attribute for digital transformation; leaders should possess customer-orientation, a factor strongly associated with innovativeness, and a digital mindset, which is usually disseminated by the leader's vision	(Ohain von, 2019)

Table 24. Previously investigated individual differences IT-specific traits (Davis & Yi, 2012)

Trait	Habitual Pattern	Context Breadth	Situational Variance	Malleability	Categorization using the hierarchical model	Exemplary Reference
Extraversion	Behavior	Broad	No	No	Cardinal Traits	(Davis & Yi, 2012; Maier et al., 2019)
Agreeableness	Behavior	Broad	No	No	Cardinal Traits	
Conscientiousness	Behavior	Broad	No	No	Cardinal Traits	
Neuroticism	Behavior	Broad	No	No	Cardinal Traits	
Openness	Behavior	Broad	No	No	Cardinal Traits	
Trait Affect	Emotional	Broad	No	No	Cardinal Traits	(Dupuis & Crossler, 2019)
Cognitive Style	Thought	Broad	No	No	Cardinal Traits	(Chakraborty et al., 2008; McElroy et al., 2007)
Mindfulness	Behavior	Broad	No	Yes	Cardinal Traits	(Goswami et al., 2009)
Assertiveness	Behavior	Broad	No	No	Cardinal Traits	(Lounsbury et al., 2007)
Tough Mindedness	Behavior	Broad	No	No	Cardinal Traits	(Landers & Lounsbury, 2006)
Work Drive	Behavior	Broad	No	No	Cardinal Traits	(Landers & Lounsbury, 2006)
Resistance to Change	Behavior	Broad	No	No	Cardinal Traits	(Nov & Ye, 2008)
Locus of Control	Thought	Broad	No	No	Cardinal Traits	(Hsia et al., 2014; Zielonka & Rothlauf, 2022)
Personal Innovativeness with IT	Behavior	IT-Specific	No	No	Central IT-Specific Traits	(Agarwal & Prasad, 1998; Davis & Yi, 2012)
Computer Playfulness	Behavior	IT-Specific	No	No	Central IT-Specific Traits	(Davis & Yi, 2012; Martocchio & Webster, 1992)
Creativity in IT	Thought	IT-Specific	No	No	Central IT-Specific Traits	(Wolverton et al., 2023)
Computer Anxiety	Behavior	IT-Specific	Yes	Yes	Secondary Dynamic IT-Specific Trait	(Thatcher & Perrewe, 2002)
IT Habits	Behavior	IT-Specific	Yes	Yes	Secondary Dynamic IT-Specific Trait	(Limayem et al., 2007)
IT Mindfulness	Behavior	IT-Specific	Yes	Yes	Secondary Dynamic IT-Specific Trait	(Thatcher et al., 2018)
Computer Self-Efficacy	Thought	IT-Specific	Yes	Yes	Secondary Dynamic IT-Specific Trait	(Compeau & Higgins, 1995; Davis & Yi, 2012)
Digital Mindset	Thought	IT-Specific	No	Yes	Secondary Dynamic IT-Specific Trait	This Dissertation

Table 25. Dependent Variables used in the IS literature for IS infusion.

Construct	Definition	Exemplary Authors
Innovate with IT	Innovative utilization of established workplace information technologies by an individual to enhance and facilitate their task performance.	(Maier et al., 2021)
Emergent use	Employing a system in a novel and inventive manner to support tasks.	(Kim & Gupta, 2014)
IS infusion	Using a system and its capabilities to its fullest potential to enhance one's own work.	(Hester, 2011)
Adaptive system use	Adaptive utilization of features, encompassing both what features are used and how they are used. It encompasses four distinct behaviors: experimenting with new features, substituting features, combining features, and reusing features.	(Sun, 2012)
Deep structure usage	The utilization of features within a system that support the underlying structure of the task.	(Burton-Jones & Straub, 2006)
System exploration	Integrating technology into one's work to boost productivity by harnessing previously undiscovered features.	(Liang et al., 2015)
Effective use of IT	The interactions among the user, task, and system that facilitate the attainment of system usage goals.	(Lauterbach et al., 2020)
Trying to innovate with IT	An individual's goal of finding novel uses of information technologies.	(Ahuja & Thatcher, 2005)
Extended usage	Utilizing a greater array of IS features to facilitate and enhance individual task performance.	(Hsieh & Wang, 2007)
Exploratory usage	The degree to which a user actively explores and innovatively employs system features to aid in job task execution.	(Saeed & Abdinnour-Helm, 2008)
Integrative use	Leveraging the system to strengthen connections between tasks.	(Hassandoust et al., 2023)
Infusion effectiveness	Degree to which a technology or system has been successfully integrated and adopted within an individual work context, and how well it contributes to achieving the desired goals or outcomes	(Pao-Long & Lung, 2002)
Intention to explore	The user's intent and drive to innovate, driven by the perceived advantages she expects to gain from the deployment of IT.	(Nambisan et al., 1999)
Intention to reuse code unethically	Unethically repurposing software code for unintended purposes.	(Sojer & Henkel, 2010)

Table 26. Previous literature on affordances based on (Fromm et al., 2020; Ostern & Rosemann, 2021; Pozzi et al., 2014) and extended by current studies.

Authors	Method	Affordance Existence	Affordance Perception	Affordance Actualization
(Goh et al., 2011)	Case Study	X	X	
(Zammuto et al., 2007)	Theoretical	X		
(Jung et al., 2010)	Case Study	X		
(Van Osh & Mendelson, 2011)	Case Study	X	X	
(Leonardi, 2011)	Case Study	X		
(Yoo et al., 2012)	Theoretical	X		
(Majchrzak & Markus, 2012)	Theoretical	X		
(Markus & Silver, 2008)	Theoretical	X		
(Davern et al., 2012a)	Theoretical	X		
(Davern et al., 2012b)	Theoretical	X		
(Volkoff & Strong, 2013)	Meta Case Study	X		X
(Leonardi, 2013)	Case Study	X	X	X
(Seidel et al., 2013)	Case Study	X		
(Robey et al., 2013)	Case Study	X		
(Bernhard et al., 2013)	Theoretical	X	X	X
(Strong et al., 2014)	Case Study	X		X
(Anderson & Robey, 2017)	Case Study			X
(Grgecic et al., 2015)	Quantitative	X	X	
(Zheng & Yu, 2016)	Case Study	X		
(Leidner et al., 2018)	Case Study	X		
(Lehrig et al., 2019)	Quantitative		X	
(Lehrig et al., 2017)	Case Study		X	X
(Karahanna et al., 2018)	Theoretical	X		
(Benbunan-Fich, 2019)	Quantitative			X
(Chan et al., 2019)	Quantitative			X
(Chatterjee et al., 2020)	Quantitative			X
(Cheikh-Ammar, 2018)	Theoretical	X		
(Du et al., 2019)	Case Study	X		X
(Faik et al., 2020)	Theoretical	X		
(Fromm et al., 2020)	Literature Review	X	X	X
(Holzer et al., 2020)	Design Science	X		
(Knote et al., 2021)	Theoretical	X		
(Lehrer et al., 2018)	Case Study	X		
(Mettler et al., 2017)	Case Study	X	X	
(Ostern & Rosemann, 2021)	Literature Review	X	X	X
(Ostern et al., 2020)	Case Study	X		X
(Seidel et al., 2018)	Design Science	X		
(Steffen et al., 2019)	Experiment	X	X	
(Suh et al., 2017)	Quantiative			X
(Thapa & Sein, 2018)	Case Study		X	X
(Haag et al., 2022)	Case Study			X
(Abhari et al., 2022)	Quantitative		X	
(Lichti et al., 2023)	Quantitative			X

1.

Chapter I

Conceptualization, Operationalization, and Nomological Net of the Digital Mindset

Paper I

A COGNITIVE CONVEYOR FOR DIGITAL INNOVATION

DEFINITION AND CONCEPTUALIZATION OF THE DIGITAL MIND SET

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Hildebrandt, Y., & Beimborn, D. (2022). Proceedings of the 17th International Conference on Wirtschaftsinformatik, Nürnberg, Germany

https://aisel.aisnet.org/wi2022/digital_business_models/digital_business_models/12/

Paper II

MEASURING THE DIGITAL MINDSET

DEVELOPMENT AND VALIDATION OF A MULTIDIMENSIONAL SCALE

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Paper III

GEARING UP THE WORKFORCE FOR A DIGITAL FUTURE

THE ROLE OF EMPLOYEES' DIGITAL MINDSET

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GEARING UP THE WORKFORCE FOR A DIGITAL FUTURE

THE ROLE OF EMPLOYEES' DIGITAL MINDSET

Abstract

This study investigates the concept of employees' digital mindset and its critical role in pre-paring the workforce for a digital future, exemplified by investigating it in the context of generative artificial intelligence (GenAI) since "how artificial intelligence will change the value of skills — is difficult to predict, because the answer depends partly on how new tools are designed, regulated and used" (New York Times, 2023). Employees' digital mindset is a set of cognitive schemas that influence how employees perceive and interpret digital tech-nologies and phenomena. We employ a survey with panel data of 166 full-time employees and a partial least squares structural equation modeling (PLS-SEM) analysis to examine the relationship between employees' digital mindset, collaborating with GenAI at work, and previous experiences, such as work-related and private digital innovation activities or partic-ipation in digital innovation communities. The findings reveal that these experiences signifi-cantly contribute to the cultivation of employees' digital mindset, which in turn enhances their abilities to co-create with GenAI. This study underscores the importance of fostering a digital mindset across the entire workforce to ensure competitiveness and adaptability in an increasingly co-creative digital environment.

1 INTRODUCTION

"The biggest societal challenge is the future of work, as well as what is the workforce of the future" (PwC, 2024). As nearly 50% of expected skills are anticipated to change due to rapid technological advancements, CEOs see shifting *mindsets* as the primary challenge to empower employees at every level (World Economic Forum, 2023). More drastically, organizations need to "[…] focus on mindset – not skill set" (Forbes, 2020) and employees' *digital mindset* is said to be the key to the future of work (Gartner, 2024; Leonardi & Neeley, 2022).

An impressive instantiation of this future of work takes place with recent generative artificial intelligence (GenAI) developments, requiring organizations to prepare their entire workforce to not only use but co-create with these tools (Benbya et al., 2024). GenAI describes a class of AI models that generate new content from prompts, with vast potential to transform the labor market and boost productivity (Brynjolfsson et al., 2023; Noy & Zhang, 2023). Changes in information-intensive tasks will impact an estimated 80% of employees (Eloundou et al., 2023), with the disruption affecting not just IT professionals (12%) but predominantly non-technical professionals (88%) (McKinsey, 2024). Hence, GenAI demonstrates how digital technologies can complement employees (Benbya et al., 2024), serving both as "[…] a tool and a partner" (Forbes, 2024). As a result, "the AI-fueled future of work needs humans more than ever" (Wired, 2024) and research agrees that these developments rather increase than decrease organizations' human capital (Sabherwal & Grover, 2024).

However, instead of searching for the best-skilled workers, organizations now need to rethink their approaches to optimize their workforce because the value of skills in this future of work "is difficult to predict, because the answer depends partly on how new tools are designed, regulated and used" (New York Times, 2023), and previously specialized craft skills can become more and more redundant (e.g., through multi-modal input systems) (Sabherwal & Grover, 2024); even workers with less or other skills may become highly valuable for companies through the potential complementary use of those tools (Noy & Zhang, 2023).

Consequently, they need to expand their horizons and enhance workforce quality, for example, through gender equality and neurodiversity (Loiacono & Ren, 2018; Schmitt et al., 2023), or by focusing on non-job-related experiences (Chen et al., 2022; Petter et al., 2018). Even more essential, cognitive aspects are emphasized as vital for the future of work enabled by digital technology (Eckhardt et al., 2019; Oberländer & Leyer, 2022), and the more pervasive and natural digital technologies like GenAI become, the more a theory of mind is necessary to explain how employees perceive those and other new technologies to enable effective and efficient co-creation (Feuerriegel et al., 2024; Richter & Richter, 2024). Or, in other words, "mindsets trump skillsets" (EY, 2018) and "every executive, every worker needs to have a digital mindset" (Havard Business Review, 2023), making recent research weighing employees' mindset more crucial than skills in the future of work (Paul et al., 2024; Weritz, 2022).

Will a *digital* mindset be the answer? Employees' digital mindset describes a set of cognitive schemas, generally expressed as typical cognitive filters, processes, and beliefs, that change how individuals perceive and interpret concepts, information, or aspects regarding digitalization (Hildebrandt & Beimborn, forthcoming). Although the relevance of this mindset is widely recognized, naming it as an essential attribute of the entire workforce (Weritz, 2022), comprising leaders (Davison & Ou, 2017; Ohain von, 2019) as well as ordinary employees (Zhao et al., 2023), the insights of previous literature usually do not go beyond highlighting the digital mindset as an important component for digital innovation and transformation initiatives (e.g., Grover et al., 2022; Holotiuk et al., 2024). At the same time, developing a digital mindset (i.e., employees with a digital mindset) is a core challenge for companies (Grover, 2022), while hunching that with increasing experience with digitalization (Grover et al., 2022), digital innovation projects (Holotiuk et al., 2024), or digital technologies (Korotkova et al., 2023), more and more individuals develop a digital mindset.

Hence, there is a large discrepancy between this phenomenon's prominence and claimed relevance for the future workforce and our knowledge about its effects and influences. We know that as these digital technological developments become more ubiquitous and natural, such as with GenAI, cognitive aspects will gain prominence in explaining how employees interact in those new co-creative environments. Specifically, we know that employees' digital mindset, as practitioners and scholars emphasize, is a cognitive aspect crucial for the future workforce.

Nevertheless, we do not yet understand the direct value of employees' digital mindset and how organizations can anticipate or develop it within their workforce. This creates uncertainty about how organizations can and should invest in developing their employees' digital mindset or expand their talent pool to attract potential candidates. Hence, this leads us to the question of how important employees' digital mindset is as an alternative cognitive parameter in the future of work, thus exploring the nomological network for a digital mindset in this context. Specifically, we address the following research questions:

RQ1: *How do individual experiences impact the development of employees' digital mindset?*

RQ2: *How does employees' digital mindset impact co-creation with digital technology?*

We answer our research questions by using mindset and underlying schema theory, and transferring them to the digital context and the future of work to hypothesize the influences and effects of employees' digital mindset. We test our model with panel data from 166 full-time employees. We contribute by providing a deeper understanding of the digital mindset. Our findings offer insights into how employees' potentially can develop their digital mindset and shed light on the digital mindset's role for relevant behaviors within the future of work. In the remainder of this paper, we provide some background on mindset and underlying schema theory, digital mindset, the future of work, and GenAI, develop our hypotheses, introduce the methodological approach, present our results, and discuss our findings.

2 BACKGROUND

2.1 THEORETICAL PERSPECTIVES ON MINDSETS

A mindset can be defined as a collection of cognitive schemas that represent accumulated knowledge and experiences of a specific concept, expressed through cognitive filters, processes, and beliefs (Dweck, 2006; Gollwitzer, 2012; Gupta & Govindarajan, 2002; Nadkarni et al., 2011). Different research strands define mindsets differently, but all refer to the same underlying core theory schemas (French, 2016).

Schema theory states that the human brain structures knowledge in organized units, respectively schemas, regarding subjects, concepts, types of stimuli, or events (Fiske & Taylor, 1991). They represent recurring patterns of thought, reflecting accumulated knowledge and experiences derived from numerous instances of similar experiences concerning a particular concept. Schemas emphasize the active construction of reality and one's unconscious contribution when perceiving the environment (Piaget, 1970). Schemas develop from encounters with instances or abstracted communications of the schema's general characteristics.

According to (Fiske & Taylor, 1991), schemas are easier to develop through active experience and practice, especially complex schemas. When encountering new information, it is either assimilated into existing schemas, reinforcing them, or accommodation occurs, leading to the adjustment of existing schemas or the creation of new schemas if the information does not fit (Piaget, 1970). When individuals encounter stimuli, relevant schemas are activated and influence the encoding of new information, memory of old information, and inferences where information is missing (Fiske & Taylor, 1991). Encoding is affected by schemas from the earliest moments and focuses attention on information consistent with these schemas and away from irrelevant or inconsistent details, reducing cognitive dissonance (Carlston et al., forthcoming).

Frequently used schemas are more easily activated, leading to quicker processing of familiar stimuli and shaping perceptions of the environment. This process, often described as cognitive filters or frames of reference in mindset research, enables individuals to notice and interpret their surroundings with minimal cognitive effort (Kahneman, 2011; Rhinesmith, 1992). Further, people tend to recall material that aligns with their schemas more than information that does not. Memory for schema-consistent information simplifies daily tasks, helping people navigate complex decisions by applying previous judgments and handling ambiguous, mixed, or weak information (Fiske & Taylor, 1991). This mechanism is often referred to when mindsets are described more broadly as cognitive processes that enable individuals to perceive and evaluate relevant action possibilities in situations and infer their desirability and feasibility (Gollwitzer, 2012; Gollwitzer et al., 1990; Nadkarni & Perez, 2007).

Additionally, the schematic inference of missing information shapes evaluations and judgments about stimuli. Ambiguous or missing information is interpreted through the activated schema by attempting to fit new information into an existing schema (i.e., assimilation) (Smith, 1998), potentially leading to confirmation bias (Kahneman, 2011). Schematic inference is frequently referred to when mindsets are described as beliefs and absolute convictions about a thing, the environment, or the person that change how individuals interpret situations (Dweck, 2006; Dweck & Leggett, 1988).

Previous research on mindset investigated mindsets for specific contexts and their interrelationships within nomological variables. Exemplarily, a work-growth mindset describes beliefs regarding growth opportunities of one's abilities at work (Dweck & Yeager, 2019; Rogers et al., 2023) is influenced by educational interventions (Burgoyne et al., 2018; Burnette et al., 2023; Limeri et al., 2020), makes employees rather help coworkers (Heslin et al., 2006), work more innovatively, and seek feedback (Janssen & van Yperen, 2004). An individual's global mindset is defined as the awareness of different cultures and markets in an environment of continuous globalization that enables managers to see various shared meaning systems or global consequences and is determined by working abroad and involvement in global operations (Andresen & Bergdolt, 2021; Wollenberg et al., 2020) and showed to affect innovative work behavior and direct and indirect effects on work performance (Pusparini & Aryasa, 2021). In the context of pervasive digitalization and the ubiquitous influence of digital innovations, organizations need to promote a digital mindset among their employees to stay competitive (Davison & Ou, 2017; Warner & Wäger, 2019), which has recently drawn the attention of IS research (Leonardi & Neeley, 2022; Weritz, 2022).

2.2 Facets of Employees' Digital Mindset

Employees' digital mindset, adhering to this psychological mindset and schema theory foundation, is broadly defined as the collection of cognitive schemas regarding concepts and aspects of digitalization (Allen, 2020; Hildebrandt & Beimborn, forthcoming; Solberg et al., 2020). These schemas, generally expressed as typical cognitive filters, processes, and beliefs, change how individuals perceive and interpret concepts, information, or aspects regarding digitalization (Hildebrandt & Beimborn, forthcoming). These aspects and concepts describe, for example, digital technologies themselves, new working environments, or digital phenomena (Davison & Ou, 2017; Grover, 2022; Hildebrandt & Beimborn, forthcoming).

Digital technologies, in this context, refer to those characterized by a modular digital architecture with loosely coupled layers of content, service, network, and devices, enabling the creation of new functions and value by combining these layers (Henfridsson et al., 2018; Yoo et al., 2010). Their pervasive presence in society and organizations opens flexible, value-creating opportunities for a wide range of employees, not just those in IT or R&D departments (Hildebrandt & Beimborn, 2023; Holotiuk et al., 2024; Opland et al., 2022).

In line with these boundaries, Hildebrandt and Beimborn (forthcoming) conceptualized employees' digital mindset as not to be understood as a superordinate construct but rather as three independent but correlated schema collections termed the *creative*, *digital*, and *agile cognition*, encompassing 11 different thinking patterns. A high digital mindset level among employees indicates a strong manifestation of these correlating cognitions, with the highest level of a digital mindset being present when all three cognitions are highly developed.

Digital cognition encompasses four thinking patterns: data-driven, exponential, digital-oriented, and platform-oriented thinking patterns, which describe schemas that shape how employees perceive and interpret novel paradigms arising from and accompanying emergent digital technologies. Data-driven thinking refers to data and its generation, manifesting in higher sensitivity towards data associated with or created through digital technologies and the inferred evaluation of this data as a valuable resource. Exponential thinking refers to digital technologies and their typical technical growth and scalability but also diffusion, which manifest in interpreting digital technologies not only as the digital technologies with present capabilities and potentials but also in terms of deriving future exponential development potentials. Digital-oriented thinking refers to the application of digital technologies (cf. Drechsler et al., 2019; Nambisan et al., 2017), leading to an interpretation as valuable in the absence of or ambiguous information (Hildebrandt & Beimborn, forthcoming). Platform-oriented thinking refers to digital platforms (cf. Hund et al., 2021; Yoo et al., 2012), manifesting through recognizing decentralized solutions and utilization possibilities of digital technologies as platforms with multiple facets (Hildebrandt & Beimborn, forthcoming).

Creative cognition includes combinatorial, generative, disruptive, and risk-affine thinking patterns that describe an increased sensitivity to and perception of digital technologies' creative potential and possibilities inherent to their layered modular architecture. Combinatorial thinking refers to the recombinability of (different layers of) digital technologies (cf. Henfridsson et al., 2018; Nambisan et al., 2017), expressed by perceiving those connections between digital technologies and existing digital or non-digital technologies with more cognitive ease. Generative thinking refers to the reprogrammability, misappropriability, and generativity of digital technologies (cf. Hund et al., 2021; Yoo et al., 2010), leading attention beyond the intended use of digital technologies. Disruptive thinking is how digital technologies completely revolutionized and reshaped existing solutions or processes (cf. Chan et al., 2019; Nylén & Holmström, 2015), expressed by tuning attention toward such disruptive solutions of digital technologies at work (Allen 2020). Lastly, risk-affine thinking refers to assessments of creative uses and applications of digital technologies, leading employees to infer information about such applications and a more positive evaluation and interpretation of associated risks.

Agile cognition encompasses collaborative, iterative, and resilient thinking and reflects established schemas related to new forms of work and interactions with digital technologies, manifested through beliefs and convictions about agile problem-solving methods and experimentation with digital technologies. Collaborative thinking refers to co-creation and both inter- and intra-disciplinary collaboration, often facilitated by digital technologies (cf. Drechsler et al., 2019; Nambisan et al., 2017) and manifests through directing attention to collaborative action options and strong beliefs in the value of cooperation in problem-solving scenarios. Iterative thinking refers to experimentation, entrepreneurial trial and error, and agile work methodologies within the context of digital technologies (e.g., sprints) (cf. Ciriello et al., 2018; Kohli & Melville, 2019; Svahn et al., 2017). It manifests as simple experimentation with digital technologies, and prototypical digital solutions for problems are interpreted as desirable approaches (Hildebrandt & Beimborn, forthcoming). Resilient thinking refers to reflection within these cycles, learning from mistakes, and embracing the necessity of these cycles, errors, and especially learnings (cf. Drechsler et al., 2019; Hund et al., 2021; Svahn et al., 2017). This schema is expressed in individuals' use and development of digital solutions, embracing experimentation, including potential failures, for continuous improvement and adaptation (Hildebrandt & Beimborn, forthcoming).

Previous literature on the digital mindset has often raised the question of how crucial it is for digital innovation and transformation (e.g., Grover et al., 2022; Holotiuk et al., 2024; Lucas & Goh, 2009) but did hardly go beyond. Studies, mostly qualitative, highlight its value in leadership (Ohain von, 2019), the creation of new products or services (Davison & Ou, 2017; Grover, 2022), responding to disruptions (Vial, 2019), and easing tensions from digital M&As (Hildebrandt et al., 2015) to build digital capabilities to convert into a digital company (Zhao et al., 2023).

Following these indications, Hildebrandt and Beimborn (forthcoming) conceptualized and operationalized the phenomenon, with initial empirical studies investigating the touted effects. On the one hand, these studies showed correlations and discriminance to other individual constructs, such as PIIT or IT mindfulness (Hildebrandt & Beimborn, 2023, forthcoming). On the other hand, single cognitions (i.e., creative cognition) led employees to subconsciously and consciously perceive more innovative uses of digital technologies (Hildebrandt & Beimborn, 2023) or that certain thinking patterns reduce the negative impacts of technostress and increase overall job performance and satisfaction (Valta et al., forthcoming).

At the same time, developing a digital mindset is a core challenge for companies (Grover, 2022). Still, scholars indicate that, with increasing experience with digitalization (Grover et al. 2022), digital innovation projects (Holotiuk et al. 2024), and digital technologies (Korotkova et al. 2023), individuals develop a digital mindset. However, the literature contains no quantitative empirical evidence supporting those claims. Table 5 in the Appendix summarizes related work on the digital mindset in IS premier outlets that explicitly investigates, references, or possesses employees' digital mindset as an outcome.

Hence, although the existing literature cites employees' digital mindset as essential for organizations in the digital context, we only know about empirical evidence for altered perception (e.g., affordance perception) or the mitigation of negative effects (e.g., technostress), while concrete effects on truly beneficial behaviors of employees are lacking. Also, we do not understand how organizations or employees can *develop* a digital mindset. Without information on those significant nomological variables, organizations – even if they prioritize a digital mindset to build up their future workforce – cannot assess what they should focus on when hiring employees or in which experiences and interventions they should invest. Therefore, we address these issues by examining, based on schema theory and previous literature on the digital mindset, how different active experiences with digital innovation influence the cognitions of the digital mindset and what effects they have on individuals' behaviors relevant in the future of work, specifically that of the co-creation with technology.

2.3 FUTURE OF WORK AND CO-CREATIVE ENVIRONMENTS

The future of work encompasses multiple transformations in work aspects driven by digital technological advancements (Colbert et al., 2016). These transformations include shifts in work models, environments, the nature of work itself, and the workforce within companies (Kaarst-Brown et al., 2018; Richter et al., 2018; Wang et al., 2020). Exemplarily, as traditional employer-employee relationships evolve through the utilization of crowd workers and online freelancers, more flexible work models are arranged (Deng et al., 2016; Taylor & Joshi, 2018), also leading to remote or telework that presents new challenges (Maier et al., 2022).

Changes in the nature of work involve shifts in core activities and responsibilities, either replacing or complementing existing tasks (Brynjolfsson et al., 2023; Feuerriegel et al., 2024). Consequently, the characteristics and demands of a company's workforce also continuously change, influencing which skills profiles and aspects of (prospective) employees are essential for success and where and how companies can acquire suitable talent (Di Gangi et al., 2022; Weitzel et al., 2009). Historically, this was crucial for building an appropriate IT workforce, but recent technological advancements, such as GenAI, now disrupt the entire workforce (McKinsey, 2024), enabling all employees to co-create using digital technologies (Benbya et al., 2024; Feuerriegel et al., 2024).

GenAI refers to AI models that create new content from prompts using large language and image generation models trained on extensive datasets (Benbya et al., 2024). This content includes text, images, music, videos, or software code. The rapid development and widespread availability of tools like ChatGPT, Claude AI, and GitHub Copilot, along with their integration into existing hardware systems (e.g., Google AI[31] and Apple Intelligence[32]), have accelerated the reach of this technology within organizations, outpacing previous technological advancements (Benbya et al., 2024; Sabherwal & Grover, 2024). Even without a dedicated AI strategy or proprietary GenAI tools, this widespread dissemination is reshaping how we work (Noy & Zhang, 2023).

While some reports predict significant employee substitution (Goldman Sachs, 2023), recent research suggests GenAI tools are more likely to support and complement employees by fostering co-creative environments (Benbya et al., 2024; Feuerriegel et al., 2024). This mutual delegation of tasks enhances rather than diminishes human capital by creating new value (Fügener et al., 2022; Sabherwal & Grover, 2024). Additionally, the multi-modal nature of GenAI allows employees to compensate for skill gaps, making traditional craft skills less critical (Benbya et al., 2024; Noy & Zhang, 2023). Organizations must, therefore, broaden their focus when optimizing their workforce for this new era of co-creation. Previous research names demographic factors, job characteristics, and non-work-related experiences that companies should consider optimizing their IT workforce or acquiring skilled digital talent and recently emphasizes the role of cognitive aspects (see Table 6 in the Appendix for details).

For instance, promoting gender equality (Schmitt et al., 2023; Sundermeier et al., 2020) and embracing neurodiversity (e.g., expanding the talent pool to include employees with autism and autistic tendencies) (Jia et al., 2022; Loiacono & Ren, 2018) are beneficial strategies for enhancing an organization's IT workforce. Furthermore, adapting work models and modes, such as offering hybrid work arrangements, can automatically broaden the pool of digitally proficient talents (Marx et al., 2023; Weritz et al., 2022). Besides, scholars suggest that companies should evaluate employees beyond IT- and job-relevant skills and experiences (Karaevli et al., 2021). Factors such as general digital nativeness—early experiences and familiarity with digital technologies—(Chen et al., 2022) their empowerment with IT (Zaza et al., 2023), or non-job-related experiences like gaming (Colbert et al., 2016; Petter et al., 2018) can indicate valuable competencies of IT-savvy employees. Those experiences do not necessarily indicate specific IT skills but relevant cognitive aspects (Kaarst-Brown et al., 2018), which significantly influences how they create value in organizations (Oberländer & Leyer, 2022) and are said to be even more important than IT-specific skills (Paul et al., 2024; Weritz, 2022).

As digital technologies increasingly impact non-technical work areas, understanding those cognitive aspects becomes crucial for effective co-creation (Feuerriegel et al., 2024). Here, recent literature calls for research on new constructs to better understand the collaboration between individuals and these tools (Paul et al., 2022; Venkatesh, 2022). Specifically, research models should focus on human-AI interaction patterns, considering how individuals' perceptions of these systems can enhance collaboration in co-creative environments (Feuerriegel et al., 2024).

We address two shortcomings by focusing on employees' digital mindset's role in co-creation behavior in the context of GenAI tools. First, previous literature merely revolves around optimizing a workforce by adding IT talent and considering their cognitive differences and prior experiences with digital technologies. However, with advancements like GenAI, we need to optimize the entire workforce—not just IT. Companies now rely on all employees, not just IT experts, to generate value through these technologies, making it essential to explore cognitive aspects relevant to everyone. Second, we address the previous literature's findings and calls for research, emphasizing that skills, particularly in the context

[31] https://ai.google/
[32] https://www.apple.com/apple-intelligence/

of GenAI, become less relevant. Instead, cognitive aspects are particularly important to better understand the complementarity between employees and their use of digital technologies, such as GenAI. Hence, we address both shortcomings by investigating the relationship between employees' digital mindsets and co-creation behavior in the context of GenAI tools.

Taken together, Figure 1 shows our conceptual model based on schema theory, literature on the digital mindset, and the future of work.

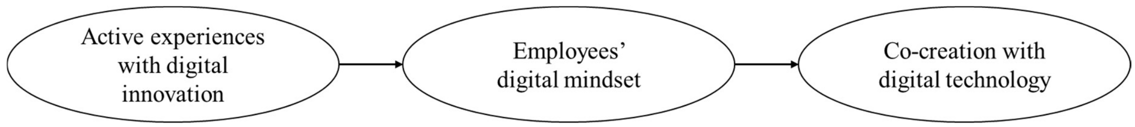

Figure 1. Conceptual Model

3 RESEARCH MODEL AND HYPOTHESES

Employees' digital mindset comprises the *digital*, *creative*, and *agile* cognition representing sets of schemas (Hildebrandt & Beimborn, forthcoming). Schema theory proposes that experiences form schemas, and the literature suggests that workplace experiences with digital innovation may foster a digital mindset (Holotiuk et al., 2024). Further, the future-of-work literature suggests other non-job-related experiences (e.g.,, especially private activities) (Chen et al., 2022; Colbert et al., 2016). As it may be challenging for organizations to assess these private experiences, especially of prospective employees, the literature suggests that non-work-related experiences in online communities could be considered because they also can indicate relevant aspects of the future of work and experiences from online communities as particularly relevant for organizations as they can utilize potential spill-over effects (Colbert et al., 2016; Petter et al., 2018) to derive new channels for recruiting talent (Weitzel et al., 2009). GenAI describes the most recent and pervasive development in the future of work, creating co-creative environments and making collaboration with those tools particularly relevant.

3.1 EFFECTS OF EMPLOYEES' ACTIVE EXPERIENCES WITH DIGITAL INNOVATION ON THEIR DIGITAL MINDSET

Schemas of a mindset reflect accumulated knowledge and experiences derived from numerous similar instances (Fiske & Taylor, 1991). These schemas are adaptable and evolve through active interaction with the environment. When encountering new information, it is either assimilated into existing schemas, reinforcing them, or accommodation occurs, leading to the adjustment of existing schemas or the creation of new ones if the information does not fit (Piaget, 1970). We assume that employees' active private digital innovation experiences, experiences at work, and online communities influence the cognitions of the digital mindset as they conduct assimilation and accommodation regarding relevant stimuli more often.

We define active experiences with digital innovation at work as past experiences of taking initiatives to generate new ideas and create new value through digital technologies in the workplace. This includes actively seeking and generating ideas for new value through digital technologies, as well as actively implementing these ideas and participating in their realization (cf. De Jong & Den Hartog, 2010). Examples of these initiatives include seeking out, exploring, and implementing tools, software, their data or features, or hardware to apply them in improving products or services, as well as changing or enhancing how employees work (Opland et al., 2022). The existing literature indicates that a digital mindset develops among employees in institutions outside (i.e., digital spaces) (Hildebrandt et al., 2015) and within organizations (i.e., digital innovation labs) that revolve around such experiences (Holotiuk et al., 2024). This is plausible as employees, in their search for and generation of new ideas with digital technologies, may more frequently be exposed to new stimuli, such as properties and characteristics of digital technologies (e.g., layered modular architecture or exponential developments), as well as insights into their potential applications (exploring disruptive use cases, platform approaches, data utilization), reinforcing corresponding schemas of the digital and creative cognition as they more frequently need to assimilate or accommodate those stimuli:

H1a: *Employees' work experiences with digital innovation are positively related to their digital cognition.*

H1b: *Employees' work experiences with digital innovation are positively related to their creative cognition.*

Through initiatives in implementing such innovations, these employees may often be confronted with faulty or incomplete solutions, or solutions that require collaboration and co-creation with other areas for their successful implementation, thereby strengthening and expanding the cognitive schemas of the agile cognition concerning these concepts:

H1c: *Employees' work experiences with digital innovation are positively related to their agile cognition.*

Furthermore, the literature suggests that not only work-related experiences might be relevant for organizations to anticipate relevant characteristics (Petter et al., 2018) and indicates that continuous experiences with digitalization in private environments strengthen a digital mindset (Zhao et al., 2023). We define active private experiences with digital innovation as past experiences that include actively seeking and generating ideas for adding new value through digital technologies in day-to-day personal activities, as well as actively implementing these ideas (cf. De Jong & Den Hartog, 2010). For example, those individuals explore, implement, or combine smart-home solutions, utilizing or linking data from various sources, such as a smartwatch or smart toothbrush, connecting a document scanner with a private cloud, or similar activities. As a result, these individuals are more frequently exposed to the properties and characteristics of digital technologies (e.g., layered modular architecture or exponential developments) and potential applications or paradigms, as described above, but in private environments, forming digital and creative cognition schemas. Hence, we expect the same relationship for active private experiences with digital innovation:

H2a: *Employees' private experience with digital innovation is positively related to their digital cognition.*

H2b: *Employees' private experience with digital innovation is positively related to their creative cognition.*

Also, in private contexts, these employees may often be confronted with faulty or incomplete solutions or use trial and error approaches, strengthening these cognitive schemas of agile cognition:

H2c: *Employees' private experience with digital innovation is positively related to their agile cognition.*

We define active experiences with digital innovation communities as past behaviors and personal experiences in online communities where individuals exchange questions and answers about (problems with) digital technologies (cf. Connolly et al., 2023). This means that employees have actively participated in these communities by engaging in discussions, challenges, or issues, responding to topics, or posting them (e.g., superuser.com, stackexchange.com, or similar platforms). In contrast to previous outlined experiences with digital innovation (i.e., work and private), where initiatives in idea generation, exploration, and implementation are assumed to expose individuals more frequently to new stimuli and affect employees' digital mindset, online communities may offer potential for individuals to bring relevant stimuli into equilibrium with existing schemas through assimilation and accommodation, even if they do not seek to generate value through new digital technologies themselves. For instance, active engagement with initiatives of other participants who use digital technologies to solve problems in private or work contexts may confront individuals with relevant concepts, characteristics, or use cases of digital technologies, shaping corresponding schemas (i.e., schemas of digital and creative cognition):

H3a: *Employees' experience with digital innovation online communities is positively related to their digital cognition.*

H3b: *Employees' experience with digital innovation online communities is positively related to their creative cognition.*

Additionally, these individuals become part of the solution by participating in these forums. They are thus exposed to faulty approaches, which shape schemas of collaborative, iterative, and resilient thinking of agile cognition. Therefore, we hypothesize:

H3c: *Employees' experience with digital innovation online communities is positively related to their agile cognition.*

3.2 Effects of Employees' Digital Mindset on Their Co-creation with Digital Technology

GenAI collaboration at work describes how employees typically utilize GenAI tools for parts of their occupational task bundles and cooperate with these tools to co-create by carrying out tasks in a complementary manner. This is achieved through delegation in both directions, as employees may delegate work to the GenAI tool or the GenAI tool to the employee. For these delegations, the delegating partners (employee and GenAI) must recognize these complementarities through information about their own or their partner's abilities, also known as metaknowledge (Fügener et al., 2022). We hypothesize that this behavior is influenced by the cognitions associated with employees' digital mindset and their underlying schemas.

The heightened sensitivity to data, attributed to data-driven thinking, enables employees to more frequently and with less cognitive effort recognize where data occurs and might be valuable for their task bundles at work (Valta et al., forthcoming), increasing the recognition of potentially complementary use cases of GenAI tools. Additionally, digital-oriented thinking, as well as schemas regarding exponential developments of other digital technologies (i.e., exponential thinking), lead to inferences about the beneficial capabilities of GenAI tools in situations where they lack information about their own abilities (i.e., their metaknowledge) or those of GenAI tools, or in ambiguous situations to make delegation decisions (Fügener et al., 2022; Kahneman, 2011). This inference is driven by the congruence with their existing schema (cf. Smith, 1998) of beneficial and rapidly developing digital technologies. Through platform-oriented thinking, these employees focus their attention on the platform aspects of these tools (e.g., the construction of function-specific AI agents), and they perceive the multiple facets relevant to various processes or task bundles with greater cognitive ease (Hildebrandt & Beimborn, forthcoming). Collectively, schemas within the digital cognition may lead to an increased and easier recognition of complementary use cases for GenAI in their task bundles, leading us to hypothesize:

H4: *Employees' Digital cognition is positively related to their GenAI collaboration at work.*

Previous studies have demonstrated that the schemas associated with creating cognition enable employees to perceive more and more creative uses for digital technologies, both subconsciously and consciously (Hildebrandt & Beimborn, 2023). We expect similar effects in the context of GenAI collaboration at work. Combinatorial thinking directs employees' attention to potential connections between GenAI tools and their task bundles, as well as existing digital technologies used in the workplace (Hildebrandt & Beimborn, forthcoming), making employees potentially recognize potential complementarities with greater cognitive ease. Through generative and disruptive thinking, the potentials of these GenAI tools for tasks or task bundles beyond conventional uses match with existing schemas, making employees identify those potential complementary uses more easily (Hildebrandt & Beimborn, 2023). This expanded perception may lead to situations where the perceived capabilities of these GenAI tools often exceed the employees' own perceived abilities (Fügener et al., 2022). Risk-affine thinking leads to a more positive inference of potential risks and outcomes of those perceived potentials, driving employees' delegation decisions toward GenAI tools and leading to the delegating of more partial tasks. Therefore, we hypothesize:

H5: *Employees' Creative cognition is positively related to their GenAI collaboration at work.*

Experiences with experimenting with digital technologies and the resulting iterative and resilient thinking make employees less likely to perceive prototypical or unfinished digital solutions as cognitively dissonant (Hildebrandt and Beimborn, forthcoming). This may lead to a broader view where not only the complete solutions offered by GenAI tools as stimuli are perceived as capabilities but also bringing employees' attention to complementarities for small sub-tasks or aspects of tasks (cf. Carlston et al., forthcoming). As a result, employees may engage in more collaboration due to their recognition of more opportunities for delegation, even in minor areas or only for small aspects of tasks. Additionally, these employees have experience in co-creation and technology-supported collaboration, resulting in collaborative thinking (Hildebrandt & Beimborn, forthcoming), leading co-creation with digital technologies to be congruent with their existing schemas (cf. Smith, 1998), potentially leading to a quicker and stronger recognition of these action options. Further, due to their beliefs about co-creation (Hildebrandt

& Beimborn, forthcoming), they may more rapidly derive the validity of co-creation and delegation decisions concerning these technologies in uncertain situations. Therefore, we hypothesize:

H6: *Employees' Agile cognition is positively related to their GenAI collaboration at work.*

3.3 Employees' Digital Mindset as a Mediator of Employees' Active Experiences with Digital Innovations

Diverse and more experiences lead to the formation of complex and stable schemas, which become cognitively compact and easier to activate, allowing for the integration of inconsistent information, and resulting in higher effects (Fiske & Taylor, 1991). Consequently, experiences with digital innovation might not automatically foster collaboration with GenAI tools but lead to more stable and compact schemas, leading individuals to perceive more delegation potential and, therefore, increased collaboration.

Exemplarily, extensive and diverse experience with seeking and implementing novel apps strengthens schemas of digital cognition, making them more compact and stable, indirectly enabling a better recognition of the potential for delegating tasks to GenAI tools, even in situations where the information is not schema-consistent (e.g., using GenAI tools with technologies or data that did not work in the past):

H7a: *Employees' digital cognition mediates the impact of their active experiences with digital innovation on their GenAI collaboration at work.*

With experiences with rather 'exotic' disruptive or combinatorial digital solutions, the accuracy and stability of creative cognition are enhanced, increasing its resilience to schema-inconsistent information, such as task environments that are not information-intensive, indirectly enabling individuals to identify more delegation opportunities to GenAI and driving collaboration:

H7b: *Employees' creative cognition mediates the impact of their active experiences with digital innovation on their GenAI collaboration at work.*

Lastly, increased experiences, confrontations, and experiences with the use of trial-and-error approaches stabilize schemas of the agile cognition, leading to the desirable evaluation of delegation through GenAI tools also in contexts and for tasks that are usually not in scope for such agile and iterative approaches and, thus, increase the collaboration with GenAI tools:

H7c: *Employees' agile cognition mediates the impact of their active experience with digital innovation on their GenAI collaboration at work.*

Taken together, Figure 2 depicts our research model and nomological net of employees' digital mindset derived from the conceptual model.

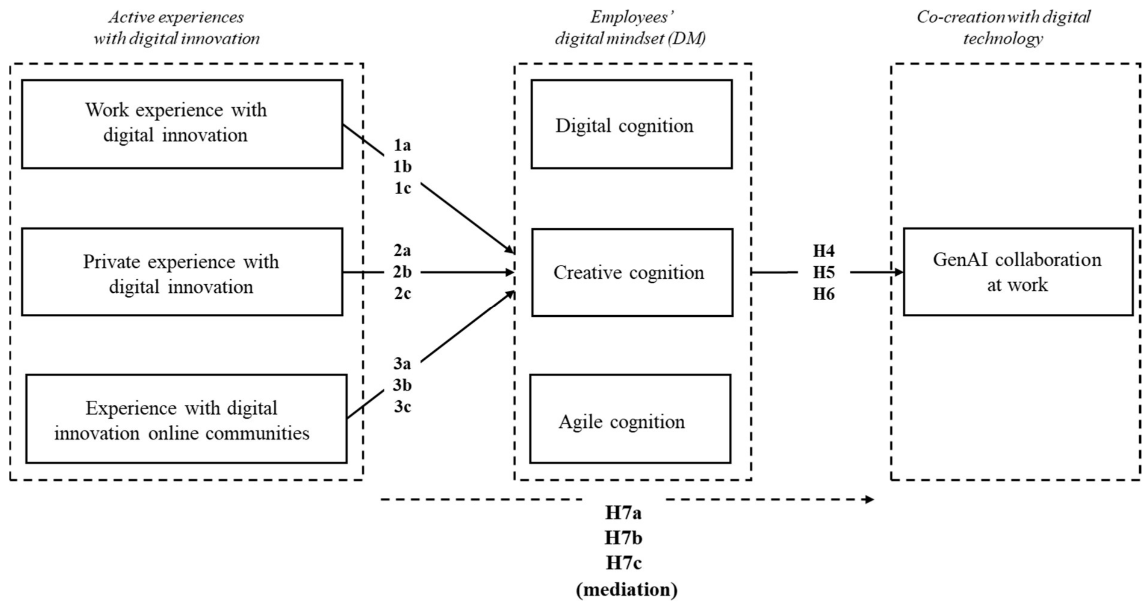

Figure 2. Research model

4 Method

4.1 Data Collection

We conducted an online survey using the crowdsourcing platform *Prolific* to collect panel data in three waves. Using crowdsourcing platforms for collecting data in IS research is well-established (Baum et al., 2019). Recent studies suggest that such crowdsourcing data shows similar quality to data collected in firms (Maier et al., 2019). We ensured data quality by following the guidelines recommended by previous research and only included participants that had an acceptance rate above 95%, were full-time employed, located in the US, and answered check questions correctly (e.g., "Which sport do you like best? Regardless of your true preference, please select hockey."), and completed each survey wave in a realistic time frame (5-10 minutes) (Jia et al., 2017). We paid $2.40 per completed survey. Further, we pre-screened participants and included only participants who used GenAI tools at least once in the past three months, privately or at work, to avoid variance distortions due to absent use or knowledge. To avoid crowd workers' self-selection biases, we also included questions regarding their use of other tools. As the concept of interest in our study, employees' digital mindset, is applicable across the entire workforce and across industries, we did not limit our sampling to any specific industry, business area, or educational level. We collected the data at three points of time, pilot-testing each survey and its adapted items with 50 crowd workers and inserting a time interval of 2-3 weeks. Demographic data and digital innovation experiences were assessed in the first wave, including 310 out of 1202 pre-screened participants (40 removed due to quality guidelines), followed by employees' digital mindset in the second wave with 266 subsequent participants (28 removed due to quality guidelines) and 186 participants in the third wave (20 removed due to quality guidelines), assessing their collaboration with GenAI tools at work. Hence, the final sample comprised 166 participants who completed all surveys and passed the quality gates in each survey (see Table 1 for demographics).

We only used existing validated measures and measured them with seven-point and five-point Likert scales from 1 ("strongly disagree") to 7 ("strongly agree") or 1 ("not at all") to 5 ("a great extent"). For measuring *work and private experience with digital innovation,* we adapted items from (De Jong & Den Hartog, 2010), conceptualizing those experiences as a second-order construct to capture those past behaviors. We used 2 items for active idea exploration, 3 for active idea generation, and 3 for idea implementation. *Experiences with digital innovation online communities* were measured by adapting items from (Connolly et al., 2023). For measuring *employees' digital mindset*, we adapted items from (Hildebrandt & Beimborn, forthcoming) to measure the three cognitions as second-order constructs. Although the digital mindset is technology-independent, describing the general altered perception and interpretation of digital technologies and their phenomena (Hildebrandt & Beimborn, forthcoming), we adapted the items to the context of GenAI tools. The reason for this adaptation is to ensure that the participants in our study consistently understand the concept of digital technology and its relatively broad boundary conditions through the specific context. Like the other parts of the study, these items were also subjected to a pilot test with 50 participants. Accordingly, we used scales for measuring employees' *digital cognition* with 16 items grouped in 4 dimensions, *creative cognition* with 14 items in 4 dimensions, and agile cognition with 11 items in 3 dimensions (Hildebrandt & Beimborn, forthcoming). For *GenAI tool collaboration at work*, we used four items based on (Hoffman, 2019). We controlled for age, gender, work experience, position tenure, and education. Table 7 in the Appendix provides an overview of all items.

Table 1. Sample Characteristics (N= 166).

Age	<21	0.6 %	**Work Experience**	Less than one year	0.6 %
	22-34	24.7 %		1-5 years	9.0 %
Mean = 42.51	35-44	33.7 %		6-10 years	11.5 %
St. dev. = 10.75	45-54	29.5 %		11-15 years	20.5 %
	55-64	8.4 %		16-20 years	9.0 %
	>65	3.0 %		21-25 years	18.7%
				More than 25 years	30.7%
Gender	Male	55.1 %	**Education**	Less than High School	0.0 %
	Female	43.4 %		High School	8.4 %
	Diverse	0.0 %		Some College	12.1 %
				Undergraduate Degree	47.0 %
				Graduate Degree	27.1 %
				Doctorate or Professional Degree	5.4
Position Tenure	Less than one year	3.6%	**Industry**	Financials	12.0%
	1-5 years			Distribution/Transport/Logistics	3.6%
	6-10 years	45.2%		Government	5.4%
	11-15 years	31.9%		Healthcare	12.0%
	16-20 years	9.0%		IT	15.0%
	21-25 years	6.0%		Marketing and Communication	5.4%
	More than 25 years	2.4%		Retail	6.6%
		2.8%		Services	7.8%
				Manufacturing	9.6%
				Other	22.3%

4.2 Data Analysis

We employed a structural equation model (SEM) using partial least squares (PLS) to analyze our collected data. We used the PLS approach instead of a covariance-based approach for several reasons: Primarily, our research, which explores the nomological network of employees' digital mindset in the context of the future of work, is exploratory in nature. The PLS method is recommended for studies investigating newer or less established relationships, making it a suitable choice for our study (Hair et al., 2022; Soror et al., 2015). Additionally, as PLS is more suitable for theory construction and covariance-based approaches are more suitable for theory confirmation by providing more detailed fit statistics, we consider PLS more suitable for our study, as we aim to construct a theory about employees' digital mindset and its role in the future of work (Hair et al., 2022). We used the software SmartPLS 4 and tested our models, including the previously mentioned control variables. The mediation analysis was conducted following the recommendations of (Zhao et al., 2010) and (Preacher & Hayes, 2004) and assessement of the variance accounted for (VAF).

4.3 Common Method Bias

Our primary approach to reducing common method bias (CMB) was integrated with the study design to gather data at different points in time, reducing recall bias, one of the most problematic sources of CMB. Furthermore, we ran several tests to investigate if there are observable signs of CMB in our data that could distort correlations between variables in our research model (Podsakoff et al., 2003). First, Harman's single-factor test showed that 26.9% of the variance is explained by a single factor, which is far below the recommended threshold of 50% (Podsakoff & Organ, 1986). Second, we assessed the correlation matrix reported in the study. All correlations were below the threshold of .90. Third, we tested for collinearity, as VIFs greater than 3.3 can indicate contamination of common methods bias (Kock, 2017). All VIFs of the inner model of our research model showed values well below 3.3. Overall, our tests indicate no observable signs of common method bias.

4.4 Measurement Model Validation

Testing the validity of our measurement model, we assessed convergent and discriminant validity (Bagozzi, 1981). We ensured that the loading of each indicator on its construct exceeded .71 to ensure indicator reliability; no items needed to be removed from the analysis (see Table 8 in the Appendix) (Carmines & Zeller, 1979). We verified construct reliability by ensuring that average variance extracted (AVE) and composite reliability (CR) values exceeded the recommended thresholds of .50 and .70 (see Table 9 in the Appendix). Discriminant validity was ensured by assessing the heterotrait-monotrait ratio; no ratio exceeded the proposed threshold of .90 (see Table 10 in the Appendix) (Henseler et al., 2015).

5 Results

Figure 3 summarizes the test results of our model analysis.

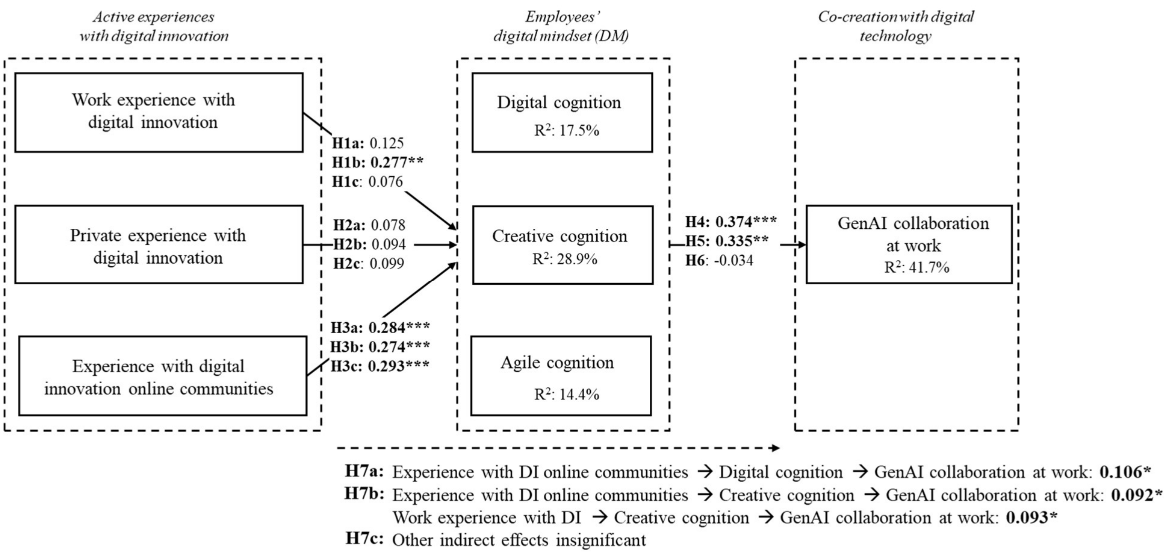

Figure 3. Summary of results

Table 2 shows the results for the full model, Table 3 provides the results of a contrasting direct model excluding the digital mindset cognitions, and Table 4 shows the indirect effects and confidence intervals. Sole effects of the control variables for reference can be found in Table 11 in the Appendix.

Our results indicate that employees' experiences with digital innovation at work are positively related to employees' creative cognition (H1b supported; f^2= 0.031), while no significant relationship could be observed for digital and agile cognition (H1a and H1c not supported). Regarding private experiences with digital innovation, we could not observe significant relationships (H2a, H2b, H2c not supported). By contrast, experiences with digital innovation in online communities showed significant positive relationships for digital cognition (H3a supported; f^2= 0.053), creative cognition (H3b supported; f^2= 0.074), and agile cognition (H3c supported; f^2= 0.064).

Further, the hypothesized effects of the digital mindset cognitions on GenAI collaboration at work are supported for the digital and creative cognition but not agile cognition: Employees' digital cognition and creative cognition are positively related to GenAI collaboration at work (H4 supported; f^2= 0.050;

H5 supported; f^2= 0.089). Employees' agile cognition is not positively related to GenAI collaboration at work (H6 not supported).

To investigate the mediating effects, we analyzed the significance of specific indirect effects via bootstrapping (see Table 4) and used the approach of (Zhao et al., 2010) to determine the type of mediation (based on path coefficients in Table 2 and Table 3). The results indicate that employees' digital cognition substantially mediates the impact of their digital innovation experience in online communities on their GenAI collaboration at work (0.106, $p < 0.05$, VAF: 55%), while their creative cognition fully mediates the effects of their work experience in digital innovation and digital innovation experience in online communities on their GenAI collaboration at work (0.076, $p < 0.05$, VAF: 50%; 0.092, $p < 0.05$, VAF 52% respectively).

Table 2. Results for the full model

Full Model					
IVs: \ DV:		**Digital Cognition**	**Creative Cognition**	**Agile Cognition**	**GenAI Collaboration**
Work Experience with DI		0.125	**0.277***	0.076	0.121
Private Experience with DI		0.094	0.099	0.078	-0.027
DI Experience Online Communities		**0.284*****	**0.274*****	**0.293*****	0.059
Digital Cognition					**0.374*****
Creative Cognition					**0.335*****
Agile Cognition					-0.034
Controls	Age	0.192	0.134	0.218	0.003
	Gender	0.062	0.089	0.124	0.069
	Education	0.020	-0.022	-0.024	-0.001
	Time in Current Position	**0.200***	0.037	0.059	**-0.219****
	Work Experience	-0.061	-0.095	-0.116	-0.019
R^2		0.265	0.319	0.186	0.417
ΔR^2 compared to controls - only model		0.175	0.289	0.144	0.387
Notes: (standardized ß; *: p < 0.05; **: p < 0.01 ***: p< 0.001); DI: Digital Innovation; IV: Independent Variable; DV: Dependent Variable					

Table 3. Results for the direct model

Direct Model (model without Digital Mindset cognitions)	
IVs: \ DV:	**GenAI Collaboration**
Work Experience DI	**0.227***
Private Experience DI	0.031
DI Experience Online Communities	**0.238***
Notes: (standardized ß; **: p < 0.01; ***: p< 0.001); DI: Digital Innovation; IV: Independent Variable; DV: Dependent Variable	

To explore insignificant effects, we modified the tested model to gain further insights into potential suppression effects and relationships in a post-hoc analysis.

Our post-hoc analysis revealed that the effects of agile cognition become highly significant once the other cognitions are removed from the model (AC → GenAI Collaboration; β: 0.424; $p<0.001$; ΔR^2: 0.170). Also, the effects of experiences with digital innovation in private contexts become significant when the other types of experiences are excluded (Private Experience Digital Innovation → DC; β: 0.147; $p<0.05$; ΔR^2: 0.460; Private Experience Digital Innovation → CC; β: 0.300; $p<0.001$; ΔR^2: 0.420; Private Experience Digital Innovation → AC; β: 0.287; $p<0.001$; ΔR^2: 0.090). Subsequent connections between agile cognition and digital as well as creative cognition in the post-hoc analysis (see Table 12 in the Appendix for details) revealed strong relationships of agile cognition with the other two cognitions, as well as strong indirect effects on GenAI collaboration (see Table 13 in the Appendix for details).

Table 4. Indirect effects and confidence intervals

Mediating Effect (H7)	Effects
Digital Cognition (DC)	
Work Experience Digital Innovation → DC → GenAI Collaboration	-0.023
Private Experience Digital Innovation → DC → GenAI Collaboration	0.035
Digital Innovation Experience Online Communities → DC → GenAI Collaboration	**0.106***
Creative Cognition (CC)	
Work Experience Digital Innovation → CC → GenAI Collaboration	**0.092***
Private Experience Digital Innovation → CC → GenAI Collaboration	0.033
Digital Innovation Experience Online Communities → CC → GenAI Collaboration	**0.072***
Agile Cognition (AC)	
Work Experience Digital Innovation → AC → GenAI Collaboration	0.004
Private Experience Digital Innovation → AC → GenAI Collaboration	-0.003
Digital Innovation Experience Online Communities → AC → GenAI Collaboration	-0.010
Notes: (*: p <0.05)	

6 Discussion

New digital technological developments change the way we work, and employees' *digital mindset* is said to be the key to the future workforce in new co-creative environments (Benbya et al., 2024; Di Gangi et al., 2022; Gartner, 2024). We have used schema theory and explored the nomological network of employees' digital mindset as an alternative parameter for these new environments.

Our findings indicate positive relationships between active participation in online communities related to digital innovation and all cognitions of the digital mindset. This indicates that when employees actively engage in online communities discussing digital innovation—whether through discussions, challenges, posting, or participating in such activities—they develop cognitive schemas related to digital technologies and phenomena, even if they have not had direct personal experiences with digital innovation through spill-over effects (cf. Connolly et al., 2023).

Furthermore, our analyses reveal a positive relationship between experiences with digital innovation at work and their creative cognition. This implies that employees who actively seek opportunities to enhance their work or work methods through digital technologies are more likely to develop schemas regarding these technologies' characteristics and potential applications, thereby cultivating their creative cognition.

We observed unexpected non-significant results of relationships between experiences and digital mindset cognitions. While experiences with digital innovation at work influenced creative cognition, no effects were seen for digital and agile cognition. Interestingly, we also found no effects of experiences with digital innovation in private contexts on the cognitions of the digital mindset. The modified post-hoc model revealed additional insights. Through added paths between experiences with digital innovation in private contexts and experiences in online communities and at work, we could observe direct and indirect effects (see Table 12 and Table 13 in the Appendix for details). Hence, these findings reveal that private experiences are relevant, leading employees to participate more actively in such online communities and seek similar solutions in the workplace. However, the effects of experiences with digital innovation at work on digital and agile cognitions remained insignificant.

One possible explanation for this discrepancy is that experiences in the work context were not explicitly gathered in organizational units that provide the conditions to develop such schemas. In conventional work settings, errors and failures may be less often assimilated as "desirable" due to guidelines, compliance, or key performance indicators (KPIs), resulting in less pronounced development of these schemas. A similar explanation may apply to the lack of effects on digital cognition. In day-to-day activities, tools are often used more as instruments rather than within a platform approach or might not be able to lever the potential of accessible data or the rapidly evolving technological developments (e.g., due to compliance or privacy reasons), which leads to the formation of these schemas rather through other experiences.

Our analysis of the effects of digital mindset cognitions on GenAI collaboration at work indicates that employees with a higher level of digital and creative cognition are likelier to collaborate with GenAI at work. This suggests that employees who have developed cognitive schemas regarding the application and utilization of digital technologies, platforms, and the data generated and involved in their tasks experience cognitive confirmation biases that enable them to perceive more complementary use cases for GenAI. Consequently, they are more likely to make delegation decisions for individual tasks within their task bundles, leading them to higher levels of collaboration with GenAI tools. Further, employees who have developed cognitive schemas concerning digital technologies' characteristics, combinatory possibilities, and disruptive potential, along with the associated risks, can better recognize how GenAI tools can overtake parts of or entire task bundles. This broadens their meta-knowledge (cf. Fügener et al., 2022) about the perceived capabilities of these GenAI tools, leading to the identification of more potential opportunities for delegation and, consequently, more collaboration.

Surprisingly, our results showed no significant relation between employees' agile cognition and their GenAI collaboration at work. Therefore, we could not demonstrate that developed cognitive schemas are related to co-creation, opportunities for experimentation, and perseverance in interacting with digital technologies, which directly correlate with more vital collaboration with GenAI at work. However, the post-hoc analysis reveals that agile cognition indeed plays a crucial role; it leads employees to perceive interactions with digital technologies as trial and error or to re-expose themselves to similar digital technologies through their resilient schemas. This process enhances digital and creative cognition, which then increases the recognition of delegation potential, leading to the delegation of sub-tasks or entire task bundles to GenAI tools (i.e., GenAI tool collaboration at work). Taken together, all cognitions are relevant for collaboration with GenAI at work, though not all exert a direct influence.

Our initial and post-hoc analysis also demonstrated that the digital mindset cognitions mediate the significant influences of these experiences. This means that the digital mindset cognitions of employees based on their experiences offer a better explanation of why employees collaborate with GenAI tools than their experiences alone.

Lastly, most effects of control variables were nonsignificant, except for position tenure, which had a positive relationship with employees' digital cognition and a negative one with GenAI collaboration at work. Hence, results indicate that the longer employees are in their current position, the higher their schemas of digital cognition, but the lower their recognition of what tasks can be delegated with GenAI tools and their collaboration with them.

6.1 Theoretical Implications

With these results, we contribute to the existent literature on the future of work and the digital mindset as follows:

Employees' digital mindset helps us better understand why certain employees across the workforce co-create with digital technologies relevant to the future of work.

Based on the existing literature, we know that organizations need to optimize their IT workforce for the future of work by considering additional factors and experiences to find skilled talent (Marx et al., 2023; Petter et al., 2018; Schmitt et al., 2023). These findings suggest that these skills and the IT workforce are particularly relevant for the future of work and need to be optimized despite current developments affecting the entire workforce (Feuerriegel et al., 2024; Oberländer & Leyer, 2022), making organizations and their competitiveness dependent on all employees (Opland et al., 2022). Consequently, researchers have called for a more substantial investigation of cognitive factors that may determine the value of future human capital, as skills alone may be a less accurate indicator of relevant employee behaviors (Benbya et al., 2024; Feuerriegel et al., 2024). Our findings respond to these calls by demonstrating that employees' digital mindset can be an essential cognitive explanation for why employees work differently due to future technological advancements. Additionally, the results help us understand why employees' prior experiences lead to those behaviors. It is not merely the experiences themselves but the cognitive schemas developed through these experiences that result in behavior beneficial to the organization. With these insights, we build on existing work that already suggests other factors besides skills for the IT workforce (Chen et al., 2022; Petter et al., 2018) by demonstrating employees' digital mindset as a relevant factor for the entire workforce. Furthermore, we connect to previous works indicating theoretically that employees' digital mindset will be a crucial factor for the future workforce (Leonardi & Neeley, 2022; Ohain von, 2019; Weritz, 2022; Zhao et al., 2023) and provide empirical evidence. Hence, we contribute to the existing literature by proposing employees' digital mindset as a new relevant factor that determines the human capital of organizations, which future researchers and theoretical models should consider when aiming for a better understanding of what factors can optimize an organization's entire workforce for the future of work.

Employees' digital mindset is primarily shaped by online experiences with digital innovation.

The existing literature on employees' digital mindset has only indicated such a mindset's effects (Hildebrandt & Beimborn, forthcoming; Valta et al., forthcoming). Also, studies have suggested that a digital mindset develops in work contexts (Hildebrandt et al., 2015; Holotiuk et al., 2024). These insights leave two gaps: first, besides theoretical claims (Hildebrandt & Beimborn, forthcoming), the literature lacks empirical evidence for the malleability and, therefore, potential for developing employees' digital mindset. Second, the findings imply that a digital mindset primarily develops at work, despite literature showing that, e.g., skills relevant for an IT workforce can also be derived from experiences in private contexts (Petter et al., 2018). Our results break these assumptions by demonstrating a more prominent role of online experiences that lead to a more substantial formation of the cognitions associated with employees' digital mindset. Our post-hoc analysis further revealed that whether individuals experiment with digital innovations privately or engage with such topics in online communities is irrelevant, as these experiences are closely related. These findings align with the literature on the future of work, which has shown that non-work-related experiences are relevant for skills in the IT workforce (Chen et al., 2022; Petter et al., 2018), extending this relevance of private experiences (both online and offline), also for cognitive aspects like employees' digital mindset. Additionally, these findings extend the conceptual work on the digital mindset, which theoretically explains the influence of such experiences (Hildebrandt & Beimborn, forthcoming) by supporting those theoretical claims with empirical evidence. Therefore, we provide evidence for the potential of employees' mindset to change, as such experiences can be actively steered through constructivist training and interventions, adding those experiences as antecedents to the nomological net of employees' digital mindset. Hence, we contribute to the existing literature by broadening the nomological net and the theory of the digital mindset, adding experiences with digital innovation as an influential factor.

The effects of employees' digital mindset cognitions might differ, and the indirect effects of cognitions should be considered.

The existing literature suggests that employees' digital mindset can be measured through three cognitions and indicates that not all cognitions may be relevant to every behavior (Hildebrandt & Beimborn, forthcoming). This leads to the assumption that some cognitions may be entirely irrelevant for certain behaviors and can, therefore, be omitted from the research model based on theoretical considerations. Our results and post-hoc analyses show that research models, including the cognitions of the digital mindset, should also consider indirect effects between these cognitions. Thus, these findings align with the existing literature, which has already indicated that different aspects and cognitions of a digital mindset may be important depending on the context and that not every cognition is necessarily relevant (Hildebrandt & Beimborn, forthcoming). However, we further specify this assumption that not every cognition has a direct effect but may have an indirect one. Hence, we add to this understanding by suggesting that, depending on the dependent variable, indirect effects of cognitions should also be considered, and researchers should test for these effects to accurately understand the relevance and influence of digital mindset cognitions on behaviors.

6.2 Managerial Implications

Our research also offers valuable insights for practitioners.

Optimize recruitment strategies by considering employees' digital innovation experiences.

Our research findings indicate that considering employees' digital mindset can provide organizations a clear advantage when recruiting new employees. Specifically, companies can more strategically search within online communities focused on digital innovation to find potential candidates, as these communities often serve as an indicator for employees with a high digital mindset level. Furthermore, companies can incorporate specific questions about experiences in such communities during recruitment interviews, thus identifying prospective candidates with an expressed digital mindset without requiring an explicit measurement.

Develop targeted training methods to develop employees' digital mindset.

Based on the finding that private experiences with digital innovation and active participation in online communities shape employees' digital mindset, companies can develop training methods to prepare their existing workforce better. Managers could, for instance, promote the development of internal engagement platforms that provide experiences similar to those of external online communities. Such platforms could encourage employees to engage more deeply with digital innovations and learn from one another. Additionally, companies could initiate informal "digital innovation coffee chats" or "digital innovation lunches" to foster discussions on digital topics and trigger active experiences to benefit in the long term.

Utilize private or online experiences with digital innovation as employees or applicants.

The insights gained are not only valuable for companies but also for (potential) employees. Employees can leverage these insights to position themselves better in the job market. By highlighting their experiences with digital innovation and participation in relevant online communities in resumes and interviews, they can demonstrate their digital thinking. This could help them stand out from other candidates and increase their attractiveness to companies that value a digital mindset.

6.3 Limitations and Future Research

As with any empirical study, our research has limitations. As the focal construct of our study was employees' digital mindset, we did not include competing IT skills in our model. However, an exploration of employees' digital mindset alongside other skills and traits is imperative to arrive at a conclusive assessment of the role of employees' digital mindset in contrast to other skills or IT-specific traits (e.g., IT mindfulness). Further, we only included linear effects of employees' digital mindset, assuming that, for example, the effects of employees' agile cognition were suppressed by the other cognitions. However, configurational explanations could lead scholars to other conclusions about the relevance and impact of the different cognitions. Accordingly, future research avenues include an analysis of non-linear effects, potentially combined with other skills or traits and other technological contexts. A promising approach might involve a follow-up study using and the application of a configurational approach, such as fuzzy set comparative analysis (fsQCA) (cf. Emmerich et al., 2022; Mattke et al., 2022). For example, cognition configurations could be evaluated, or, in order to shed more light on fruitful skill and mindset configurations, configurations of different skills, behavioral traits, and employees' digital mindset could enhance our understanding of how such mindsets affect employees' behavior in the future of work.

7 Conclusion

Organizations must optimize their workforce to address new occupational requirements caused by fast-evolving digital technological developments (Weritz, 2022). Our study demonstrates that employees with a higher digital mindset—characterized by digital, creative, and agile cognition—are more actively engaged in co-creating with digital technologies. This digital mindset serves as a mediator, influencing the impact of prior experiences with digital innovation and is partially positively shaped by workplace experiences with digital innovation. Additionally, participation in online communities plays a pivotal role in the development of this mindset, underscoring the importance of fostering these experiences to prepare employees for the digital age.

APPENDIX

Table 5. Related work on the digital mindset in premier IS outlets

Explicitly investi gated, only refer enced, or treated as an outcome?	Relevant statements or findings	Reference
Referenced	Only when both the digital mindset of the corporate management and the digital infrastructure are in place will the organization be competent to analyze the substantial data generated from customer transactions and leverage findings to create and manage new products and service.	(Davison & Ou, 2017)
Outcomes	Digital mindset of companies, reflecting risk-taking, innovation fostering, and collaborative work environments reflect the biggest challenge for companies, particularly traditional ones.	(Grover, 2022)
Referenced	The purpose of a CDO is triggering digital initiatives to accelerate the organization towards a digital mindset.	(Lorenz & Buchwald, 2023)
Outcome	As more digitalization takes place, more people adopt a digital mindset.	(Grover et al., 2022)
Outcome	Acceptance and trust regarding technological hypes requires trust influencers that promote digital mindsets through familiarization with and acceptance of technology	(Korotkova et al., 2023)
Outcome	The digital mindset is part of digital capability: digital capability emphasizes the process of building the knowledge, skills, and mindsets that are required for individuals to participate in a digital society, highlighting the continuous actions that are shaped by the wider learning environment. Digital capability is developed by individuals through continuous actions in the social environment.	(Zhao et al., 2023)
Referenced	A digital mindset of employees is required to convert a company into a digital company.	(Lucas & Goh, 2009)
Outcome	In the context of digital transformation, organizational leaders must work to ensure that their organizations develop a digital mindset while being capable of responding to the disruptions associated with the use of digital technologies.	(Vial, 2019)
Referenced	Acquiring individuals with different mindsets from the digital space can reduce tensions from following different innovation logics that occur through M&A.	(Hildebrandt et al., 2015)
Outcome	The digital mindset is an essential leader's attribute for digital transformation; leaders should possess customer-orientation, a factor strongly associated with innovativeness, and a digital mindset, which is usually disseminated by the leader's vision	(Ohain von, 2019)
Outcome	Rotating employees in digital innovation units can strengthen their digital mindset.	(Holotiuk et al., 2024)
Explicitly investigated	Employees' digital mindset can be measured with three cognitions and is discriminant to other individual traits investigated in the IS Literature.	(Hildebrandt & Beimborn, forthcoming)
Explicitly investigated	Employees' digital mindset subconsciously and consciously alters perception of digital technology affordances.	(Hildebrandt & Beimborn, 2023)
Explicitly investigated	Employees' digital mindset is positively related to job satisfaction and performance and mitigates negative technostress effects.	(Valta et al. forthcoming)

Table 6. Related literature on additional factors organizations can consider to optimize their workforce

Aspects for optimizing workforce	Relevant Finding/Statements	Reference
Neurodiversity	Organizations should expand their talent pool to autistic workers to optimize their (IT) workforce.	(Walkowiak, 2021, 2023)
	Including a neurodiverse population increases the pool of qualified talent for tech companies, enhances performance and increases competitive advantage.	(Loiacono & Ren, 2018)
	Autistic tendencies are an indicator for intrinsic IT interest.	(Jia et al., 2022)
Gender	The relationship between diversity and digital innovation in firms is bi-directional; diversity reduces the digital divide in the workforce.	(Sundermeier et al., 2020)
	Gender equality and diversity increases employer attractiveness for talents and improves team performance.	(Schmitt et al., 2023)
Offered work models	Hybrid workplace settings attract and keep digitally open employees.	(Weritz et al., 2022)
Expansion of recruiting channels	Web 2.0 platforms are useful additions to recruit and attract IT talent and should be added to the recruitment portfolio.	(Weitzel et al., 2009)
Non-job related experiences	Employees with early-age digital experience should be considered when recruiting new employees for IT departments as it affects job performance and work innovation.	(Chen et al., 2022)
	Competencies of a digital workforce go beyond digital fluency and relevant propensities of individuals (e.g., risk-taking) may gathered through experience in online games.	(Colbert et al., 2016)
	Different online gaming genres allow players to develop and demonstrate different competencies or skills relevant for positions in IT; organizations should widen the talent pool by considering peoples' hobbies or non-work activities, especially online gaming.	(Petter et al., 2018)
Cognitive Aspects	Organizations with remote and hybrid settings should seek for candidates that have strong connection between the self and technology to increase innovation.	(Zaza et al., 2023)
	Employees must be mentally ready for working in virtual environments.	(Eckhardt et al., 2019)
	Employees' mindset and self-related competences are considered more important than IT system competencies.	(Paul et al., 2024)
	Indication that cognitive and metacognitive aspects will be critical in a future workplace, with highest importance exposed for employees' digital mindset.	(Weritz, 2022)
	Employees' mental models affect employee-driven digital process innovation in crisis and non-crisis scenarios.	(Oberländer & Leyer, 2022)

Table 7. Survey items (*: dropped items due to low loadings (<.071))

Construct		Statement	Reference
Work experience with digital innovation	*Active Idea Exploration*	I paid attention how issues that are part of my daily work can be solved with digital technologies.	(De Jong & Den Hartog, 2010)
		I wondered how things can be improved with digital technologies.	
	Active Idea Generation	I searched for how digital technologies can provide new working methods, techniques or instruments.	
		I generated innovative solutions with digital technologies for problems.	
		I found new approaches to execute tasks with digital technologies.	
	Active Idea Implementation	I introduced innovative digital ideas to my work practices	
		I contributed to the implementation of new digital ideas.	
		I put effort in the development of new digital ideas.	
Private experience with digital innovation	*Active Idea Exploration*	I paid attention how daily issues can be solved with digital technologies.	
		I wondered how day-to-day activities can be enhanced with digital technologies.	
	Active Idea Generation	I searched for how digital technologies can provide new methods, techniques or instruments to my day-to-day activities.	
		I generated original solutions with digital technologies for problems.	
		I found new approaches to execute tasks with digital technologies in my day-to-day activities.	
	Active Idea Implementation	I introduced digital innovative ideas to practices in my day-to-day activities.	
		I implemented new digital ideas in my day-to-day activities.	
		I put effort in the development of new digital ideas.	
Experiences with digital innovation online communities		I often participated in such online communities in the past.	(Connolly et al., 2023)
		I took an active part in such online communities in the past (responding, posting topics, and participating in discussions, challenges, or problems).	
		I have often contributed to such online communities (e.g., providing information, ideas, responses).	
		I have participated in such online communities to develop new insights for me or others.	
Digital cognition	*Digital-oriented thinking*	I always see the benefits of using new GenAI tools at work.	(Hildebrandt & Beimborn, forthcoming)
		I believe that new GenAI tools should be applied at work.	
		I believe that one should always be open-minded with regard to the use and application of new GenAI tools at work.	
		I always perceive new GenAI tools at work with curiosity.	
	Exponential thinking	I always think about how rapidly the number of potential use cases for GenAI tools will grow in the future	
		I believe the amount of use cases of GenAI tools will develop exponentially in the future.	
		I always think of the future potentials of GenAI tools as rapidly growing.	
		I am convinced that the amount of use cases for GenAI tools will develop unimaginably in the future.	
	Data-driven thinking	I always see the potential of data for improving the quality of current GenAI tools.	
		I am always aware that the data GenAI tools are trained with are crucial for solving problems with GenAI tools.	
		When I think about GenAI tools at work, I always think of the importance of the training data involved.	
		I am always aware that training data are the foundation for the quality of GenAI tools.	
	Platform thinking	I always consider GenAI tools as a general digital platform for different uses and users at work.	
		I always recognize how GenAI tools could serve as a digital platform that connects and coordinates different providers and users.	
		I always see the potential of GenAI tools to serve as digital platform for building different solutions.	
Cre ativ		I believe one should work with GenAI tools, despite potential risks of inaccurate results.	

	Risk-affine thinking	I would always consider working with GenAI tools even if the probability of errors is high.	
		I believe that working with GenAI tools is worth it, even if the probability of erroneous results is high.	
		I would always consider working with GenAI tools at work even if the probability of reliable results is low.	
	Disruptive thinking	I always recognize how GenAI tools could replace established solutions or processes.	
		I always see potentials for existing solutions or processes at my work being replaced by a GenAI tool.	
		I always see potentials for GenAI tools to transform my work.	
	Combinatorial thinking	I always recognize how GenAI tools could be combined with other tools or data to solve problems.	
		I always notice how combining GenAI tools with existing tools could help me solving problems.	
		I always see how GenAI tools can become one piece of a larger digital solution.	
	Generative thinking	I always notice how GenAI tools could be adapted for different purposes at work beyond their current use.	
		I always see GenAI tools as general-purpose technologies that can be employed for different uses.	
		Considering GenAI tools, I always see other potential uses besides their intended ones.	
		I always see the potential of new uses for GenAI tools that go beyond their current use.	
Agile cognition	*Iterative thinking*	During a project where GenAI is used, one will always work in trial & learn cycles.	
		In projects using GenAI tools, I believe one will always engage in short iterations of learning and integrating new requirements.	
		When using GenAI tools in a project, it is always necessary to work in iterative cycles.	
	Collaborative thinking	I believe collaboration is always helpful when creating solutions using GenAI tools.	
		I always see value in cross-unit collaborations for projects using GenAI tools.	
		In projects where GenAI tools are used, collaboration is always preferred.	
		I believe it is always helpful to cooperate when working on projects where GenAI tools are used or developed.	
	Resilient thinking	I always see value for learning when facing setbacks during the usage or development of GenAI tools.	
		I see value in accepting failures that we face during the usage or development of GenAI tools.	
		After problems with GenAI tools, I always see how I could use the trials as a learning outcome to get back on track quickly.	
		I believe learning from trial & error when using or developing GenAI tools is essential.	
GenAI tool collaboration		GenAI tools complement me at work.	(Hoffman, 2019)
		I work mutually with GenAI tools towards goals.	
		I cooperate with GenAI tools to solve tasks at work.	
		GenAI tools and myself contribute equally to task solutions at work.	

Table 8. Loadings and cross-loadings

	W_Exp_DI_IE	W_Exp_DI_IG	W_Exp_DI_IM	P_Exp_DI_IE	P_Exp_DI_IG	P_Exp_DI_IM	On_Exp_DI	DigOr	Expo	Data	Platf	Comb	Gen	Disrupt	Risk	Collab	Iterat	Resil	GenAI_Collab
W_Exp_DI_IE1	**0.930**	0.722	0.589	0.581	0.541	0.555	0.368	0.401	0.207	0.238	0.299	0.369	0.405	0.366	0.314	0.220	0.334	0.223	0.321
W_Exp_DI_IE2	**0.902**	0.625	0.513	0.540	0.496	0.507	0.230	0.327	0.180	0.166	0.203	0.265	0.264	0.279	0.144	0.112	0.251	0.125	0.206
W_Exp_DI_IG1	0.733	**0.889**	0.711	0.595	0.676	0.664	0.433	0.346	0.186	0.185	0.281	0.366	0.365	0.357	0.333	0.118	0.350	0.130	0.321
W_Exp_DI_IG2	0.674	**0.935**	0.766	0.529	0.667	0.668	0.364	0.279	0.124	0.163	0.226	0.281	0.405	0.264	0.335	0.117	0.269	0.123	0.353
W_Exp_DI_IG3	0.634	**0.929**	0.736	0.476	0.608	0.577	0.369	0.267	0.184	0.151	0.235	0.369	0.382	0.271	0.343	0.169	0.289	0.090	0.330
W_Exp_DI_IM1	0.557	0.781	**0.918**	0.426	0.610	0.623	0.443	0.249	0.120	0.216	0.225	0.314	0.365	0.256	0.334	0.107	0.247	0.113	0.372
W_Exp_DI_IM2	0.502	0.700	**0.930**	0.420	0.568	0.594	0.400	0.272	0.114	0.239	0.224	0.222	0.294	0.183	0.222	0.118	0.331	0.100	0.321
W_Exp_DI_IM3	0.615	0.747	**0.925**	0.442	0.581	0.632	0.361	0.308	0.138	0.186	0.237	0.263	0.365	0.267	0.339	0.152	0.351	0.166	0.263
P_Exp_DI_IE1	0.571	0.551	0.463	**0.959**	0.765	0.729	0.431	0.417	0.200	0.325	0.202	0.358	0.265	0.377	0.276	0.209	0.300	0.219	0.292
P_Exp_DI_IE2	0.605	0.558	0.429	**0.960**	0.773	0.729	0.384	0.434	0.290	0.351	0.235	0.391	0.302	0.403	0.251	0.183	0.367	0.253	0.260
P_Exp_DI_IG1	0.562	0.655	0.567	0.797	**0.942**	0.817	0.490	0.436	0.237	0.346	0.255	0.435	0.348	0.428	0.326	0.153	0.378	0.236	0.340
P_Exp_DI_IG2	0.506	0.676	0.628	0.713	**0.942**	0.872	0.507	0.329	0.141	0.237	0.178	0.249	0.296	0.305	0.289	0.137	0.330	0.175	0.300
P_Exp_DI_IG3	0.521	0.661	0.582	0.771	**0.854**	0.847	0.473	0.370	0.186	0.289	0.172	0.306	0.356	0.368	0.306	0.199	0.382	0.210	0.257
P_Exp_DI_IM1	0.558	0.651	0.610	0.726	0.847	**0.956**	0.489	0.317	0.103	0.265	0.170	0.278	0.297	0.321	0.324	0.087	0.305	0.124	0.284
P_Exp_DI_IM2	0.507	0.655	0.624	0.726	0.836	**0.946**	0.531	0.318	0.141	0.305	0.175	0.296	0.280	0.312	0.346	0.112	0.368	0.127	0.306
P_Exp_DI_IM3	0.583	0.656	0.660	0.702	0.860	**0.935**	0.463	0.394	0.189	0.303	0.230	0.304	0.306	0.352	0.360	0.135	0.355	0.176	0.330
On_Exp_DI1	0.313	0.398	0.408	0.381	0.483	0.479	**0.957**	0.291	0.185	0.407	0.334	0.325	0.366	0.410	0.283	0.318	0.359	0.221	0.331
On_Exp_DI2	0.321	0.365	0.379	0.422	0.490	0.485	**0.938**	0.298	0.143	0.394	0.322	0.305	0.357	0.381	0.240	0.265	0.350	0.196	0.346
On_Exp_DI3	0.302	0.408	0.416	0.395	0.518	0.497	**0.954**	0.289	0.189	0.382	0.348	0.355	0.400	0.413	0.303	0.303	0.389	0.216	0.363
On_Exp_DI4	0.321	0.418	0.440	0.409	0.508	0.516	**0.926**	0.256	0.175	0.363	0.286	0.350	0.304	0.369	0.246	0.263	0.298	0.165	0.322
DigOr1	0.363	0.316	0.311	0.350	0.357	0.336	0.241	**0.864**	0.543	0.424	0.522	0.569	0.525	0.530	0.395	0.342	0.261	0.462	0.481
DigOr2	0.303	0.320	0.272	0.431	0.433	0.404	0.244	**0.821**	0.507	0.403	0.515	0.544	0.400	0.604	0.479	0.338	0.265	0.399	0.518
DigOr3	0.258	0.109	0.161	0.252	0.198	0.162	0.253	**0.796**	0.500	0.469	0.508	0.524	0.402	0.472	0.244	0.412	0.416	0.554	0.290
DigOr4	0.395	0.313	0.238	0.430	0.348	0.291	0.254	**0.811**	0.490	0.446	0.445	0.544	0.534	0.503	0.322	0.313	0.254	0.452	0.377
Expo1	0.263	0.196	0.153	0.321	0.266	0.244	0.272	0.577	**0.852**	0.499	0.616	0.633	0.483	0.458	0.271	0.509	0.231	0.515	0.486
Expo2	0.146	0.126	0.092	0.163	0.111	0.071	0.055	0.517	**0.869**	0.357	0.487	0.479	0.372	0.357	0.181	0.431	0.100	0.471	0.329
Expo3	0.193	0.127	0.065	0.222	0.137	0.077	0.181	0.563	**0.858**	0.397	0.575	0.531	0.382	0.426	0.218	0.439	0.183	0.546	0.312
Expo4	0.090	0.147	0.149	0.129	0.153	0.107	0.086	0.414	**0.794**	0.284	0.394	0.358	0.385	0.284	0.164	0.320	0.114	0.369	0.280
Data1	0.218	0.191	0.233	0.315	0.295	0.246	0.412	0.504	0.475	**0.834**	0.609	0.486	0.528	0.491	0.169	0.546	0.422	0.557	0.299
Data2	0.178	0.152	0.192	0.271	0.233	0.262	0.323	0.407	0.369	**0.849**	0.534	0.429	0.456	0.432	0.154	0.375	0.408	0.399	0.311
Data3	0.204	0.180	0.202	0.301	0.282	0.311	0.344	0.457	0.358	**0.873**	0.535	0.471	0.433	0.423	0.161	0.425	0.463	0.406	0.383
Data4	0.152	0.080	0.151	0.308	0.235	0.224	0.301	0.419	0.363	**0.841**	0.448	0.406	0.409	0.324	0.076	0.358	0.340	0.439	0.238
Platf1	0.195	0.181	0.183	0.145	0.166	0.130	0.268	0.535	0.587	0.591	**0.891**	0.551	0.528	0.470	0.301	0.499	0.344	0.582	0.450
Platf2	0.292	0.266	0.249	0.188	0.171	0.144	0.281	0.553	0.530	0.543	**0.902**	0.512	0.620	0.566	0.350	0.489	0.396	0.575	0.409
Platf3	0.263	0.275	0.237	0.281	0.281	0.270	0.375	0.543	0.563	0.562	**0.902**	0.559	0.529	0.504	0.231	0.441	0.421	0.555	0.438
Comb1	0.255	0.305	0.281	0.326	0.297	0.234	0.301	0.562	0.607	0.495	0.528	**0.891**	0.527	0.531	0.283	0.399	0.333	0.449	0.493
Comb2	0.343	0.373	0.266	0.403	0.362	0.335	0.339	0.615	0.499	0.456	0.552	**0.905**	0.499	0.584	0.376	0.357	0.301	0.442	0.551
Comb3	0.334	0.298	0.223	0.310	0.306	0.252	0.301	0.588	0.507	0.463	0.524	**0.870**	0.552	0.550	0.292	0.439	0.283	0.498	0.386
Gen1	0.335	0.389	0.365	0.243	0.310	0.302	0.336	0.532	0.424	0.469	0.585	0.527	**0.920**	0.580	0.360	0.359	0.298	0.520	0.435
Gen2	0.345	0.382	0.291	0.308	0.282	0.232	0.308	0.552	0.529	0.486	0.602	0.607	**0.848**	0.558	0.259	0.415	0.283	0.522	0.462
Gen3	0.314	0.393	0.331	0.240	0.317	0.277	0.357	0.416	0.381	0.477	0.499	0.460	**0.865**	0.449	0.355	0.300	0.300	0.477	0.314
Gen4	0.320	0.321	0.323	0.257	0.303	0.291	0.346	0.499	0.377	0.484	0.514	0.499	**0.909**	0.493	0.333	0.321	0.230	0.483	0.405
Disrupt1	0.321	0.332	0.250	0.258	0.290	0.216	0.301	0.502	0.373	0.400	0.489	0.484	0.545	**0.821**	0.280	0.395	0.315	0.467	0.414
Disrupt2	0.247	0.219	0.193	0.335	0.327	0.313	0.378	0.458	0.310	0.424	0.457	0.499	0.476	**0.854**	0.445	0.289	0.358	0.387	0.339
Disrupt3	0.333	0.264	0.205	0.428	0.365	0.345	0.373	0.655	0.476	0.429	0.499	0.594	0.471	**0.855**	0.398	0.407	0.341	0.491	0.482
Risk1	0.244	0.338	0.313	0.248	0.262	0.299	0.243	0.437	0.299	0.194	0.331	0.356	0.340	0.385	**0.869**	0.332	0.213	0.209	0.390
Risk2	0.208	0.327	0.308	0.255	0.328	0.358	0.283	0.390	0.200	0.170	0.248	0.305	0.372	0.409	**0.934**	0.232	0.173	0.185	0.334
Risk3	0.243	0.343	0.310	0.240	0.307	0.318	0.261	0.351	0.185	0.087	0.281	0.288	0.337	0.362	**0.916**	0.232	0.122	0.115	0.320
Risk4	0.236	0.319	0.239	0.249	0.281	0.335	0.243	0.405	0.225	0.150	0.325	0.343	0.281	0.456	**0.895**	0.222	0.203	0.204	0.381
Collab1	0.123	0.093	0.111	0.136	0.100	0.065	0.277	0.330	0.406	0.452	0.402	0.384	0.306	0.360	0.197	**0.915**	0.405	0.423	0.239
Collab2	0.199	0.142	0.094	0.269	0.183	0.132	0.276	0.471	0.523	0.432	0.544	0.456	0.406	0.435	0.239	**0.846**	0.428	0.494	0.401
Collab3	0.197	0.169	0.155	0.152	0.138	0.128	0.274	0.341	0.447	0.471	0.495	0.393	0.334	0.390	0.275	**0.908**	0.474	0.487	0.303
Collab4	0.147	0.123	0.126	0.176	0.132	0.097	0.271	0.394	0.459	0.464	0.463	0.376	0.373	0.363	0.297	**0.925**	0.398	0.480	0.325
Iterat1	0.286	0.315	0.305	0.338	0.351	0.326	0.293	0.285	0.159	0.403	0.336	0.307	0.222	0.328	0.110	0.437	**0.889**	0.376	0.258
Iterat2	0.272	0.279	0.253	0.317	0.350	0.311	0.375	0.370	0.242	0.495	0.440	0.389	0.344	0.395	0.181	0.482	**0.924**	0.416	0.225
Iterat3	0.312	0.283	0.350	0.274	0.301	0.338	0.325	0.315	0.097	0.389	0.373	0.210	0.269	0.350	0.245	0.343	**0.865**	0.315	0.217
Resil1	0.151	0.117	0.100	0.261	0.205	0.143	0.158	0.511	0.564	0.498	0.545	0.479	0.521	0.443	0.182	0.458	0.312	**0.883**	0.321
Resil2	0.144	0.078	0.108	0.131	0.178	0.137	0.132	0.454	0.468	0.412	0.530	0.412	0.494	0.453	0.211	0.438	0.372	**0.824**	0.295
Resil3	0.234	0.172	0.151	0.302	0.257	0.206	0.286	0.542	0.501	0.527	0.572	0.508	0.492	0.478	0.154	0.453	0.364	**0.823**	0.418
Resil4	0.122	0.047	0.100	0.130	0.090	0.018	0.137	0.398	0.378	0.353	0.488	0.348	0.391	0.413	0.116	0.416	0.351	**0.833**	0.224
GenAI_Collab1	0.279	0.308	0.254	0.285	0.241	0.185	0.221	0.419	0.382	0.348	0.383	0.505	0.332	0.412	0.214	0.297	0.148	0.307	**0.810**
GenAI_Collab2	0.218	0.230	0.252	0.180	0.258	0.236	0.283	0.486	0.415	0.306	0.477	0.457	0.409	0.404	0.352	0.342	0.225	0.384	**0.902**
GenAI_Collab3	0.293	0.383	0.342	0.282	0.343	0.350	0.367	0.408	0.323	0.327	0.388	0.436	0.360	0.389	0.336	0.312	0.276	0.291	**0.876**
GenAI_Collab4	0.210	0.329	0.329	0.240	0.313	0.329	0.355	0.408	0.320	0.261	0.383	0.434	0.451	0.459	0.428	0.247	0.235	0.287	**0.808**

Note: W_Exp_DI_IG: Active idea generation (work); W_Exp_DI_IM: Active idea implementation (work); P_Exp_DI_IE: Active idea exploration (private); P_Exp_DI_IG: Active idea generation (private); P_Exp_DI_IM: Active idea implementation (private); On_Exp_DI: Experiences with digital innovation online communities; DigOr: Digital-oriented thinking; Expo: Exponential thinking; Data: Data-driven thinking; Platf: Plaform thinking; Comb: Combinatorial thinking; Gen: Generative thinking; Disrupt: Disruptive thinking; Risk: Risk-affine thinking; Collab: Collaborative thinking; Iterat: Iterative thinking; Resil: Resilient thinking; GenAI_Collab: Collaboration with GenAI at work.

Table 9. Reliability and averange variance extracted (AVE)

	Cronbach s alpha	Composite reliability (rho c)	Average variance extracted (AVE)
Active Idea Exploration (Work)	0.811	0.913	0.841
Active Idea Generation (Work)	0.907	0.941	0.843
Active Idea Implementation (Work)	0.915	0.946	0.854
Active Idea Exploration (Private)	0.914	0.959	0.921
Active Idea Generation (Private)	0.873	0.940	0.887
Active Idea Implementation (Private)	0.941	0.962	0.894
Experiences With Digital Innovation Online Communities	0.959	0.970	0.891
Digital-Oriented Thinking	0.841	0.894	0.678
Exponential Thinking	0.866	0.908	0.712
Data-Driven Thinking	0.871	0.912	0.721
Platform Thinking	0.881	0.926	0.807
Risk-Affine Thinking	0.925	0.947	0.817
Disruptive Thinking	0.797	0.881	0.711
Combinatorial Thinking	0.867	0.919	0.790
Generative Thinking	0.908	0.936	0.785
Iterative Thinking	0.873	0.922	0.798
Collaborative Thinking	0.920	0.944	0.808
Resilient Thinking	0.862	0.906	0.708
Genai Tool Collaboration	0.871	0.912	0.723

Table 10. Heterotrait-monotrait ratio

	W_Exp_DI_IE	W_Exp_DI_IG	W_Exp_DI_IM	P_Exp_DI_IE	P_Exp_DI_IG	P_Exp_DI_IM	On_Exp_DI	DigOr	Expo	Data	Platf	Comb	Gen	Disrupt	Risk	Collab	Iterat	Resil	GenAI_Collab
W_Exp_DI_IG	0.860																		
W_Exp_DI_IM	0.697	0.852																	
P_Exp_DI_IE	0.710	0.638	0.508																
P_Exp_DI_IG	0.672	0.796	0.710	0.837															
P_Exp_DI_IM	0.663	0.751	0.719	0.819	0.789														
On_Exp_DI	0.371	0.454	0.464	0.454	0.578	0.551													
DigOr	0.482	0.371	0.340	0.507	0.474	0.408	0.335												
Expo	0.243	0.201	0.153	0.278	0.227	0.164	0.192	0.718											
Data	0.260	0.201	0.257	0.260	0.394	0.353	0.339	0.444	0.615										
Platf	0.325	0.302	0.276	0.254	0.262	0.222	0.372	0.703	0.702	0.714									
Comb	0.412	0.416	0.341	0.387	0.775	0.685	0.607	0.688	0.685	0.607	0.688								
Gen	0.425	0.461	0.405	0.324	0.384	0.336	0.405	0.646	0.541	0.605	0.695	0.666							
Disrupt	0.438	0.382	0.299	0.473	0.466	0.399	0.475	0.781	0.543	0.590	0.682	0.750	0.692						
Risk	0.289	0.401	0.351	0.298	0.363	0.389	0.301	0.496	0.276	0.183	0.363	0.398	0.402	0.517					
Collab	0.209	0.160	0.148	0.223	0.172	0.126	0.324	0.486	0.564	0.560	0.588	0.502	0.431	0.504	0.304				
Iterat	0.382	0.371	0.380	0.388	0.429	0.402	0.403	0.423	0.209	0.548	0.489	0.389	0.350	0.480	0.223	0.525			
Resil	0.226	0.140	0.154	0.276	0.250	0.166	0.232	0.665	0.650	0.610	0.729	0.601	0.638	0.641	0.220	0.589	0.476		
GenAI_Collab	0.344	0.413	0.387	0.326	0.390	0.358	0.394	0.591	0.480	0.418	0.548	0.619	0.512	0.587	0.436	0.394	0.589	0.298	0.430

Note: W_Exp_DI_IG: Active idea generation (work); W_Exp_DI_IM: Active idea implementation (work); P_Exp_DI_IE: Active idea exploration (private); P_Exp_DI_IG: Active idea generation (private); P_Exp_DI_IM: Active idea implementation (private); On_Exp_DI: Experiences with digital innovation online communities; DigOr: Digital-oriented thinking; Expo: Exponential thinking; Data: Data-driven thinking; Platf: Plaform thinking; Comb: Combinatorial thinking; Gen: Generative thinking; Disrupt: Disruptive thinking; Risk: Risk-affine thinking; Collab: Collaborative thinking; Iterat: Iterative thinking; Resil: Resilient thinking; GenAI_Collab: Collaboration with GenAI at work.

Table 11. Results for control variables

Controls only **IVs: \ DV:**	**Digital Cognition**	**Creative Cognition**	**Agile Cognition**	**GenAI Collaboration at Work**
Age	**0.253***	0.221	**0.268***	**0.163**
Gender	0.119	0.048	0.081	-0.086
Education	0.024	-0.013	-0.022	0.004
Time in Current Position	**0.208****	0.041	0.067	-0.130
Work Experience	-0.179	-0.240	-0.223	-0.158
R^2	0.090	0.030	0.042	0.030

Notes: (standardized ß; *: $p < 0.05$; **: $p < 0.01$ ***: $p< 0.001$) IV: Independent Variable; DV: Dependent Variable

Table 12. Results of the modified post-hoc model analysis including relationships between cognitions and experiences

Modified Post hoc Model IVs: \ DV:		Work Experience DI	DI Experience Online Communities	Digital Cognition	Creative Cognition	Agile Cognition	GenAI Collaboration
Work Experience DI		-	-	0.078	**0.242****	0.076	0.121
Private Experience DI		**0.730*****	**0.528*****	0.045	0.063	0.078	-0.027
DI Experience Online Communities		-	-	**0.284*****	**0.274*****	**0.293*****	0.059
Digital Cognition				**-**	**-**	**-**	**0.374*****
Creative Cognition				**-**	**-**	**-**	**0.335*****
Agile Cognition				**0.620*****	**0.463*****	**-**	-0.034
Controls	Age	0.013	-0.037	0.192	0.134	0.218	0.003
	Gender	0.080	0.010	0.062	0.089	0.124	0.069
	Education	-0.030	0.005	0.020	-0.022	-0.024	-0.001
	Time in Current Position	-0.017	0.059	**0.200***	0.037	0.059	**-0.219****
	Work Experience	0.032	-0.089	-0.061	-0.095	-0.116	-0.019
R^2		0.537	0.296	0.265	0.319	0.186	0.417

Notes: (standardized ß; *: $p < 0.05$; **: $p < 0.01$ ***: $p< 0.001$); IV: Independent Variable; DV: Dependent Variable; DI: Digital Innovation

Table 13. Significant indirect effects of the modified post-hoc model analysis and confidence intervals

Indirect Path	Effects
AC → DC → Collab_GenAI	**0.232***
AC → CC → Collab_GenAI	**0.155***
P_EXP_DI → DI_EXP_ON → AC	**0.152***
P_EXP_DI → DI_EXP_ON → AC → DC	**0.095***
P_EXP_DI → DI_EXP_ON → AC → DC → Collab_GenAI	**0.035***
P_EXP_DI → W_EXP_DI → CC	**0.178***
P_EXP_DI → W_EXP_DI → CC → Collab_GenAI	**0.060***
DI_EXP_ON → AC → DC	**0.181***
DI_EXP_ON → AC → CC	**0.136***
DI_EXP_ON → AC → DC → Collab_GenAI	**0.068***

Note: *: $p < 0.05$; AC: Agile cognition; DC: Digital cognition; CC: Creative cognition; Collab_GenAI: Collaboration with GenAI at work; P_EXP_DI: Private experiences with digital innovation; DI_EXP_ON: Experiences with digital innovation online communities; W_EXP_DI: Work experiences with digital innovation

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Chapter II

Effects of Employees' Digital Mindset on IS Infusion Behaviors

Paper IV

AFFORDANCE PERCEPTION THROUGH A DIGITAL MINDSET

A DUAL PROCESS THEORY PERSPECTIVE

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Hildebrandt, Y., & Beimborn, D. (2023). Affordance Perception Through a Digital Mindset: A Dual Process Theory Perspective. In: *Proceedings of the Forty-Fourth International Conference on Information Systems (ICIS) 2023*, Hyderabad, India. https://aisel.aisnet.org/icis2023/generalis/generalis/3/

Paper V

IT-Specific Traits and IS Infusion Behaviors

Effects of a Digital Mindset

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IT-SPECIFIC TRAITS AND IS INFUSION BEHAVIORS

EFFECTS OF A DIGITAL MINDSET

Abstract

To secure competitive advantages and fully leverage IT investments, companies must focus on effectively realizing the potential of IS, known as IS infusion, primarily through innovative utilization by employees. Consequently, companies need to identify the determinants of such IS infusion behaviors. We assume that the digital mindset, a dynamic IT-specific trait describing the sum of an individual's knowledge and experiences determining individual sensemaking, affects such innovative utilizations. We build on the unified theory of acceptance and use of technology (UTAUT) and evaluate the role of the digital mindset for IS infusion behavior of narrow (MS PowerPoint) and broad IT (smartphones) with 139 and 155 employees. Our results indicate that the digital mindset is an indirect precursor to employees' innovative use of narrow and broad IT. It also directly influences other IT-specific traits, such as personal innovativeness with IT and IT mindfulness, and the predictors of the UTAUT in the context of IS infusion behaviors. We contribute by demonstrating that the digital mindset plays an important role for IS infusion behavior by significantly influencing preceding traits and technological expectations.

1 INTRODUCTION

Companies are increasingly depending on their employees' innovative power to reach the final stage of IT implementation, known as IS infusion. This stage is characterized by fully harnessing the opportunities presented by digital technologies and optimizing IT investments (Cooper and Zmud, 1990; Kesting and Parm Ulhøi, 2010). IS infusion behaviors comprise employees' innovative use of digital technologies, e.g., exploring new possible use cases or recombining multiple hardware and/or software technologies, which facilitates their employer's ability to generate novel products, processes, and business models (Jasperson et al., 2005). For researchers, this creates an enduring interest in identifying what determines such IS infusion behaviors (Opland et al., 2022). A promising area for finding better explanations of such usage behaviors is the field of individual traits that predispose the actions of individuals, underpinning humans' central role in the effective usage of IT (Blut et al., 2022).

Traits can be categorized based on their breadth and dynamics, indicating if they are either general or context-specific or describing how the expression of traits depends on certain parameters of a situation (e.g., the type of IT system that is used) and susceptibility to training (Thatcher et al., 2018; Thatcher and Perrewe, 2002).

Extant research using this theoretical foundation shows that IT-specific traits that predispose specific behaviors take a major position in explaining IS infusion behaviors on the individual level. In particular, personal innovativeness in IT (PIIT), a stable trait that is invariant across different types of IT and predisposes trying out new IT, as well as IT mindfulness, a dynamic trait that varies across different types of IT that predisposes presence in the moment during IT usage, significantly affect IS infusion behaviors (Tams and Dulipovici, 2022; Thatcher et al., 2018).

In parallel, mindsets, classified as rather malleable traits that alter general sensemaking and, therefore, can affect multiple behaviors, have recently drawn increased scholarly attention (Emmerich et al., 2022; Keating and Heslin, 2015). Mindsets represent the sum of an individual's knowledge and experiences that determine individual sensemaking (Dweck, 2006; Gollwitzer et al., 1990). In the context of digitalization and especially emerging digital innovations, the IT-specific trait of the "digital mindset" was recently conceptualized, describing cognitive filters, processes, and beliefs that predispose how individuals act in the context of pervasive digital technologies (Hildebrandt and Beimborn, forthcoming). In general, mindsets have positively influenced innovative job performance and job satisfaction (Janssen and van Yperen, 2004; Keating and Heslin, 2015). As malleable traits, mindsets are of particular interest as they affect various behaviors and offer opportunities for training and development (Dweck and Yeager, 2019; Thatcher et al., 2018).

We address two issues of existing research. First, existing literature assumes that IS infusion behaviors are primarily determined by IT-specific and behavior-specific traits, such as PIIT and IT mindfulness (Tams and Dulipovici, 2022; Thatcher et al., 2018). Hence, employees are more likely to exhibit innovative IT usage behavior if they have a natural inclination for experimental exploration (i.e., PIIT) and use IT mindfully. These tendencies are closely tied to overarching broad personality traits, which are relatively stable and difficult to develop over time (Davis and Yi, 2012). We challenge this assumption by proposing that such IT-specific traits and following behaviors are also influenced, both directly and indirectly, by an employee's digital mindset—an individual trait that is more amenable to modification, thus offering a potentially valuable variable to explain IS infusion behaviors. Second, the lack of empirical studies may lead to the assumption that trainable and context-specific mindsets have only a minor role in organizations concerning information system use despite being frequently touted as essential for management and ICT use (Al-Ghazali et al., 2022; Eilers et al., 2022; Leonardi and Neeley, 2022; van der Meulen et al., 2020). Hence, empirical investigations of influences of a digital mindset in the context of IS infusion behaviors are essential as they generate insights into the trainable human part of sociotechnical systems and the extent to which this part can contribute to a more innovative, effective, or successful usage of IS. The research question we pose is as follows:

What is the role of the digital mindset for IS infusion behaviors?

We answer this research question by adapting the UTAUT model in the post-adoption context (Blut et al., 2022), extending it by IT-specific traits, especially the digital mindset, and using adaptive system use as a proxy for IS infusion behavior (Sun, 2012). Subsequently, we test our hypotheses through a structural equation model (SEM) in a survey-based four-wave study using two samples (i.e., 139 and 155 full-time employees), considering narrow (i.e., Microsoft PowerPoint) and broad IT systems (i.e., smartphones).

Next, we will provide the theoretical background on the UTAUT, IS infusion behaviors, and the digital mindset. We then develop our hypotheses and introduce our methodological approach. After presenting our results, we discuss our findings, implications, and limitations.

2 Theoretical Background

2.1 Unified Theory of Acceptance and Use of Technology (UTAUT)

The UTAUT model explains individuals' decisions to use information technologies, which are driven by behavioral intentions determined through individual beliefs in an organizational context (Venkatesh et al., 2003). The original UTAUT model contains individual beliefs about the ease of IT use (effort expectancy), improvements of one‘s own job performance through IT use (performance expectancy), the influence of relevant social contacts on one's IT use (social influence), and the extent to which organizational and technical support is provided (facilitating conditions). Effort expectancy, performance expectancy, and social influence determine the individual behavioral intention to use IT. In turn, facilitating conditions and behavioral intention to use determine the actual IT usage behavior (Venkatesh et al., 2003). A recent meta-study on the UTAUT model indicated that additional predictors, in particular traits, help to explain technology use more comprehensively. Therefore, we extend our model with recently investigated IT-specific traits, namely the individual willingness to try out new technologies (personal innovativeness in IT (PIIT)) and tendencies to be mindful during technology use (IT mindfulness) (Blut et al., 2022).

The UTAUT model has been extensively used in prior IS research (Venkatesh et al., 2016) and has been used to explain the adoption and usage of software and hardware (Fortagne et al., 2021; Gopinath et al., 2022). However, the UTAUT model and its predictors were also adapted to explain individual IS infusion behaviors (Carter et al., 2020b; Hassandoust et al., 2016; Jasperson et al., 2005).

2.2 IS INFUSION

IS infusion describes the full realization of IS potentials by organizations and is the final stage of the six-stage IS implementation process (Cooper and Zmud, 1990). It is preceded by initiation of the IS by an organization, followed by adoption, adaptation, acceptance, and routinization behaviors of employees (Cooper and Zmud, 1990). The final three stages pertain to various levels of implementation activities, where individual usage behaviors can occur (Hsieh and Zmud, 2006). Acceptance reflects the users' commitment to using the system. Routinization occurs when system usage becomes an integral part of an individual's routine and infusion represents the deep and thorough integration of an IT application into the work processes of both individuals and organizations (Hsieh and Zmud, 2006). In the final phase, IS infusion behaviors occur. These behaviors involve creatively leveraging the system to support additional tasks, including those not previously identified, thereby maximizing the system's potential (Hsieh and Zmud, 2006). Various concepts have been used in previous literature to capture IS infusion behaviors and their antecedents.

Some studies used single dimensional constructs such as *trying to innovate*, describing the discovery of novel uses for information technologies on the whole system level (Ahuja and Thatcher, 2005; Thatcher et al., 2018; Wang et al., 2013), while others operationalized *IS infusion* (Kim et al., 2016) or simply referred to it as *innovative use,* defined as the extension of a whole software product to accomplish new tasks or settings (Akbulut et al., 2004; Maier et al., 2021; Singletary et al., 2002), *exploratory usage*, describing the creative and experimental ways to use IT features (Ke et al., 2012), *deep structure usage*, describing an integration of the system with user's tasks (Sykes and Venkatesh, 2017), or *emergent use*, described as using the system in a new manner (Kim and Gupta, 2014). These conceptualizations merely describe general behaviors on the system level or address narrow aspects of feature-level use, making it necessary for scholars to use multiple constructs to rigorously reflect IS infusion behaviors (Thatcher et al., 2018).

Other studies investigated IS infusion behaviors in multidimensional approaches. In particular, *adaptive system use* (ASU), which comprises deviations from features' usages from the current mode of use and, by integrating various behaviors that an individual performs when innovatively using IT, synthesizes different perspectives of other constructs (Pan et al., 2017; Sun, 2012). ASU is conceptualized on the feature level and describes how the features in use (FIU), a packet of features ready to be used to accomplish tasks, are manipulated and vary. ASU is formed by the two dimensions of (1) "revising the content of feature in use," which is formed by *trying new features* and *feature substituting*, and (2) "revising the spirit of features in use," which is formed by *feature combining* and *feature repurposing*, describing the usage of one's FIU features in a new way (Sun, 2012). Hence, ASU comprises what and how features are used, reflects behavioral IS infusion more comprehensively and is therefore used in our study.

Various and diverse antecedents of IS infusion behaviors have been identified in the past, which can be categorized regarding the organizational environment, task characteristics, type of system used, or the individual (Hassandoust et al., 2016; Sun et al., 2019) (see Table 8 in the Appendix). Exemplarily, management support, quality, and empowerment of employees, as well as information culture drives individuals to innovatively use IT (Kim and Gupta, 2014; Ramamurthy et al., 2008; Wang et al., 2008). Further, facilitating conditions and their changes, such as organizational resource changes, or the innovation climate can significantly affect innovative behavior when interacting with IT (Ke et al., 2012; Liang et al., 2015; Sun, 2012; Sun et al., 2019). Besides, new tasks, the complexity of tasks, or the quantitative or qualitative overload describe task-related impact factors on innovative IT behaviors (Ahuja and Thatcher, 2005; Lauterbach et al., 2020). Next to task-related factors, also system complexity, integration, information quality or design and method autonomy affects IS infusion behaviors (Hsieh et al., 2011; Liang et al., 2015; Saeed and Abdinnour-Helm, 2008).

However, the main body of the literature revolves around individual-related antecedents of IS infusion behaviors (Sun et al., 2019; Wang et al., 2013) and showed that individual differences, perceptions, and inclinations significantly affect such behaviors (Hassandoust et al., 2016). On the one hand, it has been shown that one's IT identity (Carter et al., 2020b), motivation (Li et al., 2013), creativity-related skills, and IT knowledge affect IS infusion behaviors (Sun et al., 2019; Tennant et al., 2014). Further, traditional UTAUT predictors, such as perceived usefulness, perceived voluntariness, and perceived ease of use as well as trust in IT positively influence IS infusion behaviors (Hsieh and Wang, 2007; Thatcher et al., 2011). Recent studies also showed that challenging IS use stress, caused by challenging IS use stressors, fosters IS infusion behavior (Maier et al., 2021).

On the other hand, research has focused on traits. Traits are predispositions that alter how individuals act across situations (Costa and McCrae, 1991) and can be differentiated in their breadth and dynamics (Allport, 1961; Hampson et al., 1986). On the one hand, trait breadth comprises contextual breadth, indicating whether traits predispose behaviors across all situations or only in specific contexts. Exemplarily, the five-factor model of personality (FFM) predisposes behaviors across all situations, while IT-specific traits, such as computer anxiety, predispose behaviors in situations with IT (Davis and Yi, 2012). On the other hand, trait breadth also contains behavior breadth, indicating the range of behaviors a trait predisposes. Speaking of the previous example, the FFM predisposes various behaviors, while general anxiety is conceptualized more narrowly, solely predisposing anxiety behavior (Borkenau and Müller, 1991; Endler and Kocovski, 2001).

Dynamics divide traits based on situational variance and malleability. Situational variance describes how specific parameters of a situation affect the expression of a trait. Depending on the particular IT system in a specific situation, computer self-efficacy (CSE) as an IT-specific trait may vary, while personal innovativeness in IT will remain stable (Davis and Yi, 2012). Lastly, malleability describes the susceptibility of traits to interventions, training, or development measures (Thatcher et al., 2018). These traits are of particular interest, as they proved to have the highest explanatory power for behavior in IT-specific contexts compared to stable IT-specific traits (Maier et al., 2019). An overview of how to differentiate traits can be obtained in Figure 1.

Research on traits and IS infusion behaviors has mainly focused on IT-specific traits that predispose specific behaviors. Personal innovativeness in IT (PIIT) affects innovative IT use and moderates the effect of other predictors, such as triggers (Liang et al., 2015; Sun, 2012; Tams and Dulipovici, 2022). PIIT describes a relatively stable trait that is invariant across different types of IT and predisposes the behavior of trying out new IT (Agarwal and Prasad, 1998). Further, scholars found that IT mindfulness and computer self-efficacy positively affect IS infusion behavior (Liang et al., 2015; Thatcher et al., 2018). IT mindfulness predisposes the behavior of heightened presence in the moment when working with IT. It comprises alertness to distinction, awareness of multiple perspectives, openness to novelty, and orientation in the present. IT mindfulness is malleable and influenced by situational factors, such as the used IT system (Compeau and Higgins, 1995; Thatcher et al., 2018). Hence, these findings indicate that IT-specific traits are particularly crucial in elucidating IS infusion behavior. This is because these traits are not only responsive to organizational interventions, such as training, but also influence the characteristics of other antecedents and simultaneously directly affect IS infusion behavior.

By moving the focus to another IT-specific trait and utilizing ASU as a proxy for IS infusion behavior, we aim to address two issues of previous research. First, research that investigated the relationship between traits and IS infusion behaviors has mainly used proxies that are conceptualized on the system level (e.g., "trying to innovate") (Carter et al., 2020b; Sun et al., 2019; Thatcher et al., 2018), whereas it is also indicated that this behavior should be studied more on the level of individual features of a system (Jasperson et al., 2005). That is, the findings of previous studies regarding outcomes of IT-specific traits led to the conclusion that employees who innovatively use features of a system for a traditional or exploitative task are attributed a low expression of IT-specific traits, as only parts of the system are used innovatively but not the system itself. Hence, we aim to complement existing findings on the macro (i.e., system) level of IS infusion by providing more detailed and comprehensive insights into how IS infusion on the micro (i.e., feature) level is affected by IT-specific traits. Second, previous studies concerning traits and IS infusion behaviors have focused on IT-specific and behavior-specific traits, such as PIIT, IT mindfulness, or computer self-efficacy (Tams and Dulipovici, 2022; Thatcher et al., 2018). Based on these findings, it can be concluded that IS infusion behavior is influenced by specific inclinations for behavior when using IT, which, in turn, are rooted in broad personality traits (i.e., Five Factor Model) (Davis and Yi, 2012). Hence, it would be necessary to bring about fundamental changes in one's personality if one would aim to foster IS infusion behavior at the individual level, which, however, requires substantial time and effort as broad personality traits are thought of as relatively stable over time (Allport, 1961). We challenge this conclusion by focusing on exploring the impact of employees' tendencies for sensemaking of digital technologies, respectively their digital mindset.

The emphasis on IT-specific traits holds significant importance for multiple reasons. Firstly, these traits are crucial as they not only exert a strong direct impact on IS infusion behaviors, as demonstrated by prior studies, but also interact with other non-individual factors, amplifying their effects. Additionally, these traits are malleable, allowing their hierarchical influence to extend to various other behavior-specific traits, such as PIIT, CSE, or IT mindfulness. By adapting the UTAUT to the context of IS infusion and incorporating such IT-specific traits, we attain a deeper insight into why individuals, despite having broadly similar personalities, display varying expectations and actually engage in IS infusion behaviors. Unlike previously examined traits, these tendencies towards sensemaking serve as a more central, malleable characteristic, potentially triggering cascading effects on more behavior-specific traits such as PIIT or IT mindfulness, resulting in higher IS infusion behaviors. Subsequently, this study focuses on the effects of the digital mindset, which represents a broader IT-specific trait that affects various behaviors, is invariant across situations, and is malleable (see Figure 1).

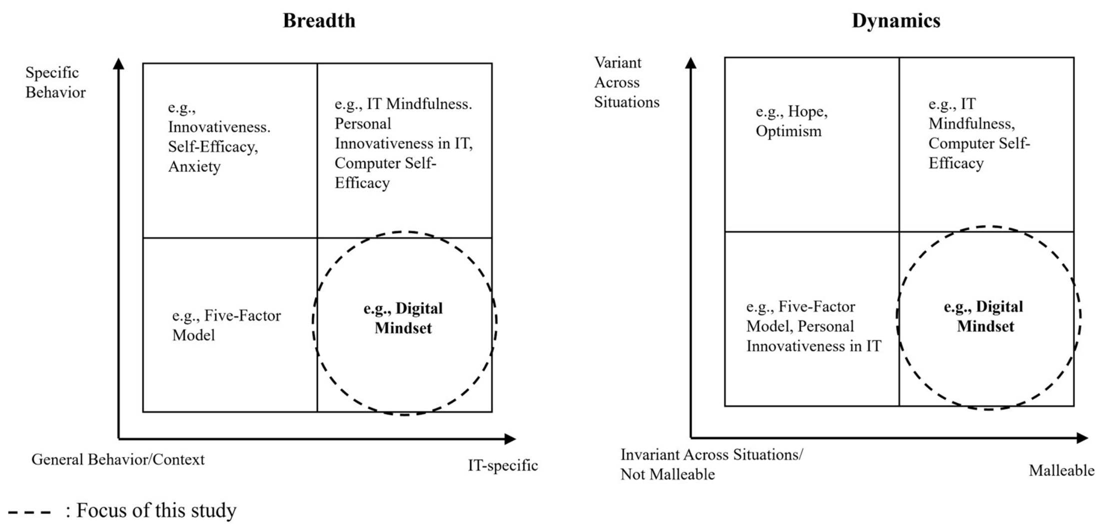

Figure 1. Trait Differences and Focus of this Study

2.3 Digital Mindset as an IT-Specific Trait

Mindsets are defined as the sum of one's knowledge and experiences that predispose actions by affecting the three sensemaking mechanisms of noticing, identifying, and interpreting (Dweck et al., 1995; Gollwitzer et al., 1990; Gupta and Govindarajan, 2002). Cognitive filters activated in specific contexts lead individuals to different association patterns when processing information based on their experience and knowledge, making them able to perceive and associate things that others do not with little cognitive effort (Kahneman, 2011; Rhinesmith, 1992). Further, individuals combine and apply experiential knowledge, changing how individuals identify the feasibility and desirability of specific actions in a situation (Gollwitzer et al., 1990). Moreover, experiential knowledge forms absolute convictions about a thing, the environment, or one's person, changing an individual's interpretation (Dweck, 2006). Mindsets can be classified as malleable traits (Dweck and Yeager, 2019; Keating and Heslin, 2015) and have been adapted to various contexts, such as agile environments (Emmerich et al., 2022) or globalization (Gupta and Govindarajan, 2002). Research indicates that mindsets, e.g., regarding one's capabilities or new environments such as agile work contexts, can possess positive effects on innovative job performance, job satisfaction (Janssen and van Yperen, 2004), and agility (Eilers et al., 2022), and are proposed to enhance employee engagement (Keating and Heslin, 2015). Consequently, research states that digitalization and the ubiquitous influence of digital innovations also require new ways of thinking (Vial, 2019), respectively, a digital mindset (Leonardi and Neeley, 2022).

The *digital mindset*, describing the sum of an employee's knowledge and experiences regarding digitalization, affects how individuals notice, identify, and interpret situations where IT, accompanying phenomena, and new forms of work are apparent (Hildebrandt and Beimborn, forthcoming; Leonardi and Neeley, 2022). Therefore, it can be classified as an IT-specific trait (Hildebrandt and Beimborn, forthcoming). Various conceptualizations of the digital mindset exist, focusing on different aspects of digitalization, such as agile changes in the workforce (van der Meulen et al., 2020), disruptive capabilities of digital technologies (Allen, 2020), or their data (Leonardi and Neeley, 2022). A recent conceptualization integrates these different approaches (Hildebrandt and Beimborn, forthcoming), describing the digital mindset as individuals' digital, agile, and creative cognition reflected by different thinking patterns that represent these new sensemaking mechanisms.

Accordingly, the *digital cognition* describes how employees notice, identify, and interpret new digital phenomena that arise with pervasive digital technologies, such as data, platforms, and exponential developments of technology over time, while *agile cognition* describes one's sensemaking regarding new forms of work and paradigms, such as iterative thinking, resilient thinking, or collaborative thinking (Hildebrandt and Beimborn, forthcoming). Finally, an employee's *creative cognition* describes how they notice, identify, and interpret possible problem-solution pairs and associated risks of digital technologies and their disruptive, generative, and combinatorial characteristics.

In the context of innovative IT use, these characteristics of digital technologies play a crucial role, as they create new ways of possible uses that present themselves to the user (Yoo et al., 2012) and which need to be noticed and identified by employees to lever their potentials (Henfridsson et al., 2018; Yoo et al., 2012). Accordingly, as the new digital characteristics cause innovation potentials of digital technologies, we focus on the *creative cognition* of individuals as a proxy for the digital mindset in the context of this study, reflecting an employee's sensemaking of these digital characteristics and consisting of generative, combinatorial, disruptive, and risk-affine thinking. Through generative thinking patterns, employees recognize the inherent agnosticism of digital technologies, allowing for flexible recognition, including new unanticipated forms of use and evaluation of new functions. Complemented by combinatorial thinking, employees associate digital technologies with new combinations and permutations of digital properties and features, quickly assessing their feasibility and desirability based on their accumulated knowledge. Further, through disruptive thinking, individuals challenge established problem-solution pairs and evaluate the use of digital technologies, challenging existing conventional mechanisms. This expands their space of potential problem-solution pairs in situations involving digital technologies. Finally, through risk-affine thinking, employees identify high-risk actions as feasible or desirable, interpreting the acceptance of such risks generally as valuable. This is also in line with Hildebrandt and Beimborn's (forthcoming) initial conceptualization, proposing those thinking patterns may be associated with innovative behaviors. Table 1 gives an overview of the different thinking patterns of the digital mindset applied in our study.

Table 1. Thinking Patterns of the Digital Mindset (DM) Based on (Hildebrandt and Beimborn, forthcoming).

Thinking pattern	Definition in a DM context
Generative thinking	Continuously thinking in ways that foster and include solution repurposing, typical for digital solutions, by integrating abstraction and modularity.
Combinatorial thinking	Continuously integrating the combinatorial characteristics in solution finding to broaden the potential solution space by creatively combining digital technologies.
Disruptive thinking	Continuously questioning existing solutions and imagining how digital technologies could induce alternative scenarios that include fundamental pivots.
Risk-affine thinking	Countinuous readiness of individuals to take calculated risks regarding digital technologies and business domains.

In conclusion, the digital mindset represents a broader IT-specific trait than other investigated traits, such as IT mindfulness or PIIT, as it describes fundamental thinking patterns in the context of digital technologies that can affect multiple behaviors. Both academic and practical literature consistently underscore the significance of digital mindsets in organizations (Korotkova et al., 2023; Leonardi and Neeley, 2022; van der Meulen et al., 2020), particularly for developing new digital business models (Lucas and Goh, 2009), harnessing digital opportunities (Davison and Ou, 2017), foster innovative interactions with digital technologies (Tour, 2015), or generally digitally innovating and transforming firms (Lorenz and Buchwald, 2023). Other context-specific mindsets, such as a global mindset, have already demonstrated a direct correlation with innovative work behavior and performance (Pusparini and Aryasa, 2021) and first empirical studies have revealed that employees possessing a digital mindset tend to unconsciously envision more innovative applications for digital technologies (Hildebrandt and Beimborn,, 2023). These individuals also exhibit more distinct IT-specific traits, as evidenced by discriminant analyses of conceptual works (Hildebrandt and Beimborn, forthcoming).

Despite insights from practitioners and qualitative studies suggesting the crucial role of an employee's digital mindset in fully leveraging digital technologies, respectively IS infusion behaviors, there is still a lack of substantial empirical evidence to support this assertion. This deficiency limits our comprehension of how an employee's digital mindset directly affects IS infusion behaviors, particularly in terms of its interaction with or enhancement of existing IT-specific traits and beliefs. However, by integrating the concept of a digital mindset and adapting the UTAUT to the IS infusion context, researchers can better comprehend the significance of such a mindset. This approach will clarify its influence on other IT-specific traits, expectations of innovative behavior, and the actual innovative behavior crucial in the IS infusion stage. Furthermore, such an exploration will elucidate the significance and potential benefits of companies addressing the digital mindset to foster IS infusion behaviors.

3 RESEARCH MODEL AND HYPOTHESIS DEVELOPMENT

For our study, we adapted the underlying UTAUT model to the context of IS infusion, as similarly done by Carter et al. (2020b), using *intention to explore* as a proxy for behavioral intention for IS infusion behavior and *ASU* as a proxy for actual IS infusion behavior. Hence, we examine the interplay of the digital mindset with other UTAUT predictors, intention to explore, and ASU, as presented in Figure 2.

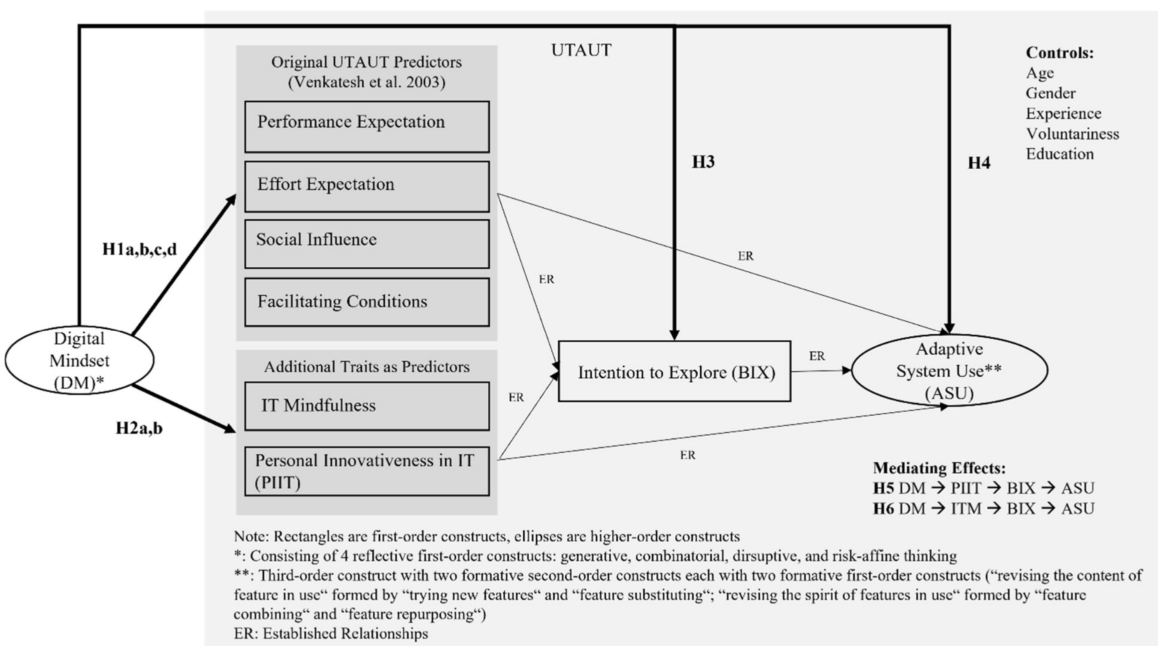

Figure 2. Research Model

The majority of the UTAUT predictors, such as performance expectancy, effort expectancy (i.e., in the sense of ease of use), social influence, and facilitating conditions, describe how individuals perceive and interpret IT or a specific technology. Previous IS research has shown that IT-specific traits influence these system-specific perceptions (Davis and Yi, 2012). Hence, we can assume that this is also valid for the digital mindset as an IT-specific trait, guiding how individuals notice, identify, and interpret information in their digital environment.

3.1 Direct Effects of a Digital Mindset

Employees possess a broader problem-solution space through a strong digital mindset with its generative, disruptive, and combinatorial thinking patterns as non-obvious problem-solution pairs are associated as feasible or desirable. In line with that, with higher levels of risk-affine thinking, they view digital technologies and potential uses with optimism and halo effects, meaning unfounded positive judgments of these opportunities (Kahneman, 2011).

Exemplarily, employees notice how technologies can be combined with other technologies or be used in entirely new and unexpected ways to increase efficiency and enhance productivity with less cognitive effort (Hildebrandt and Beimborn, forthcoming; Gollwitzer et al., 1990). They unconditionally believe in the benefits and advantages of these technologies, such as potential productivity boosts. As a result, these individuals are recognizing more ways digital technologies can increase productivity and efficiency, ultimately leading to a higher performance expectancy (Henfridsson et al., 2018; Steininger, 2022).

This might not only be the case for the used technology but also for the surrounding supporting (technical) infrastructure and social environment. Employees may also recognize a broader range of how organizational constraints or technical infrastructures can be combined or repurposed to support technology interaction (Henfridsson et al., 2018), which greatly increases the chance that supporting conditions of the environment will be recognized, leading to higher levels of perceived facilitating conditions.

Furthermore, these thinking patterns may enable employees to perceive potential combinations or uses of digital technologies and how they can apply the uses of other people (e.g., colleagues) or their experiences and skills with digital technologies. On the one hand, this means that through combinatorial but also disruptive thinking, these employees may be quicker to recognize how they can transfer knowledge from observing colleagues or their own previous engagement with other technologies or in other contexts, and thus they perceive use as easier.

On the other hand, the risk-affine ways of thinking, associated halo effects, and subsequent positive evaluations of feasibility (Gollwitzer et al., 1990) may also lead to newly found unfamiliar features tending to be seen as easier to use. Hence, such individuals may estimate needing less cognitive resources to use digital technologies, leading to lower levels of expected effort (Hildebrandt and Beimborn, forthcoming).

In addition to changing which effort employees expect, these thinking patterns can also influence individuals in how others' usage affects them. For instance, through generative and combinatorial thinking, employees associate how their colleagues adapt their usage behavior to new needs or different purposes. This might facilitate the adoption of new usage patterns observed from colleagues. Because employees with a digital mindset and disruptive thinking are also inclined to question their usual ways of using software (i.e., an existing problem-solution pair), they are more open to considering different approaches, especially those they learn from their colleagues. Halo effects and associated optimism through risk-affine thinking regarding these observed usage behaviors might also increase the incorporation of those usage patterns into their practices. Ultimately, the thinking patterns might facilitate the adoption of observed usage patterns of peers, leading to more substantial social influence (Hildebrandt and Beimborn, forthcoming). In conclusion, the thinking patterns of the digital mindset alter the digital environment's perception and the evaluation of the desirability and feasibility of digital solutions, leading to higher levels of performance expectancy, effort expectancy, social influence, and facilitating conditions. Hence, we hypothesize:

H1a-d: The digital mindset is positively related to performance expectancy (a), negatively related to effort expectancy (b), positively related to social influence (c), and positively related to the perception of facilitating conditions (d).

The digital mindset can be classified as a broader IT-specific trait than PIIT and IT mindfulness since it may affect multiple behaviors (Davis and Yi, 2012; Hampson et al., 1986). According to the hierarchical trait view, broader traits affect more narrow, behavior-specific traits (Hampson et al., 1986). It is rational that these cascading effects are also valid for the digital mindset and PIIT and IT mindfulness, as employees with high levels of the digital mindset may perceive a higher breadth of potential solutions, such as combinations, other uses, or fundamental new uses of digital technologies. Due to risk-affine thinking, they better evaluate probable action outcomes of such creative use potentials (Hildebrandt and Beimborn, forthcoming). On the one hand, this increases the tendencies of individuals to explore these perceived opportunities creatively, being experimental and risk-affine when interacting with IT, overall increasing their openness to novelty and PIIT (Agarwal and Prasad, 1998). This also aligns with the initial conceptualization of the digital mindset, suggesting relationships between some thinking patterns with PIIT and IT mindfulness (Hildebrandt and Beimborn, forthcoming). On the other hand, seizing these capabilities through combinatorial or generative thinking may enable individuals to recognize better the boundaries of what technology is capable of now and in the future and increase the tendencies of individuals to take in different perspectives on the technology and its impact on different contexts. Ultimately, this leads to higher alertness to distinction, awareness of multiple perspectives, orientation in the present, and IT mindfulness (Thatcher et al., 2018). We hypothesize:

H2a: The digital mindset is positively related to PIIT.

H2b: The digital mindset is positively related to IT mindfulness.

The two behavioral outcomes of our research model are the intention of employees to explore and its consequence, ASU, which represents IS infusion behavior in our study. Intention to explore is described as the willingness of employees to use features innovatively to support work tasks. ASU refers to novel ways of using features of an IT, including trying new features, substituting features, combining features, or repurposing features.

From a digital mindset perspective, individuals with high a digital mindset and combinatorial, generative, or disruptive thinking perceive more possibilities of how digital technologies, especially their various features, can be used. Specifically, these individuals may associate more possible solutions when approaching tasks or problems without exerting more cognitive effort (Kahneman, 2011). At the same time, individuals may experience halo effects regarding these possibilities stemming from fundamental positive beliefs regarding associated risks (Hildebrandt and Beimborn, forthcoming). Hence, individuals with higher levels of digital mindset may evaluate such explorative usages as feasible and desirable when approaching tasks (Gollwitzer et al., 1990). As these explorative options are increasingly perceived and considered when solving problems, the general probability increases that those will play a role in finding a solution or solving tasks, increasing the intention to explore. We hypothesize:

H3: The digital mindset is positively related to intention to explore.

Other than the influence of the digital mindset on willingness and intention, previous research indicated that IT-specific traits directly explain behavior in IT situations (Maier et al., 2019), and mindset research in other contexts also indicated that mindsets directly affect human behavior (Li et al., 2022a). Through combinatorial thinking, individuals easily associate how system features can be combined with other features. As these perceptions do not cognitively disrupt individuals when using the system (Kahneman, 2011), it may be more probable that individuals consider these when responding to tasks. Additionally, with generative and disruptive ways of thinking, using system features for different outcomes or in entirely new ways is perceived with similar cognitive efforts as conventional feature use, and, therefore, individuals may more regularly repurpose and substitute features (Hildebrandt and Beimborn, forthcoming; Kahneman, 2011). Further, with risk-affine thinking, individuals may rather see the benefit and value of combining, repurposing, substituting, or trying new features. Consequently, we propose that the digital mindset directly affects adaptive system use with its two times two dimensions, as outlined in the previous section. We hypothesize:

H4: The digital mindset is positively related to adaptive system use.

3.2 Indirect Effects of a Digital Mindset

In addition to the direct effects of a digital mindset, recent literature on the digital mindset and other context-specific mindsets indicates the presence of indirect effects (Hildebrandt and Beimborn, forthcoming; Eilers et al., 2022). Moreover, considering the hierarchical nature of traits, it is suggested that more broadly conceptualized traits not only influence narrower traits but also exert more substantial indirect effects through those narrower traits on behavioral outcomes (Davis and Yi, 2012). For instance, individuals with risk-affine thinking perceive the risks associated with experimenting with various software features as desirable, increasing their inclination to try these features (i.e., PIIT) (Hildebrandt and Beimborn, forthcoming). Consequently, individuals with a greater propensity to explore new features, perceiving fewer potential downsides or weighing them less critically, are more likely to explore features within a system actively. This inclination ultimately increases opportunities to substitute previously used features, discover new ones, or repurpose and combine existing ones. Further, the general heightened PIIT due to a digital mindset positively affects ASU, as these individuals may also engage in trying out new features without a conscious intention to do so, as feature combinations or repurposings are subconsciously associated as desirable or feasible through a digital mindset (Hildebrandt and Beimborn, forthcoming; Kahneman, 2011). That is, PIIT and an individual's intention to explore mediate the effects of established ways of thinking so that the positive effects of a digital mindset function indirectly. We hypothesize:

H5: PIIT and an individual's intention to explore mediate the positive effect of the digital mindset on ASU.

We expect similar effects as IT mindfulness is also a narrower trait than the digital mindset. For instance, individuals' active and conscious adoption of different perspectives during system usage, respectively, their IT mindfulness, might be facilitated when they easily perceive the potential for combinatorial, generative, or disruptive opportunities through a strong digital mindset (Hildebrandt and Beimborn, forthcoming). Moreover, their alertness towards new features is heightened as the perception of these features requires less cognitive effort and cognitive disruptions. Consequently, individuals are more willing to explore these features, increasing the likelihood of utilizing new features or employing existing features in novel ways. We propose:

H6: IT mindfulness and an individual's intention to explore mediate the positive effect of the digital mindset on adaptive system use.

Finally, our research model includes the remaining original UTAUT relationships for nomological completeness. The UTAUT model was extensively applied to the context of technology, and recent works proved these established relationships for IS infusion behaviors (Carter et al., 2020b; Thatcher et al., 2018). Therefore, we refrain from explicitly introducing hypotheses for the effects of performance expectancy, effort expectancy, social influence, PIIT, and IT mindfulness on intention to explore or the influence of intention to explore, facilitating conditions, PIIT, and IT mindfulness on ASU.

4 Method

4.1 Data Collection and Measurement

We examined our research model empirically and collected data via a web-based survey in four waves, using the crowdsourcing platform Prolific. Crowdsourcing platforms are an established data collection method in IS research and have shown to provide similar data quality to data collected in organizations (Li et al., 2022b; Maier et al., 2019; Zalmanson et al., 2022). We followed several guidelines to ensure the quality of crowdsourced data, such as filtering for workers with high acceptance rates with regard to previous tasks (95%), realistic survey completion time frames (i.e., >6 minutes for each wave) and who are located in the US, as well as including a minimum of two trap or attention questions in each wave (Jia et al., 2017).

As our study goal is to deepen our understanding of how broad IT-specific traits of individuals can support organizations in gaining competitive advantages through IS infusion behaviors, our sampling strategy aimed to examine employees who possess full-time employment and use IT to complete tasks at work. UTAUT and IS infusion research indicate that the effect of predictors on the actual IS infusion behaviors might differ for narrow or broad technologies (Blut et al., 2022; Carter et al., 2020b). Narrow IT describes software or technology with a narrow scope of use and thus a specific purpose, while broad IT describes platform-like systems with many different purposes of use from the outset (Blut et al., 2022; Carter et al., 2020b). Thus, we conducted two surveys. On the one hand, we assessed employees who use the narrow IT of Microsoft Powerpoint (MS Powerpoint) to accomplish tasks at their work, as previous research indicates that MS Powerpoint, which was primarily built for creating and building presentations, tends to be used in various and innovative ways (Ciriello et al., 2015). On the other hand, we surveyed employees who use the broad IT of smartphones to accomplish work tasks, similar to previous studies that indicate their suitability as a target technology (Carter et al., 2020b). Screening questions were applied upfront.

Consequently, each of our two samples includes individuals who possess full-time employment, use MS PowerPoint or smartphones to accomplish work tasks, and have completed all four survey waves. Our final samples consisted of 139 (MS PowerPoint) and 155 (smartphones) out of 333 and 337 pre-screened participants (see Table 2 for sample details).

We only used previously validated scales and assessed them with a seven-point Likert scale from one ("strongly disagree") to seven ("strongly agree"). In the first wave, we collected data for the *digital mindset* using a recently validated and applied 22-item scale consisting of 3-4 items per dimension (Hildebrandt and Beimborn, forthcoming). In the second wave, we assessed the UTAUT predictors by adapting existing items for *performance expectancy* (4 items), *effort expectancy* (4 items), *social influence* (3 items), and *facilitating conditions* (4 items) from (Venkatesh et al., 2003); for the additional IT-specific trait predictors, we adapted items for *PIIT* (4 items) (Agarwal and Prasad 1998) and *IT mindfulness* (4 items) (Thatcher et al., 2018).

In the third wave of the study, we adapted a 3-item measure to assess *behavioral intention to explore* from (Nambisan et al., 1999) and an established scale for *adaptive system use*, including *trying new features* (4 items), *features substituting* (3 items), *feature combining* (4 items), and *feature repurposing* (6 items) (Sun, 2012). As employees might not be aware of the adaptive system usage behavior, we applied an incident analysis, as recommended in other studies (Orlikowski and Yates, 2002; Sun, 2012). Hence, participants were asked to report an incident where they changed their use of MS Powerpoint or smartphone features. The subsequent questionnaire on adaptive system use referred to that incident. Finally, we controlled for age, gender, voluntariness, and experience (for Powerpoint only, as we expected no substantial variance in smartphone use experience across the sample). A minimum time interval of one week was inserted between each wave. (Table 14 in the Appendix provides an overview of all items).

Table 2. Sample Characteristics for N=139 (MS PowerPoint) and N=155 (smartphones).

Variable	Value	MS PowerPoint % Respondents	Smartphones % Respondents
Age	<21	1.4 %	1.9 %
Mean = 36.36 (MS PowerPoint); 38.34 (Smartphones)	22-34	46.4 %	37.1 %
	35-44	32.6 %	35.7 %
St. dev. = 9.67 (MS PowerPoint); 10.51 (Smartphones)	45-54	13.1 %	16.2 %
	55-64	5.8 %	8.5 %
	>65	0.7%	0.6%
Gender	Male	46.8 %	51.9 %
	Female	53.2 %	48.1 %
Level of education	Less than high School	0.0%	0.0%
	High school	0.7 %	4.5 %
	Some college	10.1 %	15.5 %
	Associate's degree	2.9 %	10.3 %
	Bachelor's degree	56.1%	46.5 %
	Professional degree	26.6 %	16.8 %
	Doctorate	3.6 %	6.5 %
Experience (i.e., with MS PowerPoint or smartphone)	< 1 year	2.9 %	0.0 %
	1-5 years	15.1 %	0.0 %
	> 5 years	82.0 %	100 %

4.2 ANALYSIS

We used a structural equation model (SEM) and PLS to analyze our collected data. We used the PLS approach instead of a covariance-based approach for several reasons: First, although the overarching UTAUT model is well-established, research on the relationships of our independent and dependent variables in focus (i.e., digital mindset and adaptive system use) is scarce, making PLS suitable as it is recommended for investigations of newer relationships (Soror et al., 2015). Second, our study's goal is to incorporate the existing UTAUT theory to explain the impacts of the digital mindset on IS infusion behavior. Hence, as PLS is more suitable for theory construction and covariance-based approaches are more suitable for theory confirmation by providing more detailed fit statistics (Hair et al., 2022), PLS is appropriate as we aim to extend the structural theory of UTAUT. Third, the dependent variable of our model, adaptive system use, is a third-order formative construct. Although such formative constructs can now be represented via covariance-based approaches, PLS-based approaches are primarily used due to their better handling of the measurement complexity (Hsu et al., 2015). Accordingly, we used the software SmartPLS 4 and tested our models, including the previously mentioned control variables. To investigate the mediating effects, we conducted a mediation analysis according to the approach recommended by (Zhao et al., 2010) and (Preacher and Hayes, 2004). Finally, we conducted a multi-group analysis to assess the significance of variations of the hypothesized effects between the MS PowerPoint and smartphone samples.

4.3 COMMON METHOD BIAS

We took several precautions and analyses to reduce the risk of common method bias (CMB) in our study as much as possible. The main countermeasure was collecting the data of the different model variables at four different points of time, reducing the most critical sources for CMB, such as recall biases (Podsakoff et al., 2003).

Additionally, we performed different tests to detect possible CMB-caused distortions. First, Harman's single-factor test showed that a single factor explains 27.9% (MS PowerPoint) and 22.05% (smartphone) of the variance in the samples. Second, we checked that variance inflation factors (VIFs) were below 3.3 (Kock, 2017). Third, we included a CMB factor (a 4-item scale for fashion conscientiousness from (Malhotra et al., 2006), which is theoretically unrelated to all model constructs) in the model and transformed all remaining factors into single-item constructs. A comparison of R2 with CMB (0.448 for MS Powerpoint; 0.356 for smartphone sample) to R2 without CMB factor (0.445 and 0.353) showed an almost nonexistent average delta of 0.003 of variance being explained by the CMB factor in both data samples, resulting in a ratio of 1:148 and 1:108. Therefore, our tests indicate no observable signs of CMB in our study.

4.4 MEASUREMENT MODEL VALIDATION

We examined the validity of our measurement model by assessing indicator reliability, construct reliability, and discriminant validity (Bagozzi, 1981). For indicator reliability, we ensured that every item loading exceeded 0.71 and excluded items with loadings below that threshold (Carmines and Zeller, 1979). We ensured construct reliability by assessing the average variance extracted (AVE) and composite reliability (CR) and verifying that they surpassed the recommended thresholds of 0.50 and 0.70 (Fornell and Larcker, 1981) (see Table 9 in the Appendix). Lastly, we verified discriminant validity as the AVE square root values were found to be higher than the correlations of other constructs, and the correlation matrices revealed that all indicator correlations are higher with the intended construct than with the items of other constructs (Henseler et al., 2015). Additionally, the Heterotrait-monotrait ratio (HTMT) of the digital mindset indicates sufficient discriminance from other IT-specific traits, such as PIIT (0.713 MS Powerpoint; 0.617 smartphones) and IT mindfulness (0.558 MS Powerpoint; 0.348 smartphones). Detailed validity test reports regarding discriminant validity for both samples can be found in Table 10 to Table 13 in the Appendix.

5 RESULTS

Table 3 to Table 7 below summarize the test results (path coefficients and R^2s) of our model analysis:

Table 3 shows the results for the full model, Table 4 provides the information about a contrasting direct model excluding all mediating variables, Table 5 presents the sole effects of the control variables for reference, and Table 6 the indirect effects and confidence intervals. The standardized roots mean square residual (SRMR) indicates an acceptable model fit below .08 for both samples (.043 MS PowerPoint; .053 smartphone). Our results of the mediated model (see Table 3) indicate that all the hypothesized effects on the original UTAUT predictors can be supported in both samples: The digital mindset has a positive effect on performance expectancy (H1a supported; $f^2_{PowerPoint}$= 0.259; $f^2_{Smartphone}$= 0.045), perceived effort expectancy (H1b supported; $f^2_{PowerPoint}$= 0.087; $f^2_{Smartphone}$= 0.067), perceived social influence (H1c supported; $f^2_{PowerPoint}$= 0.168; $f^2_{Smartphone}$= 0.032), and facilitating conditions (H1d supported; $f^2_{PowerPoint}$= 0.027; $f^2_{Smartphone}$= 0.053). Additionally, the digital mindset positively affects PIIT (H2a supported; $f^2_{PowerPoint}$= 0.743; $f^2_{Smartphone}$= 0.425) and IT mindfulness (H2b supported; $f^2_{PowerPoint}$= 0.352; $f^2_{Smartphone}$= 0.087), which serve as additional UTAUT predictors in our model. Further, the digital mindset does not affect intention to explore for both samples (H3 rejected). Regarding the actual use behavior, the digital mindset does not directly affect ASU in the full model in both samples. Hence, H4 is rejected.

Table 3. Results for the mediated model (standardized ß; *: p < 0.05; **: p < 0.01 ***: p< 0.001); IV: Independent Variable; DV: Dependent Variable; ASU: Adaptive System Use

Mediated Model: MS PowerPoint Sample / Smartphone Sample								
IVs: \ DV:	**PE**	**EE**	**SI**	**FC**	**PIIT**	**ITM**	**BIX**	**ASU**
Digital Mindset (DM)	**0.472***/ 0.209***	**0.262***/ 0.251****	**0.387***/ 0.224****	**0.160*** / 0.179	**0.658***/ 0.549*****	**0.524***/ 0.285*****	0.127 / 0.130	0.150 / 0.070
Performance Expectancy (PE)	-						**0.336** / 0.355*****	-
Effort Expectancy (EE)							0.006 / 0.006	
Social Influence (SI)							**0.176*** / 0.004	
Facilitating Conditions (FC)							-	0.009 / 0.010
Personal Innovativeness in IT (PIIT)							0.034 / **0.307*****	0.137 / -0.019
IT Mindfulness (ITM)							**0.284***/ 0.186***	**0.188*** / -0.012
Behavioral Intention to Explore (BIX)							-	**0.250** / 0.360****
Controls: Age	0.089 / 0.085	**-0.264**** / -0.050	0.088 / 0.041	**-0.151*** / 0.118	0.029 / **0.225****	0.070 / 0.089	0.042 / -0.051	**-0.190****/ 0.018
Controls: Gender	0.014 / 0.139	0.018 / 0.003	-0.016 / -0.023	-0.194 / 0.309	-0.202 / -0.102	**0.320*** / -0.077	-0.020 / 0.028	-0.156 / -0.012
Controls: Education	0.032 / -0.074	0.130 / -0.110	0.113 / -0.016	**0.168*** / -0.024	-0.017 / -0.021	-0.047 / -0.058	-0.092 / **-0.127***	-0.023 / 0.016
Controls: Experience	-0.037	**0.319*****	0.085	**0.245*****	0.095	-0.091	0.026	-0.100
Controls: Voluntariness	-0.100 / -0.131	0.142 / 0.088	-0.116 / -0.043	0.164* / -0.061	0.052 / -0.107	0.027 / 0.080	-0.063 / 0.004	-0.005 / -0.069
R^2	0.208 / 0.066	0.293 / 0.091	0.187 / 0.034	0.174 / 0.078	0.448 / 0.323	0.301 / 0.093	0.574 / 0.507	0.416 / 0.152
ΔR^2 compared to controls-only model	0.198 / 0.042	0.057 / 0.061	0.159 / 0.031	0.018 / 0.048	0.357 / 0.288	0.261 / 0.078	0.553 / 0.472	0.331 / 0.142

To investigate the mediating effects, we analyzed the significance of specific indirect effects via bootstrapping (see Table 6) and used the approach of (Zhao et al., 2010) to determine the type of mediation (based on path coefficients in Table 3 and Table 4). The results indicate no indirect effects through PIIT of the digital mindset on ASU in the MS PowerPoint sample but significant fully mediated effects through IT mindfulness (0.107) and IT mindfulness and intention to explore (0.037). In the smartphone sample, we could observe significant indirect effects through PIIT and intention to explore (0.061) but not through IT mindfulness or PIIT on ASU. Therefore, we can partially support H5 for the smartphone but not the MS PowerPoint sample. H6 can be partially supported for the MS PowerPoint sample but not the smartphone sample. However, the results of the multi-group analysis showed that the differences regarding H5 were significant, while the differences regarding H6 were insignificant (see Table 7).

Table 4. Results for the direct model (standardized ß; **: p < 0.01; ***: p< 0.001); IV: Independent Variable; DV: Dependent Variable

Direct Model: MS PowerPoint Sample / Smartphone Sample			
IVs: \ DV:		**Behavioral Intention to Explore (BIX)**	**Adaptive System Use (ASU)**
Digital Mindset		**0.534*** / 0.435*** **	**0.278*** /** 0.065
Controls	Age	0.113 / 0.071	**-0.182** / 0.015**
	Gender	0.072 / 0 .034	-0.130 / -0.005
	Education	-0.074 / **-0.173***	-0.028 / 0.015
	Experience	0.006	-0.105
	Voluntariness	-0.104 / -0.061	0.017 / -0.069
R^2		0.280 / 0.217	0.381 / 0.152
ΔR^2 compared to controls-only model		0.259 / 0.182	0.296 / 0.142

Table 5. Results for control variables (standardized ß; *: p < 0.05; **: p < 0.01 ***: p< 0.001) IV: Independent Variable; DV: Dependent Variable; PE: Performance Expectancy; EE: Effort Expectancy; SI: Social Influence; FC: Facilitating Conditions; PIIT: Personal Innovativeness in IT; ITM: IT Mindfulness; BIX: Intention to Explore; ASU: Adaptive System Use

Controls Only: MS PowerPoint Sample / Smartphone Sample								
IVs: \ DV:	**PE**	**EE**	**SI**	**FC**	**PIIT**	**ITM**	**BIX**	**ASU**
Age	-0.030 / 0.050	**-0.325 / -0.091**	-0.002 / 0.012	**-0.196** / 0.081**	-0.120 / 0.156*	-0.017 / 0.043	0.001/ -0.085	**-0.241***/ 0.001**
Gender	-0.164 / 0.113	-0.029 / -0.028	-0.063 / -0.047	-0.239 / 0.280	-0.326* / -0.163	0.261 / -0.112	-0.003 / -0.024	-0.169 / -0.016
Education	-0.033 / -0.074	0.105 / -0.110	0.070 / -0.017	0.159 / -0.011	-0.082 / -0.030	-0.099 / -0.065	-0.128 / -0.122*	-0.102 / 0.019
Experience	0.004	**0.333*** **	0.134	**0.237** **	0.196*	-0.003	0.087	-0.032
Voluntariness	-0.044 / -0.133	0.187* / 0.086	-0.049 / -0.043	**0.200* /** -0.065	0.137 / -0.109	0.098 / 0.076	-0.032 / 0.010	0.042 / -0.066
R^2	0.010 / 0.024	0.236 / 0.030	0.028 / 0.003	0.156 / 0.030	0.091 / 0.035	0.040 / 0.015	0.021/ 0.035	0.085 / 0.010

Table 6. Indirect effects and confidence intervals (*: p <0.05) MSP: MS PowerPoint sample; SMA: Smartphone sample; DM: Digital Mindset; PIIT: Personal Innovativeness in IT; BIX: Behavioral Intention to Explore; ITM: IT Mindfulness; ASU: Adaptive System Use

Indirect Path	**Effects**		**95% Confidence Intervals of the Indirect Effects**	
	MSP	SMA	MSP	SMA
DM → PIIT → ASU	0.072	-0.009	[-0.081, 0.206]	[-0.134, 0.099]
DM → PIIT → BIX →ASU	0.006	**0.058***	[-0.020, 0.043]	[0.014, 0.116]
DM → ITM → ASU	**0.107***	-0.009	[0.025, 0.194]	[-0.058, 0.071]
DM → ITM → BIX →ASU	**0.037***	0.019	[0.008, 0.079]	[0.004, 0.050]

Finally, our results indicate that not all of the 'inner' UTAUT relationships are significant in our data: perceived social influence showed to have significant positive effects on the intention to explore in the context of MS Powerpoint but not in the context of smartphones; PIIT has a positive influence on intention to explore in the context of smartphones but not in the context of MS Powerpoint; IT mindfulness has a positive influence on intention to explore in both contexts and directly affects ASU positively in the context of MS Powerpoint but not smartphones. Other than that, no significant effects of effort expectancy on intention to explore could be found; also, no other significant effects of perceived facilitating conditions, PIIT, and IT mindfulness on ASU could be found. The same results would be found when the model was reduced to UTAUT variables only, both with and without control variables.

Table 7 provides an overview of all tested hypotheses. The right column presents the differences in path coefficients from the multi-group analysis.

Table 7. Overview of all tested hypotheses; DM: Digital Mindset; PE: Performance Expectancy; EE: Effort Expectancy; SI: Social Influence; FC: Facilitating Conditions; PIIT: Personal Innovativeness in IT; ITM: IT Mindfulness; BIX: Behavioral Intention to Explore; ASU: Adaptive System Use; MSP: MS PowerPoint Sample; SMA: Smartphone Sample

Hypotheses	MS PowerPoint Sample	Smartphone Sample	Difference (MSP SMA)
H1a: DM → PE	✓	✓	**0.235***
H1b: DM → EE	✓	✓	0.094
H1c: DM → SI	✓	✓	0.211
H1d: DM → FC	✓	✓	0.041
H2a: DM → PIIT	✓	✓	**0.174***
H2b: DM → ITM	✓	✓	**0.231***
H3: DM → BIX	✗	✗	-0.026
H4: DM → ASU	✗	✗	0.103
H5: DM → PIIT → ASU	✗	✗	0.064
DM → PIIT → BIX → ASU	✗	✓	**-0.051***
H6: DM → ITM → ASU	✓	✗	0.060
DM → ITM → BIX → ASU	✓	✗	0.013
Established relationships of the UTAUT			
PE → BIX	✓	✓	-0.004
EE → BIX	✗	✗	-0.032
SI → BIX	✓	✗	0.158
FC → ASU	✗	✗	0.160
PIIT → BIX	✗	✓	**-0.252***
ITM → BIX	✓	✓	0.092
PIIT → ASU	✗	✗	0.086
ITM → ASU	✓	✗	0.071
BIX → ASU	✓	✓	-0.171

6 DISCUSSION

IS infusion behaviors are powerful source for firms to remain competitive and harness opportunities of digital technologies. Hence, it is essential to understand what determines such IS infusion behaviors of employees. We provide evidence that context-specific mindsets, classified as IT-specific traits that affect multiple behaviors, directly determine related technological beliefs, and indirectly determine IS infusion behavior through narrower IT-specific traits.

Our analysis revealed that employees with higher digital mindset levels expect higher performance benefits of using technologies innovatively in their working environment, expect fewer own efforts associated with IS infusion behaviors, perceive a higher impact of relevant persons on their IS infusion behaviors, and estimate higher provisions of organizational or technical support for IS infusion behaviors. As these impacts are consistent in both narrow and broad IT contexts, we infer that employees with generative, combinatorial, disruptive, and risk-affine thinking perceive larger amounts of potential problem-solution pairs of digital technologies. Hence, employees perceive opportunities regarding how those technologies themselves, other people's usages of those technologies, or additional existing technical or organizational resources can boost one's performance and reduce efforts. Although those beliefs are affected in the context of narrow and broad IT, these effects are considerably stronger for narrow IT than broad IT, as indicated by the discrepancies in effect sizes and explained variances. This distinction appears plausible due to the likelihood that the potential perceived problem-solution pairs, which contribute to a more accurate evaluation of performance or effort-related advantages, may be influenced to a greater extent by participants other than the focal user, as opposed to within a narrow

IT context. In the case of narrow IT, users directly associate new feature combinations or usage options themselves, leading them to continuously update their beliefs about (potentials of) the technology. By contrast, in broader IT contexts, other participants may provide these options, for example, third-party smartphone application providers. As a result, the effect of the user's digital mindset in explaining these expectations is smaller, and the effect of other variables is larger.

Besides these effects of the DM on the original UTAUT predictors, our results indicate that employees with higher levels of a digital mindset show stronger tendencies to try out new IT (i.e., PIIT) and stronger tendencies for recognizing, understanding, and exploring different capabilities of IT and their effects in different contexts, respectively possess higher levels of IT mindfulness. These effects are also significantly stronger for narrow IT than for broad IT, especially in the case of IT mindfulness. This can be explained by the situational variance of IT mindfulness, as the nature of the different work tasks of broad IT could determine much more strongly whether mental presence is required when using IT for work-related tasks (Thatcher et al., 2018). For example, cutting and editing photos and videos using a smartphone might require a stronger presence and awareness of different features than participating in a video call. That is, choice and possible features used vary much more with broad IT, which also explains the variance in IT mindfulness more than the digital mindset. This assumption may also be supported by the lower discriminant effects on PIIT, which exerts less situational variance (Agarwal and Prasad, 1998; Davis and Yi, 2012). In conclusion, our results show that individuals with high digital mindset levels are more influenced by other people's IS infusion behaviors, perceive more technical or organizational support for IS infusion behaviors and expect higher performance boosts and effort reductions through IS infusion behaviors than individuals with a low digital mindset. Further, they are inclined to use IT mindfully and generally inclined to try out new IT and its features.

In terms of the effects on behavioral intention to explore and actual IS infusion behavior, our results demonstrate no significant direct effects of the digital mindset on intentions to explore features. Specifically, perceiving generative, combinatorial, or disruptive opportunities of digital technologies and evaluating them as feasible and desirable positively influence individuals' intention to explore these opportunities. Furthermore, our results indicate no direct effects of the digital mindset on IS infusion behavior (i.e., ASU). Instead, they reveal divergent indirect effects through other IT-specific traits. In the context of narrow IT usage, higher digital mindset levels lead to higher mental presence during IT feature usage, reflecting potential opportunities (i.e., IT mindfulness). This, in turn, leads to higher intentions to explore features and ultimately indirectly leads individuals to substitute, repurpose, combine, or try out new IT features (i.e., ASU). By contrast, in the context of broad IT usage, higher digital mindset levels have indirect positive effects through PIIT on the intention to explore and IS infusion behavior (i.e., ASU). The main explanation for these indirect effects may lie in the varying situational variance of the mediating traits mentioned above and the corresponding usage opportunities of the selected technology scopes. Broad IT offers a higher variance of potential uses, and the effects of IT mindfulness on usage behavior are highly dependent on the technology used and, in the case of smartphones, the specific applications or functions utilized. Therefore, the effects of IT mindfulness, as indicated by the differences, might not apply and indirect effects through this trait might be absent. On the other hand, as the effects of PIIT are considered more stable across different technologies, it has higher direct effects and serves as an intermediary in the context of broad IT. For narrow IT, where there is less situational variance in the possible uses of IT, IT mindfulness may have more effects and, as a dynamic IT-specific trait, exert the greatest influence on behavior, thus mediating the effects of the digital mindset. This explanation, based on the hierarchical trait arrangement (Davis and Yi, 2012), is supported by a post-hoc analysis: When we removed other specific technology beliefs and IT mindfulness from the model, the indirect effects of the digital mindset through PIIT and BIX on ASU became significant in the context of narrow IT. This indicates that individuals with a high digital mindset use technology features more innovatively than those with a low digital mindset, depending on the type of technology, through developing higher PIIT or IT mindfulness.

We also received some unexpected non-significant results regarding the established UTAUT relationships. The perceived ease of use (effort expectancy) showed no significant influence on the intention of individuals to explore, and organizational and technical support (facilitating conditions) showed no significant effects on ASU in either sample. One explanation might be that the employees are well-trained in using the technologies, given the context of daily work-related use. The expected effort in using new features might play a subordinate role. For example, post-hoc analyses revealed that in the context of narrow IT, potential performance expectations take precedence over effort expectancy since the effects of effort expectancy become significant when performance expectations are removed from the model. However, these effects do not appear in the context of smartphones, possibly due to the heightened experience with broad and ubiquitous IT in the private context. The lack of effects from facilitating conditions can be attributed to the innovative use of features within systems rather than the entire system itself, which rarely requires externally provided infrastructure (such as interfaces for combining different systems or structures), as innovative use occurs in isolation within the system. Therefore, perceived facilitating conditions have a smaller influence on whether individuals use the features of a system innovatively. Additionally, PIIT was found to have no significant effects on BIX in the context of narrow IT but showed significant positive effects in the context of broad IT. This discrepancy across both samples was statistically significant. That is, individuals who generally possess stronger tendencies to try and explore IT features also consciously intend to explore new IT features of broad IT systems. However, they may not necessarily express the same intention when using narrow IT systems primarily designed for specific purposes. These differing effects can be explained by the fact that multiple purposes of broad IT systems are well-known and commonly accepted by users from the outset (Carter et al., 2020a). In the context of narrow IT, on the other hand, the willingness to explore different uses or features may be hindered as there are fewer references and established opportunities for how the software can be used. With fewer opportunities, exploring features of narrow IT is associated with higher uncertainty, leading to lower intentions to explore features despite a generally higher PIIT. In addition, our findings have demonstrated that there is a noticeable absence of significant residual direct effects attributable to ITM or PIIT on ASU. These outcomes align with expectations based on the theory of planned behavior (Ajzen, 1985) and their explanation can be attributed to the mediating mechanisms exerted by BIX (see Table 15 in the Appendix).

6.1 Theoretical Implications

Overall, our results contribute to the existent literature on IS infusion behaviors and IT-specific traits as follows:

IT-specific traits not only influence the exploration of features but also indirectly impact how individuals use system features. Previous studies have primarily examined IT-specific traits and IS infusion behaviors by focusing on a single trait, using system-level proxies for specific types of technology, or analyzing the behavior of trying new features (Singletary et al., 2002; Thatcher et al., 2018). These findings suggest that IT-specific traits directly influence individuals' behavior of trying new features. Consistent with these findings, our results demonstrate that IT-specific traits influence *whether* individuals will try *new* system features and shape *how* they use and adapt *existing* features. Furthermore, we expand upon these findings by showing that when IS infusion is comprehensively conceptualized to include behaviors beyond mere feature exploration, the effects are rather indirect. Additionally, we find that these trait-driven effects are generally more pronounced for narrow IT than for broad IT. Therefore, our study contributes to the literature by demonstrating that investigating IT-specific traits and their impact on IS infusion behavior at the feature level and across different technologies provides a more nuanced understanding of how individual predispositions influence IS infusion behaviors.

The technology scope determines the mediating effects of IT-specific traits of higher-order traits.

The existing literature has already demonstrated that higher-level traits indirectly influence individuals' behavior through lower-level traits due to a hierarchical arrangement (Davis and Yi, 2012). These findings assume the general validity of this hierarchical arrangement, indicating that regardless of the technology used, dynamic IT-specific traits are the primary mediators due to their highest direct effects on behavior (Maier et al., 2019). In line with these findings, our study further supports the hierarchical arrangement of traits, wherein the more broadly conceptualized digital mindset exerts its influence indirectly through PIIT or IT mindfulness. Additionally, our results reveal that the mediation of these effects is contingent upon the specific technology employed, with stable or dynamic traits serving as mediators. Thus, the effects of behaviorally non-specific traits, such as mindsets, are transmitted through dynamic IT-specific traits when narrow IT is employed. At the same time, they are mediated through stable IT-specific traits when broad IT is utilized. As a result, our study contributes to the field by suggesting that dynamic traits should be included as mediators when investigating behaviorally non-specific traits in the context of narrow IT. In contrast, investigations of broad IT should incorporate stable IT-specific traits to better explain the target behavior.

Mindsets as context-specific but more broadly conceptualized traits directly and positively influence narrow IT-specific traits and technology-specific expectations.

Previous studies in psychology and economics have shown that mindsets related to one's abilities (e.g., growth mindset) or specific contexts (e.g., entrepreneurial mindset) influence underlying individual tendencies such as anxiety or self-efficacy (Al-Ghazali et al., 2022; Samuel and Warner, 2021; Smith and Capuzzi, 2019). At the same time, practitioners emphasized the relevance of employees' digital mindset (Leonardi and Neeley, 2022), and early qualitative studies propose that a digital mindset affects how individuals perceive affordances of digital technologies (Hildebrandt and Beimborn, 2023; Tour, 2015). Building upon this knowledge, we demonstrate that established ways of thinking about technologies influence individual's inclinations and expectations towards IT and its use, with the strength of their influence varying depending on the technology context. Additionally, we link to empirical research that established a correlation between digital mindset and IT mindfulness, particularly in the context of developing a measurement model for the digital mindset. While (Hildebrandt and Beimborn, forthcoming) concentrates exclusively on the measurement model, validity, and discriminance of the digital mindset, we delve deeper into the implications and effects of the digital mindset on other traits and behaviors. Consequently, when considering context-specific traits and expectations (i.e., original UTAUT predictors), mindsets should generally be considered. They represent a more changeable higher-order level than generic traits, such as the Big Five personality traits, providing a more flexible perspective than studying changes in individuals' general personality. These effects are particularly substantial in the context of narrow IT usage and are much stronger compared to usage contexts of broad IT. Thus, our contribution lies in identifying mindsets as an important additional layer above narrow IT-specific traits, particularly in the context of narrow IT use, as they offer a relevant and meaningful explanatory contribution to understanding individual inclinations and expectations in these contexts.

Context-specific mindsets indirectly influence IS infusion behaviors through underlying narrow traits.

Prior studies have shed light on the direct or indirect positive effects of employees' context-specific mindsets on higher-level organizational performance or behavior (Al-Ghazali et al., 2022; Eilers et al., 2022; Nummela et al., 2004). We provide empirical evidence supporting the relevance of the digital mindset by expanding upon these findings and linking to previous pinpoints to the relevance of the digital mindset for individual behavior and organizational performance in the digital context (El Sawy et al., 2016; Leonardi and Neeley, 2022). We demonstrate that depending on the technology used, an individual's digital mindset influences narrow IT-specific traits, which in turn drive his or her intention to explore system features. Consequently, this indirect influence affects the selection and usage of features of IT. Additionally, these fully and partially mediated effects align with previous findings regarding the hierarchical nature of traits and support the position of context-specific mindsets as a higher-level trait category compared to narrow IT-specific traits. Thus, we highlight the insufficiency of drawing conclusions about individuals' IS infusion behaviors solely based on widely known IT-specific traits, as context-specific mindsets contribute significantly to explaining such usage behaviors.

6.2 Managerial Implications

Our results also hold valuable insights for practitioners. The digital mindset is an important catalyst for other technology and innovation-related beliefs and inclinations toward IT-specific behaviors. Managers can use this insight to assemble teams in innovation-intensive or -dependent areas efficiently. For example, different digital mindset thinking patterns could be assessed during recruiting or internal team composition, thereby promoting innovation within the team when using IT. In addition, managers can use these insights to justify training measures to support the development of their people's digital mindset. This can include, for example, regular knowledge transfer and digitally focused design thinking workshops to anchor the characteristics of digital technologies and their possibilities in daily thinking. Finally, managers can use these insights to assess how individuals perceive new or planned rollouts of innovations or updates in IT systems. In particular, when introducing new features to IT systems already in frequent and recurring use, it is important to justify the expected productivity enhancement, as this is the most crucial factor for the future effective use of these features.

6.3 Limitations and Future Research

Like any empirical study, our work has some limitations associated with sampling and analysis methods. First, we used crowdsourced data, which comes with the risk of professional workers who, driven by profit motives, distort the data. We have tried to counteract this as much as possible by following guidelines and subsequent filtering methods. Second, in analyzing our UTAUT-supported model, we did not add the control variables as moderators as considered in the original model because of the already high model complexity. Future research should use the original UTAUT model with more extensive data samples to overcome these issues. Moreover, we employed only a simplified version of the original conceptualization of the digital mindset. Although creative cognition was selected due to its close association with innovative behaviors, other cognitive aspects (e.g., platform-oriented thinking or exponential thinking) may also influence innovative behaviors or other IT-specific traits. This limitation also excludes broader traits, such as the Big Five personality traits. To comprehensively classify context-specific mindsets within the existing hierarchy of traits, future studies should thoroughly investigate the relationships between broad traits, mindsets, and IT-specific traits.

Besides the previously indicated hints for future research, subsequent research should dive deeper into the relationship between specific digital mindset thinking patterns and ASU dimensions. This could lead to further insights into *how* exactly the digital mindset affects specific behavior types. A respective follow-up study could generate additional information about non-linear influences with the help of additional evaluations, such as fuzzy set qualitative comparative analysis (fsQCA). For example, by examining possible configurations and specific behaviors, stereotypes of the digital mindset could be elicited, providing interesting information for both IS infusion behaviors and trait theory. Lastly, follow-up studies could compare narrow or broad IT that have been recently adopted, replicating comparing different narrow and broad ITs to create an extensive overview of trait impacts and their situational variance, including time since adoption as an additional variable.

6.4 Conclusion

As IS infusion behaviors of employees are essential for an organization to leverage competitive advantage from IT investments, it is crucial to understand what drives employees to conduct such behaviors. This study reveals that the digital mindset, a malleable IT-specific trait, is an indirect precursor to employees' infusion behaviors of narrow and broad IT. It also directly influences other IT-specific traits, such as PIIT and IT mindfulness, and the predictors of the UTAUT in the context of IS infusion. Consequently, we can effectively address our research question and demonstrate that the digital mindset plays a significant role in IS infusion behaviors by significantly influencing preceding traits and technological beliefs.

APPENDIX

Table 8. Related Work on Antecedents of IS Infusion Behavior

Independent variable	Dependent variable	Antecedent category	Relevant findings	Authors
Top management support	Innovate with IT	Organizational	Management support positively affects innovating with IT.	(Wang et al., 2008)
Project management quality		Organizational	Quality of project management processes positively affects innovating with IT.	
User empowerment	Emergent use	Organizational	Employee empowerment positively affects emergent use.	(Kim and Gupta, 2014)
Information culture	IS infusion	Organizational	Information culture positively affects infusion of data warehouses.	(Ramamurthy et al., 2008)
Organizational support			Organizational support positively influences infusion of data warehouses.	
Facilitating conditions	Adaptive system use	Organizational	Perceived provision of supporting IS use resources positively affect adaptive system use.	(Sun, 2012)
Social network ties	Deep structure usage	Organizational	Network advices foster deep structure usage.	(Sykes and Venkatesh, 2017)
Resources (time, technological resources, IT support personnel, knowledge)	Innovating with IT	Organizational	Different types of IS slack resources affect innovating with IT.	(Rahrovani and Pinsonneault, 2014)
Innovation climate	System exploration	Organizational	Moderates effects of job autonomy on system exploration; Innovation climate has no direct effects on system exploration.	(Liang et al., 2015)
Task complexity	Effective use of IT	Task	Dependencies between system and taks complexity constrains user in their effective system use.	(Lauterbach et al., 2020)
Task variety	System exploration	Task	Increasing task variety positive affects system exploration.	(Liang et al., 2015)
Autonomy			Autonomy positively affects IS infusion.	
	Trying to innovate with IT	Task	Autonomy increases trying to innovate with IT for men but not for women.	(Ahuja and Thatcher, 2005)
Overload			Qualitative task overload increases trying to innovate with IT for men; Quantitative overload reduces trying to innovate with IT.	
System integration	Extended usage/ exploratory usage	System	System integration positively affects explorative use but not extended usage.	(Saeed and Abdinnour-Helm, 2008)
Information quality			Information quality positively affets extended usage but not exploratory usage.	
System complexity	IS infusion	System	Complexity of data warehouses positively affects their infusion.	(Ramamurthy et al., 2008)
System compatibility			Compatibility of data warehouses positively affect their infusion.	
Trialability	Infusion	System	The degree to which it is possible to try features of a system positively affects infusion of the system.	(Hester, 2011)
IT identity	Intention to explore new features	Individual	IT identity positvely affect the intention to explore features for narrow and broad IT.	(Carter et al., 2020b)
	Exploratory usage		IT identity positively affects the exploratory usage of narrow and broad IT features.	
	IS infusion		IT identity positively affects IS infusion.	(Hassandoust and Techatassanasoontorn, 2022)
	Emergent use		IT identity positively affects emergent use.	
	Extended use		IT identity positively affects extended use.	

Independent variable	Dependent variable	Antecedent category	Relevant findings	Authors
	Integrative use		IT identity positively affects integrative use.	
Motivation	Innovative use	Individual	Intrinsic motivations to know and to experience stimulations positively affect innovative use	(Li et al., 2013)
IT knowledge	Innovative use of IT	Individual	Prior IT knowledge indirectly affects innovative use of IT through by assimiliating and recognizing new knowledge.	(Huang et al., 2018)
Skill variety	Infusion effectiveness	Individual	An individuals variety of skills positively affects the infusion of manufacturing technologies.	(Pao-Long and Lung, 2002)
Perceived ease of use	Extended use	Individual	Perceived ease of use positively affects extended use.	(Hsieh and Wang, 2007)
	Intention to explore		Perceived ease of use positively affects individuals intention to explore new features of narrow and broad IT.	(Carter et al., 2020b)
Perceived usefulness	Extended use	Individual	Perceived usefulness positively affects extended use.	(Hsieh and Wang, 2007)
	Innovate with IT		Perceived usefulness of ERP and business intelligence systems affect their infusion.	(Wang et al., 2013)
	Intention to explore		Perceived usefulness positively affects individuals intention to explore new features of narrow and broad IT.	(Carter et al., 2020b)
Satisfaction	Innovate with IT	Individual	Satisfaction with ERP and business intelligence systems positively affects their innovative use.	(Wang et al., 2013)
Perceived voluntariness	Infusion	Individual	Perceived voluntariness positively affects IS infusion.	(Hester, 2011)
IS use stress	Innovative use	Individual	Challenge IS use appraisal positively affects innovative use and positive mediates challenge IS use stressors.	(Maier et al., 2021)
Attitude	Intention to ruse code unethically	Individual	Developers attitude toward unethical Internet-accessible code reuse positively affects their intention to engage in such behavior.	(Sojer et al., 2014)
Personal innovativeness with IT (PIIT)	Innovative use	Individual	PIIT moderates the effects of motivational antecedents on innovative IT use.	(Li et al., 2013)
	Infusion		PIIT moderates the effects of technological factors on infusion.	(Hester, 2011)
	IS Infusion		PIIT moderates the effects of IT identity on IS infusion behaviors.	(Hassandoust and Techatassanasoontorn, 2022)
	Emergent use			
	Extended use			
	Integrative use			
	Innovate with IT		PIIT moderates the impact of perceived usefulness and satisfaction on innovate with IT, dependent on the technology.	(Wang et al., 2013)
	Innovative Use of IT		PIIT positively affects innovative use of IT.	(Sun et al., 2019)
	Adaptive system use		PIIT moderates the effects of triggers on adaptive system use.	(Sun, 2012)
	Trying to innovate		PIIT positively affects trying to innovate and mediates the effects of age.	(Tams and Dulipovici, 2022)
Computer self-efficacy (CSE)	Innovate with IT	Individual	CSE moderates the effects of perceived usefulness and satisfaction on innovate with IT.	(Wang et al., 2013)
	System exploration		CSE for a specific system positively affects system exploration.	(Liang et al., 2015)
	Extended system use		CSE for a specific system positively affects extended use of a system.	
	Trying to innovate with IT		Creative IT self-efficacy positively influence trying to innovate with IT and mediates effects of age.	(Tams and Dulipovici, 2022)
	Deep structure usage		Spreadsheet self-efficacy positively influences deep structure usage for Microsoft Excel.	(Thatcher et al., 2018)

Independent variable	Dependent variable	Antecedent category	Relevant findings	Authors
	Trying to innovate		Spreadsheet self-efficacy positively influences trying to innovate with Microsoft Excel.	
IT mindfulness	Deep structure usage	Individual	IT mindfulness positively affects deep structure usage of Microsoft Excel.	
	Trying to innovate		IT mindfulness positively influences trying to innovate with Microsoft Excel.	

Table 9. Measurement Model Validity for Both Samples of MS Powerpoint/Smartphones

Construct	Cronbach s α	Mean	Standard deviation	Composite reliability	AVE
Generative thinking	0.907 / 0.872	4.99 / 5.27	1.36 / 1.18	0.913 / 0.880	0.782 / 0.723
Combinatorial thinking	0.902 / 0.914	4.98 / 5.13	1.23 / 1.21	0.909 / 0.920	0.775 / 0.796
Disruptive thinking	0.904 / 0.874	4.90 / 5.01	1.45 / 1.21	0.906 / 0.888	0.839 / 0.798
Risk-affine thinking	0.891 / 0.833	3.76 / 3.98	1.52 / 0.35	0.893 / 0.834	0.753 / 0.666
Performance expectancy	0.948 / 0.957	5.26 / 5.70	1.28 / 1.24	0.951 / 0.959	0.866 / 0.886
Effort expectancy	0.921 / 0.938	5.92 / 6.41	0.92 / 0.75	0.937 / 0.944	0.806 / 0.844
Social influence	0.965 / 0.947	4.87 / 4.70	1.37 / 1.29	0.966 / 0.949	0.935 / 0.903
Facilitating conditions	0.828 / 0.844	6.29 / 6.17	0.74 / 0.90	0.875 / 0.874	0.663 / 0.757
Personal innovativeness in IT	0.879 / 0.856	5.25 / 5.47	1.31 / 1.17	0.887 / 0.860	0.805 / 0.777
IT mindfulness	0.889 / 0.882	5.40 / 5.56	1.25 / 1.26	0.924 / 0.936	0.751 / 0.734
Intention to explore	0.926 / 0.923	5.23 / 5.51	1.35 / 1.13	0.931 / 0.924	0.871 / 0.867
Trying new features	0.840 / 0.883	5.74 / 5.56	1.12 / 1.47	0.845 / 0.888	0.676 / 0.744
Feature substituting	0.820 / 0.881	4.83 / 4.85	1.44 / 1.73	0.834 / 0.881	0.736 / 0.808
Feature combining	0.819 / 0.935	4.98 / 4.92	1.47 / 1.67	0.822 / 0.936	0.736 / 0.885
Feature repurposing	0.931 / 0.935	3.02 / 3.20	1.76 / 1.87	0.932 / 0.936	0.744 / 0.756

Table 10. Loadings and Cross Loadings for the Smartphone Sample; Gen: Generative Thinking; Comb: Combinatorial Thinking; Disr: Disruptive Thinking; Risk: Risk-Affine Thinking; PE: Performance Expectancy; EE: Effort Expectancy; SI: Social Influence; FC: Facilitating Conditions; PIIT: Personal Innovativeness in IT; ITM: IT Mindfulness; ASU-FC: Feature Combining; ASU-FR: Feature Repurposing; ASU-FS: Feature Substituting; ASU-TR: Trying New Features

	Gen	Comb	Disr	Risk	PE	EE	SI	FC	PIIT	ITM	BIX	ASU-FC	ASU-FR	ASU-FS	ASU-TR
Gen1	**0.851**	0.431	0.460	0.258	0.105	0.212	0.028	0.142	0.212	0.261	0.232	0.064	0.110	0.163	0.089
Gen2	**0.831**	0.503	0.488	0.228	0.004	0.176	0.041	0.111	0.195	0.149	0.170	0.003	0.111	0.137	0.057
Gen3	**0.901**	0.552	0.611	0.273	0.141	0.170	0.166	0.122	0.374	0.185	0.293	0.067	0.189	0.161	0.077
Gen4	**0.816**	0.596	0.582	0.330	0.182	0.140	0.134	0.100	0.350	0.330	0.309	0.149	0.116	0.239	0.075
Comb1	0.598	**0.925**	0.565	0.246	0.259	0.251	0.245	0.283	0.436	0.206	0.372	0.153	0.249	0.354	0.188
Comb2	0.452	**0.892**	0.473	0.258	0.237	0.152	0.138	0.215	0.355	0.065	0.252	0.122	0.176	0.261	0.133
Comb3	0.547	**0.895**	0.511	0.289	0.231	0.119	0.163	0.220	0.373	0.164	0.295	0.132	0.106	0.266	0.145
Comb4	0.596	**0.855**	0.546	0.225	0.127	0.243	0.165	0.276	0.413	0.230	0.287	0.104	0.236	0.267	0.180
Disr2	0.599	0.568	**0.916**	0.312	0.240	0.254	0.175	0.269	0.375	0.225	0.445	0.147	0.235	0.334	0.209
Disr3	0.529	0.462	**0.861**	0.382	0.117	0.166	0.137	0.068	0.286	0.157	0.286	0.082	0.152	0.231	0.060
Disr4	0.572	0.545	**0.904**	0.344	0.246	0.249	0.163	0.285	0.338	0.196	0.416	0.143	0.180	0.322	0.261
Risk1	0.175	0.175	0.261	**0.810**	0.077	0.066	0.006	-0.087	0.271	0.078	0.212	0.123	0.279	0.149	0.059
Risk2	0.351	0.253	0.434	**0.800**	-0.042	0.184	0.085	-0.028	0.250	0.163	0.210	0.151	0.262	0.176	0.072
Risk3	0.204	0.229	0.239	**0.803**	0.058	0.059	0.001	-0.111	0.187	0.221	0.158	0.155	0.389	0.227	-0.031
Risk4	0.287	0.260	0.290	**0.846**	-0.094	0.069	-0.050	-0.095	0.295	0.210	0.200	0.160	0.268	0.185	0.017
PE1	0.139	0.239	0.197	-0.013	**0.922**	0.175	0.417	0.375	0.258	0.180	0.448	0.199	0.001	0.176	0.234
PE2	0.104	0.192	0.195	0.005	**0.937**	0.114	0.421	0.321	0.248	0.177	0.477	0.231	0.007	0.207	0.216
PE3	0.095	0.216	0.211	-0.025	**0.946**	0.160	0.385	0.378	0.242	0.155	0.498	0.253	-0.017	0.251	0.254
PE4	0.154	0.253	0.250	-0.001	**0.958**	0.192	0.433	0.395	0.268	0.197	0.506	0.278	-0.001	0.234	0.289
EE1	0.221	0.213	0.246	0.100	0.156	**0.917**	0.084	0.576	0.253	0.227	0.230	0.128	0.077	0.118	0.120
EE2	0.161	0.172	0.227	0.119	0.200	**0.905**	0.123	0.539	0.178	0.238	0.198	0.171	0.085	0.151	0.174
EE3	0.148	0.182	0.197	0.119	0.130	**0.928**	0.093	0.527	0.231	0.245	0.215	0.165	0.067	0.124	0.163
EE4	0.209	0.220	0.247	0.115	0.145	**0.925**	0.051	0.568	0.194	0.268	0.233	0.115	0.011	0.155	0.177
SI1	0.112	0.198	0.164	0.027	0.425	0.098	**0.949**	0.201	0.314	0.084	0.301	0.077	0.123	0.044	0.114
SI2	0.069	0.154	0.156	0.009	0.419	0.091	**0.957**	0.179	0.244	0.112	0.292	0.082	0.159	0.077	0.139
SI3	0.140	0.219	0.188	0.010	0.409	0.078	**0.945**	0.222	0.268	0.098	0.269	0.074	0.126	0.068	0.125
FC1	0.072	0.147	0.107	-0.175	0.285	0.523	0.149	**0.835**	0.149	0.158	0.206	0.070	-0.066	0.114	0.194
FC2	0.142	0.207	0.235	-0.059	0.349	0.557	0.218	**0.805**	0.284	0.206	0.247	0.221	-0.021	0.234	0.289
FC3	0.162	0.253	0.249	-0.047	0.315	0.470	0.104	**0.832**	0.232	0.188	0.296	0.156	0.057	0.194	0.233
FC4	0.053	0.275	0.134	-0.095	0.328	0.469	0.224	**0.861**	0.198	0.205	0.307	0.173	0.034	0.234	0.297
PIIT1	0.333	0.345	0.376	0.231	0.262	0.200	0.267	0.267	**0.862**	0.283	0.435	0.177	0.122	0.189	0.183
PIIT2	0.261	0.413	0.277	0.316	0.183	0.191	0.192	0.236	**0.867**	0.295	0.453	0.287	0.318	0.260	0.199
PIIT4	0.306	0.410	0.341	0.268	0.271	0.226	0.309	0.227	**0.914**	0.372	0.493	0.256	0.277	0.217	0.223
ITM1	0.232	0.150	0.249	0.278	0.170	0.225	0.103	0.178	0.383	**0.886**	0.465	0.322	0.272	0.243	0.205
ITM2	0.258	0.198	0.167	0.072	0.098	0.194	0.063	0.169	0.258	**0.848**	0.223	0.108	0.032	0.134	0.105
ITM3	0.271	0.160	0.213	0.210	0.102	0.251	-0.004	0.221	0.275	**0.873**	0.320	0.150	0.072	0.206	0.151
ITM4	0.183	0.156	0.074	0.082	0.270	0.240	0.190	0.243	0.280	**0.819**	0.350	0.073	0.090	0.144	0.089
BIX1	0.290	0.341	0.431	0.193	0.482	0.222	0.290	0.359	0.486	0.358	**0.932**	0.331	0.233	0.363	0.384
BIX2	0.267	0.302	0.382	0.209	0.517	0.225	0.287	0.285	0.503	0.368	**0.935**	0.384	0.230	0.373	0.384
BIX3	0.278	0.308	0.391	0.269	0.435	0.221	0.269	0.277	0.473	0.440	**0.926**	0.362	0.340	0.430	0.343
ASU-FC1	0.117	0.153	0.177	0.222	0.242	0.151	0.073	0.190	0.288	0.255	0.399	**0.934**	0.437	0.605	0.605
ASU-FC2	0.104	0.149	0.151	0.195	0.217	0.136	0.037	0.183	0.258	0.176	0.329	**0.932**	0.400	0.525	0.670
ASU-FC4	0.066	0.070	0.113	0.181	0.204	0.155	0.033	0.119	0.192	0.132	0.309	**0.907**	0.403	0.514	0.566
ASU-FR1	0.167	0.205	0.210	0.316	0.031	0.085	0.164	0.091	0.216	0.206	0.294	0.355	**0.905**	0.408	0.278
ASU-FR2	0.124	0.170	0.196	0.310	-0.060	0.066	0.126	0.004	0.258	0.129	0.223	0.336	**0.929**	0.389	0.323
ASU-FR3	0.090	0.190	0.160	0.343	-0.044	-0.043	0.108	-0.091	0.198	0.117	0.180	0.366	**0.832**	0.391	0.276
ASU-FR4	0.121	0.239	0.176	0.323	-0.003	0.060	0.196	0.025	0.272	0.144	0.239	0.356	**0.906**	0.396	0.279
ASU-FR5	0.158	0.143	0.218	0.293	0.049	0.087	0.130	0.000	0.242	0.194	0.299	0.458	**0.841**	0.480	0.375
ASU-FR6	0.153	0.181	0.143	0.311	0.013	0.073	0.014	0.049	0.250	0.043	0.261	0.438	**0.799**	0.407	0.272
ASU-FS1	0.194	0.310	0.314	0.231	0.184	0.096	0.049	0.164	0.230	0.188	0.381	0.516	0.456	**0.910**	0.532
ASU-FS2	0.182	0.276	0.264	0.144	0.247	0.117	0.069	0.250	0.199	0.176	0.386	0.552	0.409	**0.905**	0.565
ASU-FS3	0.184	0.286	0.320	0.236	0.193	0.190	0.060	0.258	0.254	0.238	0.360	0.523	0.413	**0.881**	0.546
ASU-TR1	0.152	0.202	0.228	0.034	0.210	0.220	0.077	0.358	0.191	0.172	0.339	0.608	0.238	0.562	**0.909**
ASU-TR2	0.029	0.156	0.088	0.078	0.201	-0.018	0.071	0.087	0.175	0.070	0.301	0.634	0.425	0.510	**0.762**
ASU-TR3	0.034	0.132	0.157	-0.002	0.280	0.125	0.202	0.257	0.230	0.156	0.412	0.609	0.289	0.499	**0.869**
ASU-TR4	0.078	0.137	0.209	0.025	0.223	0.245	0.106	0.364	0.196	0.186	0.320	0.601	0.260	0.530	**0.900**

Table 11. Loadings and Cross Loadings for the MS PowerPoint Sample; Gen: Generative Thinking; Comb: Combinatorial Thinking; Disr: Disruptive Thinking; Risk: Risk-Affine Thinking; PE: Performance Expectancy; EE: Effort Expectancy; SI: Social Influence; FC: Facilitating Conditions; PIIT: Personal Innovativeness in IT; ITM: IT Mindfulness; ASU-FC: Feature Combining; ASU-FR: Feature Repurposing; ASU-FS: Feature Substituting; ASU-TR: Trying New Features

	Gen	Comb	Disr	Risk	PE	EE	SI	FC	PIIT	ITM	BIX	ASU-FC	ASU-FR	ASU-FS	ASU-TR
Gen1	**0.877**	0.590	0.519	0.402	0.334	0.246	0.300	0.228	0.493	0.398	0.345	0.260	0.169	0.158	0.312
Gen2	**0.893**	0.602	0.484	0.439	0.258	0.234	0.266	0.163	0.423	0.383	0.335	0.200	0.218	0.212	0.279
Gen3	**0.887**	0.537	0.500	0.367	0.179	0.348	0.309	0.233	0.504	0.388	0.265	0.251	0.229	0.133	0.252
Gen4	**0.881**	0.614	0.651	0.417	0.361	0.391	0.361	0.273	0.638	0.460	0.420	0.392	0.344	0.320	0.373
Comb1	0.604	**0.921**	0.632	0.479	0.337	0.256	0.300	0.128	0.479	0.384	0.367	0.310	0.212	0.218	0.274
Comb2	0.542	**0.847**	0.469	0.363	0.267	0.198	0.207	0.167	0.339	0.214	0.316	0.184	0.154	0.150	0.217
Comb3	0.615	**0.926**	0.630	0.413	0.327	0.260	0.290	0.173	0.438	0.325	0.429	0.400	0.238	0.219	0.302
Comb4	0.573	**0.822**	0.630	0.328	0.340	0.377	0.207	0.218	0.521	0.452	0.410	0.391	0.174	0.259	0.351
Disr2	0.595	0.652	**0.929**	0.367	0.348	0.306	0.265	0.270	0.507	0.411	0.483	0.471	0.206	0.235	0.472
Disr3	0.519	0.557	**0.896**	0.353	0.364	0.305	0.267	0.241	0.485	0.393	0.402	0.440	0.245	0.217	0.349
Disr4	0.562	0.637	**0.923**	0.390	0.447	0.341	0.280	0.273	0.514	0.434	0.485	0.484	0.218	0.317	0.482
Risk1	0.418	0.427	0.376	**0.878**	0.302	0.100	0.205	0.071	0.391	0.324	0.273	0.265	0.276	0.216	0.229
Risk2	0.443	0.425	0.388	**0.875**	0.235	0.127	0.263	0.074	0.451	0.333	0.224	0.261	0.233	0.219	0.245
Risk3	0.393	0.376	0.316	**0.893**	0.288	0.118	0.273	0.023	0.403	0.254	0.264	0.237	0.278	0.223	0.161
Risk4	0.333	0.334	0.317	**0.825**	0.274	0.012	0.305	0.020	0.395	0.285	0.349	0.260	0.256	0.250	0.266
PE1	0.312	0.348	0.398	0.289	**0.932**	0.309	0.534	0.182	0.383	0.454	0.574	0.357	0.224	0.255	0.353
PE2	0.314	0.331	0.408	0.307	**0.937**	0.209	0.641	0.163	0.348	0.480	0.680	0.437	0.282	0.306	0.412
PE3	0.253	0.318	0.370	0.293	**0.918**	0.265	0.500	0.187	0.325	0.461	0.569	0.322	0.284	0.218	0.315
PE4	0.317	0.350	0.393	0.286	**0.936**	0.234	0.610	0.185	0.348	0.474	0.623	0.370	0.221	0.328	0.397
EE1	0.357	0.322	0.333	0.089	0.303	**0.877**	0.112	0.499	0.316	0.358	0.311	0.224	0.167	0.102	0.275
EE2	0.308	0.257	0.283	0.144	0.213	**0.908**	0.140	0.534	0.314	0.308	0.201	0.192	0.088	0.095	0.198
EE3	0.266	0.263	0.334	0.074	0.209	**0.886**	0.031	0.611	0.227	0.269	0.168	0.164	0.036	0.078	0.217
EE4	0.288	0.252	0.283	0.068	0.225	**0.918**	0.106	0.634	0.243	0.203	0.151	0.166	0.074	0.107	0.138
SI1	0.351	0.301	0.289	0.291	0.592	0.099	**0.977**	0.166	0.341	0.279	0.518	0.258	0.119	0.161	0.300
SI2	0.321	0.264	0.283	0.277	0.608	0.095	**0.963**	0.222	0.320	0.267	0.505	0.247	0.129	0.169	0.316
SI3	0.343	0.269	0.285	0.300	0.591	0.127	**0.961**	0.216	0.362	0.321	0.507	0.238	0.118	0.149	0.312
FC1	0.120	0.108	0.198	-0.036	0.091	0.512	0.085	**0.851**	0.113	0.108	0.071	0.077	-0.076	0.066	0.137
FC2	0.237	0.178	0.251	-0.032	0.085	0.601	0.136	**0.830**	0.130	0.149	0.096	0.046	-0.004	0.085	0.155
FC4	0.246	0.150	0.303	0.055	0.129	0.564	0.073	**0.863**	0.162	0.128	0.087	0.203	0.011	0.174	0.147
PIIT1	0.520	0.401	0.424	0.407	0.311	0.218	0.316	0.095	**0.904**	0.372	0.364	0.325	0.091	0.261	0.367
PIIT2	0.530	0.497	0.529	0.510	0.386	0.354	0.320	0.127	**0.889**	0.463	0.417	0.427	0.311	0.313	0.368
PIIT4	0.521	0.458	0.514	0.348	0.312	0.258	0.314	0.105	**0.899**	0.432	0.400	0.391	0.138	0.302	0.442
ITM1	0.428	0.330	0.396	0.293	0.437	0.357	0.246	0.220	0.405	**0.866**	0.481	0.361	0.242	0.344	0.351
ITM2	0.383	0.274	0.399	0.309	0.386	0.280	0.262	0.178	0.400	**0.829**	0.475	0.296	0.143	0.317	0.526
ITM3	0.433	0.400	0.422	0.334	0.469	0.223	0.261	0.042	0.489	**0.910**	0.543	0.412	0.235	0.388	0.502
ITM4	0.353	0.350	0.344	0.260	0.447	0.284	0.268	0.064	0.337	**0.860**	0.539	0.355	0.189	0.248	0.444
BIX1	0.313	0.385	0.411	0.269	0.595	0.205	0.453	0.116	0.368	0.488	**0.940**	0.420	0.198	0.295	0.450
BIX2	0.356	0.352	0.444	0.281	0.590	0.218	0.471	0.102	0.365	0.540	**0.935**	0.393	0.229	0.363	0.518
BIX3	0.409	0.466	0.534	0.329	0.655	0.251	0.544	0.139	0.487	0.607	**0.925**	0.511	0.259	0.364	0.468
ASU-FC1	0.330	0.363	0.536	0.242	0.405	0.215	0.303	0.100	0.425	0.385	0.442	**0.892**	0.367	0.457	0.540
ASU-FC2	0.264	0.315	0.442	0.296	0.345	0.149	0.177	0.125	0.377	0.360	0.453	**0.872**	0.321	0.436	0.507
ASU-FC4	0.166	0.242	0.278	0.195	0.191	0.229	0.043	0.043	0.287	0.211	0.204	**0.794**	0.320	0.309	0.254
ASU-FR1	0.233	0.210	0.217	0.228	0.298	0.098	0.117	-0.005	0.136	0.203	0.259	0.347	**0.903**	0.269	0.065
ASU-FR2	0.222	0.173	0.194	0.199	0.160	0.109	0.116	0.032	0.169	0.131	0.135	0.291	**0.865**	0.237	0.024
ASU-FR3	0.017	0.018	0.025	0.159	0.090	-0.004	0.057	-0.094	0.044	0.013	0.038	0.227	**0.731**	0.150	-0.098
ASU-FR4	0.104	0.096	0.109	0.153	0.130	0.083	0.001	-0.077	0.075	0.086	0.093	0.230	**0.846**	0.249	-0.081
ASU-FR5	0.322	0.246	0.286	0.354	0.276	0.132	0.170	-0.026	0.247	0.313	0.290	0.338	**0.926**	0.403	0.159
ASU-FR6	0.188	0.161	0.138	0.249	0.225	0.007	0.031	-0.115	0.197	0.124	0.157	0.260	**0.785**	0.138	-0.041
ASU-FS1	0.204	0.211	0.207	0.211	0.171	0.096	0.081	0.119	0.289	0.306	0.248	0.377	0.282	**0.892**	0.333
ASU-FS2	0.255	0.225	0.344	0.287	0.294	0.055	0.176	0.123	0.283	0.341	0.323	0.468	0.216	**0.871**	0.423
ASU-FS3	0.143	0.182	0.162	0.166	0.299	0.127	0.162	0.081	0.269	0.318	0.369	0.384	0.354	**0.809**	0.240
ASU-TR1	0.385	0.343	0.509	0.267	0.337	0.214	0.266	0.116	0.485	0.495	0.465	0.561	0.095	0.295	**0.867**
ASU-TR2	0.223	0.138	0.261	0.150	0.266	0.112	0.221	0.013	0.275	0.338	0.324	0.485	0.106	0.376	**0.746**
ASU-TR3	0.342	0.334	0.459	0.296	0.444	0.200	0.347	0.156	0.375	0.487	0.508	0.574	0.072	0.404	**0.870**
ASU-TR4	0.144	0.209	0.284	0.100	0.236	0.248	0.198	0.209	0.265	0.386	0.357	0.442	-0.053	0.211	**0.798**

Table 12. Heterotrait-Monotrait Ratio for the Smartphone Sample; Gen: Generative Thinking; Comb: Combinatorial Thinking; Disr: Disruptive Thinking; Risk: Risk-Affine Thinking; PE: Performance Expectancy; EE: Effort Expectancy; SI: Social Influence; FC: Facilitating Conditions; PIIT: Personal Innovativeness in IT; ITM: IT Mindfulness; ASU-FC: Feature Combining; ASU-FR: Feature Repurposing; ASU-FS: Feature Substituting; ASU-TR: Trying New Features

	Gen	Comb	Disr	Risk	PE	EE	SI	FC	PIIT	ITM	BIX	ASU-FC	ASU-FR	ASU-FS
Comb	0.683													
Disr	0.720	0.656												
Risk	0.363	0.322	0.441											
PE	0.140	0.256	0.245	0.093										
EE	0.224	0.230	0.274	0.131	0.181									
SI	0.124	0.214	0.195	0.067	0.462	0.101								
FC	0.149	0.295	0.250	0.153	0.420	0.670	0.229							
PIIT	0.386	0.498	0.433	0.362	0.299	0.260	0.322	0.302						
ITM	0.311	0.212	0.231	0.227	0.202	0.290	0.120	0.261	0.398					
BIX	0.329	0.368	0.477	0.272	0.545	0.256	0.324	0.354	0.588	0.437				
ASU-FC	0.102	0.161	0.175	0.206	0.281	0.171	0.098	0.220	0.313	0.219	0.427			
ASU-FR	0.171	0.233	0.233	0.416	0.042	0.088	0.151	0.077	0.303	0.168	0.309	0.483		
ASU-FS	0.235	0.359	0.378	0.264	0.251	0.164	0.073	0.267	0.290	0.240	0.463	0.663	0.523	
ASU-TR	0.103	0.202	0.222	0.090	0.288	0.199	0.146	0.341	0.264	0.187	0.442	0.817	0.387	0.692

Table 13. Heterotrait-Monotrait Ratio for the MS PowerPoint Sample; Gen: Generative Thinking; Comb: Combinatorial Thinking; Disr: Disruptive Thinking; Risk: Risk-Affine Thinking; PE: Performance Expectancy; EE: Effort Expectancy; SI: Social Influence; FC: Facilitating Conditions; PIIT: Personal Innovativeness in IT; ITM: IT Mindfulness; ASU-FC: Feature Combining; ASU-FR: Feature Repurposing; ASU-FS: Feature Substituting; ASU-TR: Trying New Features

	Gen	Comb	Disr	Risk	PE	EE	SI	FC	PIIT	ITM	BIX	ASU-FC	ASU-FR	ASU-FS
Comb	0.732													
Disr	0.671	0.741												
Risk	0.507	0.499	0.448											
PE	0.344	0.391	0.455	0.344										
EE	0.370	0.334	0.376	0.118	0.285									
SI	0.373	0.306	0.317	0.325	0.642	0.115								
FC	0.277	0.218	0.320	0.116	0.209	0.720	0.226							
PIIT	0.651	0.564	0.611	0.530	0.410	0.336	0.383	0.153						
ITM	0.512	0.434	0.502	0.386	0.546	0.354	0.323	0.175	0.529					
BIX	0.417	0.469	0.540	0.349	0.698	0.248	0.554	0.142	0.481	0.643				
ASU-FC	0.366	0.437	0.594	0.358	0.459	0.255	0.285	0.151	0.513	0.495	0.550			
ASU-FR	0.238	0.193	0.209	0.286	0.242	0.104	0.103	0.099	0.189	0.192	0.201	0.414		
ASU-FS	0.268	0.279	0.321	0.304	0.334	0.124	0.183	0.145	0.383	0.437	0.418	0.598	0.322	
ASU-TR	0.379	0.358	0.526	0.293	0.435	0.259	0.349	0.197	0.495	0.599	0.570	0.792	0.125	0.468

Table 14. Survey Items (MS Powerpoint / Smartphone Sample)
***: Dropped Items due to Low Loadings (<.071)**

Construct	Item
Generative thinking (Hildebrandt and Beimborn, forthcoming)	If I developed a digital product or service, I would always make sure that it could be very variably used for different unanticipated use cases.
	If I developed a new digital product or service, I would always provide possibilities for alternative use cases.
	When using digital products or services, I always think about what else I could use them for besides their intended functions.
	I always see potential new use cases for digital products or services that go beyond their intended use.
Combinatorial thinking (Hildebrandt and Beimborn, forthcoming)	I always think about combining different (digital) components when solving problems.
	When solving problems, I always consider combining different (digital) components rather than building something from scratch.
	When I tackle problems, I always think about combining existing (digital) solutions.
	I always notice that digital products consist of different (digital) components.
Disruptive thinking (Hildebrandt and Beimborn, forthcoming)	I always recognize how a new digital product or service could replace established solutions.
	I always see potentials for existing business models being replaced by disruptive digital products or services.
	I always see potential for digital products or services to transform entire markets.
Risk-affine thinking (Hildebrandt and Beimborn, forthcoming)	I believe choosing risky options always helps to be successful.
	I always would consider working on a high potential project, even if the probability of failure is high.
	I believe that the potential revenue of choosing a risky option is always worth it, even if the probability of loss is high.
	I always would consider risky options when making decisions in a professional context.
Performance expectancy (Venkatesh et al. 2003)	Using features of MS Powerpoint/my smartphone in my job enables me to accomplish tasks more quickly.
	Using features of MS Powerpoint/my smartphone improves my job performance.
	Using features of MS Powerpoint/a smartphone in my job increases my productivity.
	Using features of MS Powerpoint/a smartphone enhances my effectiveness on the job.
Effort expectancy (Venkatesh et al. 2003)	My interactions with features of MS Powerpoint/a smartphone are clear and understandable.
	It was easy for me to become skillful at using MS Powerpoint/smartphone features.
	I find features of MS Powerpoint/my smartphone easy to use.
	Learning to operate features of MS Powerpoint/a smartphone was easy for me.
Social influence (Venkatesh et al. 2003)	People who influence my behavior think I should use MS Powerpoint/smartphone features for work purposes.
	People whose opinions I value prefer that I use MS Powerpoint/smartphone features for work purposes.
	People who are important to me think that I should MS Powerpoint/smartphone features for work-related purposes.
Facilitating conditions (Venkatesh et al. 2003)	I have the resources necessary to use MS Powerpoint/smartphone features for work purposes.
	I have the knowledge necessary to use MS Powerpoint/smartphone features for work purposes.
	MS Powerpoint/A smartphone features are compatible with other systems I use. */
	I have the support necessary to use MS Powerpoint/a smartphone for work purposes.
Personal innovativeness in IT (Agarwal and Prasad 1998)	If I heard about a new information technology, I would look for ways to experiment with it.
	Among my peers, I am usually the first to try out new information technologies.
	In general, I am hesitant to try out new information technologies. */*
	I like to experiment with new information technologies.
IT mindfulness (Thatcher et al. 2018)	I am very creative when using Microsoft Powerpoint/my smartphone.
	I have an open mind about new ways of using Microsoft Powerpoint/my smartphone.
	I like to figure out different ways of using Microsoft Powerpoint/my smartphone.
	I "get involved" when using Microsoft Powerpoint/my smartphone.
Intention to explore (Nambisan et al. 1999)	I intend to explore MS Powerpoint/my smartphone for potential application in my work.
	I plan to explore MS Powerpoint/my smartphone functions for enhancing the effectiveness of my work.
	I intend to spend considerable time and effort exploring MS Powerpoint/my smartphone features for potential application in my work.

Trying new features (Sun 2012)	I played around with features in MS Powerpoint/my smartphone.
	I used some MS Powerpoint/smartphone features by trial and error.
	I tried new features in MS Powerpoint/my smartphone.
	I figured out how to use certain MS Powerpoint/smartphone features.
Feature substituting (Sun 2012)	I substituted features that I used before.
	I replaced some MS Powerpoint/smartphone features with new features.
	I used similar features in place of the features at hand.
Feature combining (Sun 2012)	I generated ideas about combining features in MS Powerpoint/my smartphone I was using.
	I combined certain features in MS Powerpoint/my smartphone.
	I used some features in MS Powerpoint/my smartphone for the first time. */*
	I combined features in MS Powerpoint with features in other applications to finish a task.
Feature repurposing (Sun 2012)	I applied some features in MS Powerpoint/my smartphone to tasks that the features are not meant for.
	I used some features in MS Powerpoint/my smartphone in ways that are not intended by the developer.
	The developers of MS Powerpoint/a smartphone would probably disagree with how I used some features in MS Powerpoint/my smartphone.
	My use of some features in MS Powerpoint/my smartphone was likely at odds with its original intent.
	I invented new ways of using some features in MS Powerpoint/my smartphone.
	I created workarounds to ovecome system restrictions.

Table 15. Overview of All Specific Indirect Effects (*: p <0.05) MSP: MS PowerPoint sample; SMA: Smartphone sample; DM: Digital Mindset; PIIT: Personal Innovativeness in IT; BIX: Behavioral Intention to Explore; ITM: IT Mindfulness; ASU: Adaptive System Use

Indirect Path	Effects	
	MSP	SMA
DM → PIIT → ASU	0.072	-0.009
DM → PIIT → BIX →ASU	0.006	0.058*
DM → PIIT → BIX	0.026	0.162***
DM → ITM → ASU	0.107*	-0.009
DM → ITM → BIX →ASU	0.037*	0.019
DM → ITM → BIX	0.147***	0.052
ITM → BIX → ASU	0.072*	0.067*
PIIT → BIX → ASU	0.010	0.114**

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Paper VI

HUNTING DARWIN'S COUNTERPART

TRACING THE EXAPTATION PHENOMENON IN IS RESEARCH

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Hildebrandt, Y. (2022). Hunting Darwin's Counterpart: Tracing the Exaptation Phenomenon in IS Research. In *Proceedings of the Internationale Tagung Wirtschaftsinformatik*, Nürnberg, Germany.

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3.

Chapter III

Employees' Digital Mindset as a Mitigating Factor for Technostress

Paper VII

MITIGATING IS USE STRESS

THE ROLE OF DIGITAL NUDGING AND DIGITAL MINDSET

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MITIGATING IS USE STRESS

THE ROLE OF DIGITAL NUDGING AND DIGITAL MINDSET

Abstract

When engaging with information systems (IS), users often experience IS use stress. Mitigating IS use stress is crucial, as it leads customers to abandon their purchasing processes, resulting in financial losses for organizations. Research and practical experiences identified causes of IS use stress within the design of IS. In this study, we conduct an online experiment involving 214 participants to examine the impact of digital nudging as an IS design principle in mitigating perceived IS use stressors. We design and implement two digital nudges, namely framing and default setting, in a car rental scenario. We find that framing and default setting effectively mitigate the perception of IS use stressors. In addition, users' digital mindset positively impacts this relationship. This research develops an theoretical and empirical understanding of how IS design influences IS use stress and underscores the significance of individual characteristics when studying IS use stress and digital nudging.

1 INTRODUCTION

Interacting with information systems (IS) induces IS use stress among individuals (Ragu-Nathan et al., 2008). IS use stressors, especially those appraised as hindering (Maier et al., 2021), are a major problem for organizations, as they let customers abandon their booking processes (Bufquin et al., 2020). Current reports indicate that the average online purchase abandonment rate for online purchases is around 70%, resulting in annual revenue losses for e-commerce organizations of $260 billion, avoidable solely through improved IS design (Baymard Institute, 2024). Main hindrance IS use stressors that lead customers away from completing the purchase are poorly designed IS, such as distracting website design (Baymard Institute, 2024), unstructured flows of information (Baymard Institute, 2024), complex interfaces (Maier et al., 2021), or unclear information display (Tarafdar et al., 2019). For organizations to reduce abandonment rates, increase the number of purchases, and maintain long-term competitiveness, it is essential that they design their IS to provide customers with a stress-free experience (Chen, 2018; Bufquin et al., 2020; Tarafdar et al., 2019). As current IS literature does not provide an understanding of design principles for such IS, we do not know how to design IS that affect key factors of the IS use stress process. Organizations require this understanding to design IS in a way that minimizes hindrance IS use stress. Accordingly, booking.com conducts practical tests to improve their website and demonstrates that IS design can mitigate hindrance IS use stress through the integration of digital nudging techniques (e.g., Alderighi et al., 2022).

Aligning with the practical findings of booking.com, recent IS research revealed the potential of digital nudging to influence factors that are relevant in the context of IS use stress, such as reducing users' cognitive load (Mirsch et al., 2017), reducing the complexity of IS design (Mirsch et al., 2017), and enhancing general IS interaction (Kroll and Stieglitz, 2021). Therefore, digital nudging, defined as user interface design principles that aim to influence users' decision-making predictably, in favor of the user, without prohibiting any options or providing economic incentives (Weinmann et al. 2016), provides a promising approach for mitigating hindrance IS use stressors in IS design. For example, the framing nudge uses highlighting, different colors, and conscious formulations to highlight relevant information and reduce the cognitive load of users to identify them (Mirsch et al., 2017). Further, the default setting nudge preselects certain options that are automatically taken when no active choice is made, minimizing the information users need to process so that users can make an appropriate decision with less cognitive effort (Mirsch et al., 2017). Building upon this, it becomes evident that while hindrance IS use stressors overwhelm customers, leading to purchase abandonment, the incorporation of digital nudges can streamline complexity and organize information, thereby diminishing perceived stress levels during IS interactions. In this study, we apply the potential of digital nudging within IS design to alleviate hindrance IS use stress and its resulting negative financial impacts on organizations. Our objective is to provide theoretical and practical insights into designing stress-free IS and the effectiveness of integrating digital nudging to achieve this goal.

Existing research shows that IS use stress and digital nudging is influenced by users' individual characteristics (Srivastava et al., 2015; Ingendahl et al., 2021). IS use stress research shows that individual characteristics, such as personality traits, predispose how individuals respond to IS use stressors (Srivastava et al., 2015). Digital nudging research highlights that individual characteristics, such as the need for cognition, impact the effectiveness of digital nudging (Ingendahl et al., 2021). An individual characteristic that is relevant in the context of IS use stress and digital nudging is the digital mindset, as it guides how individuals perceive and respond to specific situations regarding digital technologies (Hildebrandt and Beimborn, 2024). The digital mindset impacts how individuals perceive intricate and complex tasks (Joukhadar et al., 2023), feelings of helplessness while using IS (Wong et al., 2022), or complexity and ambiguity (Solberg et al., 2020). Individuals possessing a high digital mindset tend to perceive a wider range of potential actions and interactions with IS, leading to increased complexity and cognitive efforts when approaching tasks (Joukhadar et al., 2023). Consequently, these individuals may interpret interventions like digital nudging - designed to reduce cognitive load and uncertainty through pre-selecting or highlighting information - differently, leading to varied impacts of digital nudging on their perception of IS use stressors.

Drawing on the research on IS use stress, digital nudging, and digital mindset, this study seeks to develop an understanding how the implementation of digital nudging principles in IS design influences users' perception of IS use stressors. Additionally, we aim to explore how individual differences in digital mindset shape this relationship. By integrating perspectives on digital nudging and digital mindset, we aim to provide actionable insights for organizations to alleviate IS use stress. The following research question (RQ) guides our inquiry:

RQ: *How do a) digital nudging principles in IS design influence users' perception of IS use stressors and b) digital mindset influence this relationship?*

To answer our research question, we conducted an online experiment with a follow-up questionnaire based on 214 participants. We design and implement two digital nudges, namely framing and default setting, in a car rental scenario, grounded in IS literature to potentially mitigate the perception of IS use stressors. We find that framing and default setting mitigate the perception of IS use stressors. Users' digital mindset positively impacts the relationship between digital nudging and the perception of IS use stressors. Our findings let us contribute to literature by illustrating the influence of IS design on IS use stress, revealing a novel field of application for digital nudging, and highlighting the value of considering the effects of individual characteristics when studying digital nudging and IS use stress.

The paper unfolds as follows. The following section provides theoretical background on digital nudging, IS use stress, and digital mindset. Then, we develop our research model with four hypotheses. We then explain our methodological approach, present our results, and discuss our findings. We explain limitations of our study and draw implications for theory and practice.

2 Theoretical Background

To develop a theoretical understanding of how the perception of IS use stressors is influenced by digital nudging principles in IS design and the digital mindset, we summarize related research in the streams of IS use stress, digital nudging, and digital mindset.

2.1 IS Use Stress and Mitigating Factors

IS use stress refers to the stress experienced by users of IS (Ragu-Nathan et al., 2008). It is a transactional process comprising the overall stress process relating to IS use, including causes, called IS use stressors, and reactions, which can be psychological, physiological, or behavioral (Maier et al., 2021). IS use stress has two sub-processes: one where individuals appraise IS use stressors as hindering, and another where individuals appraise them as challenging (Maier et al., 2021). Examples for hindrance IS use stressors are complicated navigation (Tarafdar et al., 2019), perceived difficulty to use (Maier et al., 2022), unclear information display (Tarafdar et al., 2019), and missing features within the IS (Ioannou et al., 2022). These hindrance IS use stressors lead to negative consequences on an individual level, such as burnout (Maier et al., 2019), sleep problems (Salo et al., 2019), or termination of IS usage (Bufquin et al., 2020), as well as on organizations, including decreased productivity (Yu et al., 2023), innovation (Maier et al., 2021), and purchase rate (Bufquin et al., 2020). On the other hand, challenge IS use stressors represent the potential of IS use stressors to be perceived as challenging. Challenge IS use stressors, while inherently demanding, have the potential to be perceived as opportunities for personal growth and innovation in IS use. Examples include managing heavy workloads or assuming IS-related responsibilities, which can foster positive outcomes and facilitate personal development (Maier et al., 2021).

As hindrance IS use stressors lead to negative consequences and challenge IS use stressors lead to positive consequences, practice and research focus on identifying factors that mitigate hindrance IS use stressors (Maier et al., 2021). To contribute to the understanding of factors that mitigate perceived hindrance IS stressors and their negative consequences, this study focuses on factors that mitigate hindrance IS use stressors. These factors are broadly categorized into individual characteristics and IS characteristics. Individual characteristics, including changeable and non-changeable traits, influence the perception of hindrance IS use stressors (Maier et al., 2019, Thatcher et al., 2018). Changeable individual characteristics, such as computer self-efficacy (Tams et al., 2018) and IT mindfulness (Thatcher et al., 2018) have been identified as impacting individuals' perception of IS use stressors and can be developed and modified over time through interventions and training programs. Conversely, non-changeable traits like personal innovativeness in IT (Maier et al., 2019) and the big five personality traits (Pflügner et al., 2021) also influence the perception of IS use stressors but are stable and less responsive to organizational interventions.

Further, non-changeable IS characteristics, such as IS presenteeism (Suh and Lee, 2017) and pace of change (Ayyagari et al., 2011) impact the perception of hindrance IS use stressors. In addition, recent IS use stress research points to the existence of another scarcely investigated IS characteristic that influences perceived hindrance IS use stressors: the design of IS (Tarafdar et al., 2019). The design of IS is changeable and might help to reduce unclear information or cognitive load necessary to interact with IS. For example, if users struggle to find the right button, feature, or information, the IS design can provide visual cues or prompts that guide the user in the right direction (Mirsch et al., 2017). Such an IS design can mitigate IS use stress associated with unclear information or missing features (Maier et al., 2021; Tarafdar et al., 2019). In addition, effective IS design could also help to reduce cognitive overload (Mirsch et al., 2017), which represents another hindrance IS use stressor. By presenting information in a clear and organized way, users can more easily process and understand the information, mitigating IS use stress. Despite the recognized potential of IS design in mitigating hindrance IS use stressors, previous studies do not provide an understanding of IS design principles that mitigate these stressors (Tarafdar et al., 2019).

2.2 DIGITAL NUDGING

One IS design principle that is relevant in the context of IS use stress is digital nudging, as it can potentially reduce users' cognitive load and the complexity of IS design (Mirsch et al., 2017). Drawing on insights from behavioral economics (Thaler and Sunstein, 2008), digital nudging uses user-interface design elements to influence user behavior in a particular way (Weinmann et al., 2016). When interacting with IS, digital nudging constantly influences users' decision-making (Mirsch et al., 2017). Digital nudging changes user behavior in favor of the user and does not forbid any options or give economic incentives, called libertarian paternalism (Thaler and Sunstein, 2008). Digital nudging aims to overcome cognitive boundaries, biases, and habits that hinder individuals from acting in their favor (Weinmann et al., 2016). Previous studies have identified several forms of digital nudging, such as framing, default setting, social norms, loss aversion, or anchoring (Mirsch et al., 2017). Reviews on digital nudging suggest that framing and default setting are the most popular digital nudges, with most articles focusing on them (Mirsch et al., 2017). Beyond their prominence, these two digital nudges are also of particular interest in the context of IS use stress, as we highlight in the following.

The concept of default setting entails pre-selecting an option automatically chosen if the user does not actively make a choice (Mirsch et al., 2017). This approach leverages individuals' strong inclination to maintain the status quo, as the perceived drawbacks of departing from the current state often outweigh the benefits of change (Mirsch et al., 2017; Weinmann et al., 2016). By establishing a default option, this tendency amplifies the perceived uncertainty and transition costs—such as those associated with switching to alternative options (Lee and Joshi, 2017). In the realm of IS, default setting can manifest in various forms, such as users not changing initial settings (Acquisti and Grossklags, 2005), refraining from exploring new features, or sticking with a current service instead of transitioning to a potentially superior one (Mirsch et al., 2017). Default setting can also mitigate decision fatigue, a phenomenon where repeated decision-making depletes cognitive resources and increases stress levels (Polman and Vohs, 2016). Default setting also fosters consistency and continuity in IS interactions, leading to a sense of familiarity and comfort, ultimately mitigating the perceived stress associated with navigating unfamiliar interfaces or options (Thaler and Sunstein, 2008; Weinmann et al., 2016). IS use stress research shows that high cognitive effort can lead to IS use stressors associated with information overload and complexity (Ragu-Nathan et al., 2008). With the help of default setting, users can make a suitable decision in a given situation with less cognitive effort. In our study, we use default setting and pre-select a reasonable option in advance. This pre-selection reduces the necessary cognitive effort for the user in comparing information and making a decision. Thus, default setting seems appropriate to mitigate perceived hindrance IS use stressors.

Framing influences individuals' choices by presenting specific options more appealingly among several alternatives (Mirsch et al., 2017). Framing refers to a controlled decision presentation considering different framing methods, such as highlighting, use of colors, or conscious formulations. Framing is based on other biases, such as availability bias, making specific options visually more attractive and letting that option appear more readily available (Mirsch et al., 2017). Framing can manifest itself in various ways, such as users subscribing to memberships as only benefits were highlighted (Mirsch et al., 2017), booking environmental-friendly transport options as they were presented as a moral choice or a contribution to the public good, or increasing retirement provision decisions as sustainable retirement provisions are formulated more appealingly (Mirsch et al., 2017). All these examples frame a specific option as the best choice of all alternatives to overcome cognitive boundaries, biases, and habits (Mirsch et al., 2017). In doing so, digital nudging counteracts underlying mechanisms contributing to IS use stressors (Ragu-Nathan et al., 2008). For example, framing helps structure information, simplifies the user interface, and reduces the flood of information users encounter (Mirsch et al., 2017). Consequently, framing diminishes instances where IS overwhelms users with excessive information, thus alleviating IS use stressors associated with information overload and complexity (Ragu-Nathan et al., 2008).

Regarding individual characteristics, recent studies suggest that the effectiveness of digital nudges varies depending on users' individual characteristics (Ingendahl et al., 2021). These studies suggest that individual characteristics play a role in shaping the effectiveness of digital nudges, such as their influence on the need for cognition and uniqueness (Ingendahl et al., 2021). Conversely, other studies suggest that individual characteristics and preferences may render the effect of digital nudging on behavior redundant, thereby diminishing its overall impact (Ridder et al., 2022). While we acknowledge the assertion that individual characteristics influence digital nudging, we contend that the need for cognition and uniqueness may not be the most relevant individual characteristics in this context. As studies on the influence of individual characteristics on the effect of digital nudges are rare, the extent to which specific individual characteristics influence digital nudging remain uncertain.

2.3 DIGITAL MINDSET

Individual characteristics describe patterns of behavior, emotions, or thought that alter how individuals make sense of and respond to certain situations (Jiang et al., 2019). In the context of IS usage, individuals' digital mindset becomes a relevant individual characteristic comprising new required ways of thinking due to pervasive digital technologies and their influence on the user (Leonardi and Neeley, 2022).

Mindsets describe altered perceptions and interpretations that individuals maintain regarding specific environments and situations (Dweck et al., 1995). They comprise cognitive schemas, developed through accumulated knowledge and experiences (French, 2016). Hence, these schemas represent recurring patterns of thought derived from numerous instances of similar experiences concerning a particular concept and are changeable as they develop and change based on new information and experiences. Therefore, when individuals encounter stimuli or information, appropriate schemas are activated, directing attention towards relevant information ensuring that attention is focused on information congruent with existing schemas and away from other information, minimizing cognitive dissonance (Carlston, 2010). Further, they influence inference of missing information and shape evaluations and judgments about stimuli that are congruent with existing schemas, potentially leading to confirmation bias (Kahneman, 2011). Taken together, an individual's mindset describes a collection of cognitive schemas related to concepts that are significant within a particular situation or context, ultimately shaping perceptions and beliefs of individuals in those contexts (Gupta and Govindarajan, 2002; Dweck et al. 1995). Besides mindsets relevant in other contexts, such as globalization (Gupta and Govindarajan, 2002) or education (Dweck and Yeager, 2019), scholarly interest has recently focused on the digital mindset within the realm of digitalization and the widespread use of IS (Leonardi and Neeley, 2022).

The digital mindset represents individual's knowledge and experiences regarding digitalization, forming different cognitive schemas, or thinking patterns, regarding concepts relevant in the context of digitalization, shaping their perception and interpretation (Hildebrandt and Beimborn, 2024; Leonardi and Neeley, 2022). Conceptualizations of the digital mindset vary, emphasizing different aspects of digitalization, such as changes in the workforce or IS capabilities (van der Meulen et al., 2020). Our study uses a recent conceptualization of the digital mindset (Hildebrandt and Beimborn, 2024), focusing on four thinking patterns about concepts that are particularly relevant in the situation of user interaction with IS: data-driven, combinatorial, generative, and risk-affine thinking. These patterns reflect how individuals perceive IS characteristics, their data, and new interaction possibilities (Hildebrandt and Beimborn, 2024). Data-driven thinking describes individuals' cognitive schema regarding data, expressed through being constantly convicted and seeing the value in data for solving problems and tasks. Combinatorial thinking describes individuals' cognitive schema regarding the combinatorial characteristics of IS, expressed through perceiving new combinations and permutations of IS properties and features (Leonardi and Neeley, 2022). Complemented by generative thinking patterns, describing schemas regarding the inherent agnosticism of IS, individuals perceive and value new functions for existing IS. Finally, risk-affine thinking describes a schema regarding risks that are associated with different uses of IS, leading individuals to see those as desirable This expands their space of potential problem-solution pairs in situations involving IS. Through risk-affine thinking, individuals identify high-risk actions with IS as feasible or desirable, expanding their space of potential problem-solution pairs in situations involving IS (Hildebrandt and Beimborn, 2024).

Mindsets have been shown to significantly affect work behavior or performance (Keating and Heslin, 2015) and moderate the effects of events on perceived psychological distress (Crum et al., 2013). Specifically, research on IT-specific mindsets yielded promising effects in the IS domain, such as an agile mindset leading to higher organizational agility (Emmerich et al., 2022). However, the heightened perceived complexity can increase stress levels, hindering full exploitation of positive consequences (Keating and Heslin, 2015). Thus, organizations need to understand how stress mitigation strategies operate differently across individuals with varying digital mindsets. Identified differences provide a better understanding of how to strategically prioritize interventions to lever these positive effects and effectively align technological interventions. Therefore, our study focuses on the digital mindset as a potential moderating factor for IS design mechanisms that aim to mitigate hindrance IS use stress.

3 HYPOTHESIS DEVELOPMENT

Drawing on prior research on IS use stress, digital nudging, and digital mindset, we depict our research model in Figure 1 and develop our hypotheses.

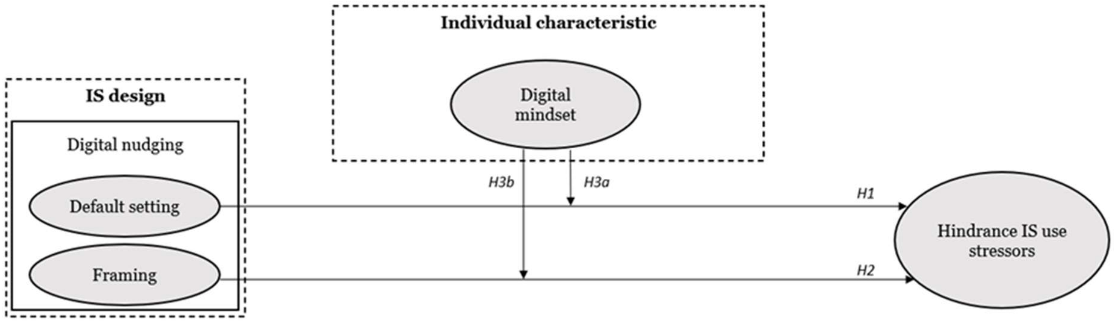

Figure 1. Research Model

Default setting, as a form of digital nudging, involves pre-selecting an option in the digital environment, prompting individuals to favor this option due to status quo bias (Acquisti and Grossklags, 2005). This pre-selection mitigates hindrance IS use stressors associated with exploring alternative options (Lee and Joshi, 2017). The effort involved in evaluating alternative choices, coupled with the anxiety arising from unknown outcomes, contributes to IS use stress (Lee and Joshi, 2017). Moreover, default options decrease the cognitive effort needed to identify and evaluate alternatives, leading to exhaustion comparable to psychological strain in IS contexts (Tarafdar et al., 2019). By simplifying the decision-making process, default setting reduces cognitive effort and complexity, mitigating perceived hindrance IS use stressors (Maier et al., 2021). Concluding, default setting reduces cognitive efforts, leading to less complexity and information overload and, therefore, less perceived hindrance IS use stressors. We hypothesize:

H1: Default setting mitigates hindrance IS use stressors.

Framing, a digital nudging technique, involves using stimuli to activate cognitive biases like availability bias or confirmation biases to guide individuals towards preferred options by positively highlighting specific options, providing additional relevant information, or employing visual cues (Mirsch et al., 2017). By highlighting benefits of certain choices, valuable information becomes more accessible, fostering cognitive ease and certainty (Kahneman, 2011). Visual cues aid in comparison between options, reducing cognitive effort during IS usage by minimizing the need for elaborating relevant information from the text, and reading, comparing, and differentiating all available choices (Kahneman, 2011). This facilitates swift identification of relevant information, reducing uncertainty and overload associated with information processing, both of which are sources of stress when using IS (Lee and Joshi, 2017; Maier et al., 2021). Thus, framing leads to more efficient information processing, alleviating user overwhelm and decreasing perceived hindrance IS use stressors. We propose:

H2: Framing mitigates hindrance IS use stressors.

Mindsets describe different cognitive schemas that profoundly influence how individuals perceive and process information, shaping their responses to various stimuli (Dweck et al., 1995). In the realm of IS use, individuals with high digital mindset levels exhibit a higher perception of possible actions and interactions with IS (Hildebrandt and Beimborn, 2024), increasing the complexity and cognitive efforts involved when approaching tasks and making decisions with IS (Maier, 2021). Through cognitive schemas concerning the generative and combinatorial properties of digital technologies, individuals' attention is directed towards various potential solutions when using IS, expanding their perceived problem-solving space. While some of these solution pairs may appear unconventional and thus riskier than others, the cognitive schemas concerning these risks prompt the automatic inference of positive evaluations and the inclusion of these possibilities. Furthermore, data-driven thinking guides their focus towards accessing as much available data as possible and inferring its relevance, leading those individuals to include more optional data, aiming to precisely analyze as much available data as possible to solve a task (Carlston, 2010; Hildebrandt and Beimborn, 2024). Hence, the schemas of individuals' digital mindset leading them to perceive higher problem-solution space with more options and information that need to be compared when approaching tasks with IS (Leonardi and Neeley, 2022), which potentially increases complexity and information overload. Consequently, default settings and framing, aiming to alleviate uncertainty and reduce cognitive load through pre-selected or highlighted information (Mirsch et al., 2017), may cause higher complexity reductions for those individuals, reducing higher amounts of complexity and cognitive loads for those individuals than for individuals with low digital mindset levels. Therefore, more options and information are affected for individuals with a higher digital mindset by digital nudging, and thus, the associated uncertainty, the strengthening of perceived certainty, and the reduction of cognitive effort may also be greater, leading to higher relief of hindrance IS use stress. Hence, the effects of default-settings and framing on IS use stressors will be stronger for individuals with a higher digital mindset than individuals with low digital mindsets, leading us to hypothesize:

H3a: Digital mindset moderates the effect of default setting on hindrance IS use stressors, such that users with a higher digital mindset who are exposed to default setting perceive lower hindrance IS use stressors.

H3b: Digital mindset moderates the effect of framing on hindrance IS use stressors, such that users with a higher digital mindset who are exposed to framing perceive lower hindrance IS use stressors.

4 METHOD

In preparation for our main experiment, which revolves around a car rental scenario, we conducted a pre-experiment to identify potential IS design elements contributing to hindrance IS use stressors during a car rental process. The insights gained from the pre-experiment informed the design of the main experiment, allowing us to effectively implement hindrance IS use stressors into the car rental scenario. To validate the effectiveness of these implemented stressors, we conducted a stress validation using both objective (skin conductance) and subjective (questionnaire) stress measurements, as illustrated in Figure 2.

4.1 PRE-EXPERIMENT, SCENARIO DEVELOPMENT, AND STRESS VALIDATION

In the pre-experiment, we interviewed 12 individuals (six women and six men, aged between 23 and 64) and developed several car rental scenarios, each including different potential stressors elaborated from literature, such as unclear information display (Tarafdar et al., 2019), complicated navigation (Tarafdar et al., 2019), missing information (Ioannou et al., 2022), or complex interfaces (Maier et al., 2021), to elicit information about potential hindrance IS use stressors. We identified various potential IS design elements that cause hindrance IS use stressors during a car rental process. The main causes were unclear and complicated IS design of the car rental platform, unclear information about insurance conditions or fees, or unclear or missing instructions on the car rental process and included services. We adjusted the design of the main experiment according to the information gained from the pre-experiment and made sure the information provided is confusing and unstructured, and the scenario requires the participants to compare complex options. We also solicited feedback from the pre-experiment participants regarding any other possible sources of IS use stress. For instance, participants indicated that certain factors, such as the presentation of a large amount of information on a single webpage and the complexity of different add-on options, lead to IS use stress. The insights of the pre-experiment informed the IS design of the car rental scenario for our main experiment, aiming to induce IS use stress.

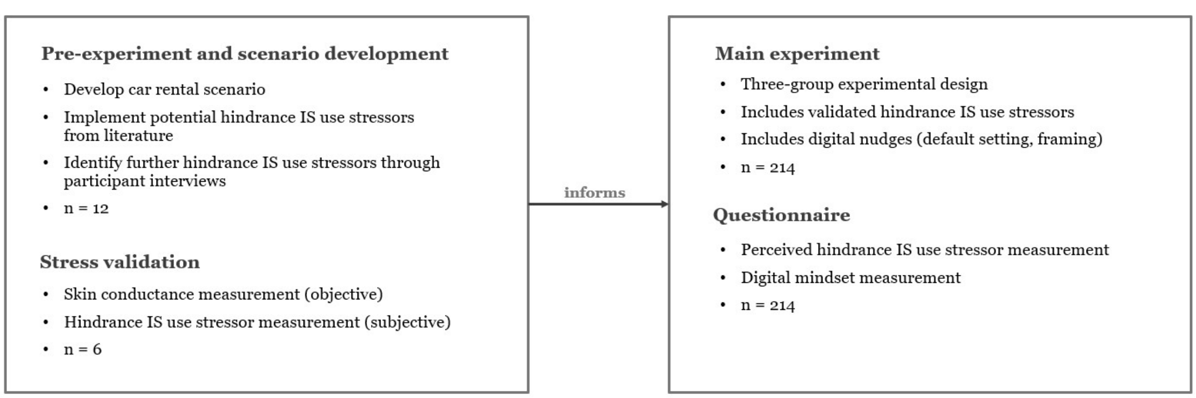

Figure 2. Methodological Approach

During the stress validation, we aimed to ensure our developed scenario effectively induces hindrance IS use stress. We conducted objective and subjective stress measurements (Fischer and Riedl, 2017) with six participants. For objective measurement, we analyzed Electrodermal Activity (EDA) using skin conductance (SC), a method previously employed in IS use stress research (Weinert et al., 2020). EDA reflects physiological responses to stress, with higher SC indicating increased stress levels (Galluch et al., 2015). We employed a MentalBioScreen K3 device to measure SC, capturing activity of the Autonomic Nervous System (ANS) linked to stress (Dawson et al., 2011). The activation of the ANS is especially expected when individuals encounter hindrance IS use stress (Akinola et al., 2019). For subjective measurement, we used validated scales to assess hindrance IS use stress (Maier et al., 2021). Results showed an increase in EDA during the experiment (mean = 10.64 μS; mean highest value = 12.27 μS, mean lowest value = 8,92 μS) compared to answering the questionnaire (mean = 6.46 μS; mean highest value = 7.35 μS, mean lowest value = 5.70 μS) and a control booking website with no intentionally implemented stressors (mean = 8.99 μS; mean highest value = 10.97 μS, mean lowest value = 5.68 μS). Subjective responses echoed these findings, with participants reporting higher perceived stress during the experiment (mean = 4.77) compared to the control website (mean = 3.74). These results confirm the effectiveness of our experimental design in inducing IS use stress. With our main experiment effectively inducing stress in users, we describe the design of the main experiment in the following.

4.2 MAIN EXPERIMENT AND QUESTIONNAIRE

Our main experiment aims to investigate whether digital nudging and digital mindset can mitigate perceived hindrance IS use stressors. To design suitable digital nudges for our main experiment, we draw on the digital nudge design method consisting of an analysis phase, design phase, and implementation and evaluation phase (Mirsch et al., 2018). During the analysis phase, we defined the mitigation of perceived hindrance IS use stressors as the goal to be achieved with the digital nudges. During the design phase, we designed digital nudges that reduce the overall complexity of information the user needs to process when interacting with the IS, structure the user interface, and reduce information overload during the car rental process. These characteristics were all identified during the pre-experiment, are part of the definition of hindrance IS use stressors (Maier et al., 2021), and are suggested to mitigate hindrance IS use stressors (Tarafdar et al., 2019). We embedded these characteristics in the main experimental environment during the implementation and evaluation phase through default setting and framing (Mirsch et al., 2017). Besides being appropriate to mitigate perceived hindrance IS use stressors, default setting and framing are essential drivers in car rental decision-making (Stryja et al., 2017), which is the experiment's setting. The main experiment followed a three-group experimental design in which participants were randomly assigned to a framing nudge condition, a default setting condition, or a condition with no digital nudges present. The main experiment was conducted online, and we developed an online car rental website to facilitate it. At the beginning, participants were instructed to assume the role of a 25-year-old individual who plans to drive 200 miles per day for ten days and requires rental car insurance that covers any damage to the vehicle.

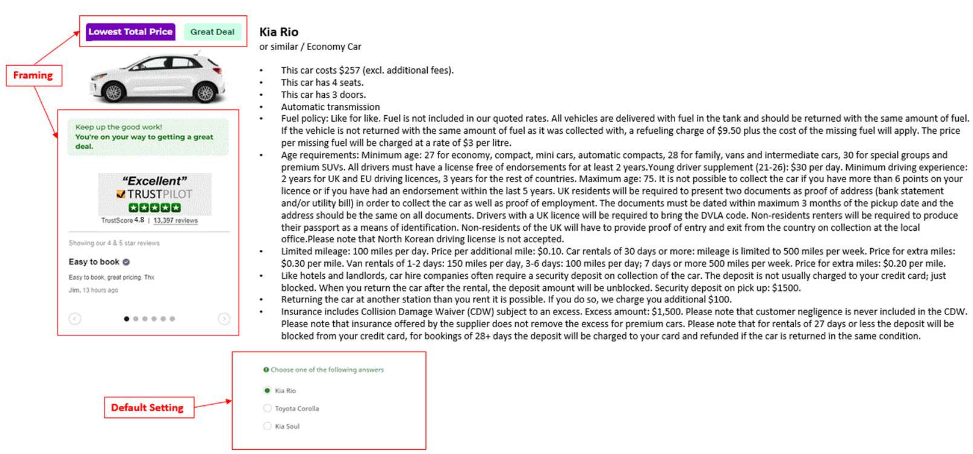

Figure 3. Experimental Design of Default Setting and Framing Conditions

Participants were also asked to imagine that they needed to return the car to a different location than the one from which they rented it. With this information in mind, the participants had to choose one car and a suitable car insurance policy, each of three options. Participants had to consider six relevant attributes simultaneously to make their decision. The car rental website provided all necessary and additional non-necessary information about three potential car rental and insurance options. We intentionally made the information complex to intensify perceived hindrance IS use stressors. Based on the pre-experiment, we provided unclear information on whether specific fees apply, included different age limits for additional young driver fees, sometimes leading to extra costs, and designed the experiment that all car rental options are equally expensive when considering all six relevant attributes. We included additional attributes, such as mileage limits and other costs for each extra mile driven. This means there is no right or wrong decision, as the experiment aims not to influence participants' decision-making but to mitigate perceived hindrance IS use stressors through digital nudging. Figure 3 exemplarily shows the design of default setting and framing nudges. In the control group, only the text and image of the car were displayed to the participants.

Table 1. Overview of the Three Conditions

Condition	Manipulation	Goal
Default setting	One option is pre-selected as the default option.	Reduce cognitive effort to identify and compare relevant information.
Framing	One option is highlighted with the help of signs, colors, and appealing slogans to make it more attractive.	Reduce the load of information that users need to compare. Support through highlighting information.
No nudge	-	Control group

To identify the impact of digital nudging on hindrance IS use stressors perceived by users during the car rental process, we designed digital nudges that counteract hindrance IS use stressors based on the insights of the pre-experiment. We formed three conditions: two include manipulating a specific option through default setting and framing, and one represents a control group without manipulation (see Table 1).

Subsequently to the main experiment, we surveyed the participants about perceived hindrance IS use stressors using an established 16-item scale (Maier et al., 2021). For measuring digital mindset, we used a validated 13-item scale (Hildebrandt and Beimborn, 2024). We provide an overview of all items used in our research model in the Appendix (Table 3). We used a 7-point Likert scale to measure the items, with 1 as "strongly disagree" and 7 as "strongly agree". Before the main experiment, we used GPower 3.1 to estimate that for a sample size of around 150 and assuming a medium effect size, the power of the statistical test would be higher than the recommended value of 0.8. We collected our data via Amazon Mechanical Turk (MTurk), consistent with prior IS use stress research (Maier et al., 2019). We followed established guidelines, including only workers who have completed many tasks and a high acceptance rate (95%), did not follow a specific pattern during the questionnaire, and answered the trap correctly (Lowry et al., 2016). We included four attention traps that asked the participants in the question text to select specific answers or removed participants who answered identical or reverse questions inconsistently. As the experiment lays the foundation for the questionnaire, we also removed participants who completed the experiment in an unrealistic short time and thus could neither be stressed by embedded hindrance IS use stressors nor be manipulated by the implemented digital nudges. That way, we ensure that participants conduct the experiment entirely and carefully read the questions (Lowry et al., 2016). Participant distribution across the three conditions was even, with 73 participants in the default setting, 70 in the framing, and 71 in the no nudge condition. We summarize the sample characteristics of 214 participants in Table 2.

Table 2. Sample Characteristics (N = 214; M = mean; Std = standard deviation; in percent)

Age (years)	<21	0.0	Level of education	Less than High School	2.3
	21-30	42.4		High School	27.6
M = 35.75	31-40	31.4		Bachelor's Degree	58.4
Std = 11.55	41-50	11.8		Master's Degree	11.7
	51-60	9.2	IT usage		
	>60	5.2	(hours per day)	<1	0.0
Gender	Female	49.7		1-3	12.1
			M= 6.36	4-6	48.3
	Male	50.3	Std = 2.84	7-9	28.9
				>9	10.7

5 RESEARCH RESULTS

In the following, we provide details on validating the measurement and structural models. Subsequently, we present the results from the questionnaire and experiment. We analyzed the questionnaire results following the structural equation modeling method (SEM) using IBM SPSS Amos 28 and one-way analysis of variance (ANOVA) using IBM SPSS Statistics 28.0.

5.1 VALIDATION OF THE MEASUREMENT MODEL AND STRUCTURAL MODEL

Each construct in the proposed research model is measured by reflective indicators so that we validate our measurement model on content validity, indicator reliability, construct reliability, and discriminant validity (Bagozzi, 1979). To ensure content validity, we only used items that have been used and validated in prior research. Details on the items are provided in the Appendix (Table 3). Upon comparing the mean value of digital mindset to previous research, we find it is comparable to recent IS studies (Hildebrandt and Beimborn, 2024). However, the mean value of hindrance IS use stressors is higher in our study than in prior studies (e.g., Maier et al., 2021). This finding can be explained through our study design, aiming to increase participants' perceived hindrance IS use stressors. As such, it serves as an indicator to support the effectiveness of our experimental design. The indicator reliability indicates the rate of the variance of an indicator originating in the latent variables. To explain 50% of the variance of a latent variable by the indicators, the value has to be at least 0.707 (Carmines and Zeller, 2008). As this is fulfilled for all indicators in the model, we can attest indicator reliability. Moreover, the loadings are all significant at the $p < 0.01$ level. To ensure construct reliability, we use composite reliability (CR) and average variance extracted (AVE) (Fornell and Larcker, 1981). AVE should have a higher value than 0.5 and CR higher than 0.7. As shown in Appendix (Table 3), both criteria are fulfilled. Discriminant validity describes the extent to which measurement items differ from others (Campell and Fiske, 1959). As the square root values of AVE are higher than the corresponding construct correlations, we can confirm that discriminant validity is fulfilled (Appendix Table 4) (Fornell and Larcker, 1981). Overall, we conclude that the measurement model is valid. We used established goodness of fit guideline values (Byrne, 2001). The fit indices of the proposed factor structure were RMSEA = 0.04, CFI = 0.95, and TLI = 0.93. The RMSEA (less than the threshold of 0.08), CFI (greater than the threshold of 0.9), and TLI (greater than the threshold of 0.9) were all satisfactory, thus demonstrating a good model fit.

5.2 DIRECT EFFECTS OF DIGITAL NUDGING ON HINDRANCE IS USE STRESSORS

To test hypotheses H1 and H2, which assume lower perceived hindrance IS use stressors in conditions with default setting and framing compared to conditions without present digital nudges, we conducted a one-way ANOVA. One-way ANOVA is a statistical method to test the variance or differences between three or more groups having one independent variable, which in our study is digital nudging. The ANOVA shows that participants of the default setting (M=4.87, Std=1.03, N=70) and framing condition (M=4.84, Std=1.15, N=73) perceived lower hindrance IS use stressors during the experiment than the control condition with no digital nudging (M=5.47, Std=0.87, N=71). Results reveal that perceived hindrance IS use stressors differ significantly between the three conditions (F=9.639 > critical

F=4.707, p<0.001). Combining the findings above shows that default setting and framing mitigate perceived hindrance IS use stressors, thus supporting hypotheses H1 and H2.

5.3 Moderating Effects of Digital Mindset on the Relationship between Digital Nudging and Hindrance IS Use Stressors

We now evaluate the moderating effects of the digital mindset on the relationship between digital nudging and perceived hindrance IS use stressors. The multiple regression in SPSS shows that the p-value for the model is significant (p<0.05), and the R-square is acceptable (0.401). As our three conditions represent digital nudging as either present (default setting and framing conditions) or absent (control group), we labeled the conditions in which digital nudging is present "1" and the no nudge condition "0" for the model evaluation.

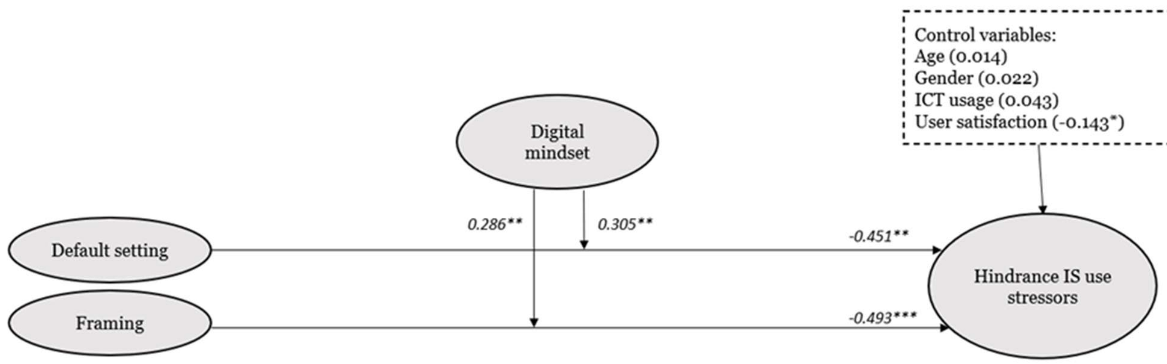

Figure 4. Research results (Note: *** p<0.001, ** p<0.01, *p<0.05. Gender coded as male = 0, female = 1. ICT usage per day coded as 1 = < 1 hour, 2 = 1-3 hours, 3 = 4-6 hours, 4 = 7-9 hours, 5 = > 10 hours.)

The evaluation results in a negative effect of default setting (ß=-0.451, p<0.01) and framing (ß=-0.593, p<0.001) on perceived hindrance IS use stressors (see Figure 4), confirming the results from one-way ANOVA. The moderating effect of digital mindset on the relationship of default setting (ß=0.286, p<0.01), respectively framing (ß=0.305, p<0.01), on perceived hindrance IS use stressors is positive and significant. The results reveal that a high digital mindset increases the effect of digital nudging on perceived hindrance IS use stressors and supports hypotheses H3a-b. Based on the above, we provide evidence that digital nudging influences the hindrance IS use stressors and the digital mindset is a moderator between digital nudging and hindrance IS use stressors.

6 Discussion

Motivated by the adverse effects of IS use stress, which can lead users to terminate the booking process (Bufquin et al., 2020), we set out to explore the potential of digital nudging in IS design to mitigate IS use stress. Additionally, we investigate how individual characteristics, such as individuals' digital mindset, influence this relationship. In doing so, we develop a theoretical understanding of which IS design features provide simplicity and clarity to help users overcome hindrance IS use stressors (Tarafdar et al., 2019), and offer practical insights for organizations on how to design IS to minimize hindrance IS use stress, thereby reducing adverse financial consequences (Bufquin et al., 2020). The following outlines our contributions to IS use stress, digital nudging, and digital mindset research.

6.1 Theoretical Contributions

Our experimental study offers insights into how digital nudging embedded in the design of IS influence users' perception of hindrance IS use stressors and demonstrates how the digital mindset as individual characteristic affects the relationship between digital nudging and hindrance IS use stressors. Thereby, we contribute a theoretical and empirical understanding on the influence of digital nudging on IS use stress, and how the digital mindset impacts this relationship. We find that digital nudges, such as framing and default setting, which support specific favorable characteristics in IS design, such as clear information, complete information, or self-explanatory interfaces, mitigate IS use stressors. In doing so, we provide concrete IS characteristics and practical implementations of an "appropriate IS design"

(Tarafdar et al., 2019, p. 8), empirically proven to mitigate IS use stressors. In addition, individual characteristics, such as the digital mindset, impact the effectiveness of digital nudging in mitigating IS use stress. This lets us contribute that the perceived IS use stress depends on visual stimuli users encounter through the design of IS, as well as their perceptions and interpretations of these stimuli, as reflected by their digital mindset. Given our context of online car bookings, our study informs omnichannel commerce (Trenz et al., 2020) to reduce their customers' IS use stress by implementing digital nudges that simplify the user interface and support customers during the purchasing process. This reveals the theoretical understanding that individuals' perception of IS use stressors during their interaction with an online car booking website is influenced by both physical filters, which can be integrated into the website, and cognitive filters, which shape individuals' perceptions of their environment. Therefore, our findings emphasize that in the context of researching IS use stress and digital nudging, it is inadequate to focus solely on either the user or the IS. Instead, both the user and IS must be investigated in conjunction. In the following, we go into more detail on contributions derived from our findings for research on IS use stress, digital nudging, and digital mindset.

Prior research on IS use stress indicates that individual characteristics like personal innovativeness in IT (Maier et al., 2019) and computer self-efficacy (Tams et al., 2018), affect the perception of IS use stressors. These traits are categorized into stable traits, that are non-changeable and exert a consistent influence across technology-related situations, and dynamic traits, which are changeable through trainings and experiences, and capture more malleable predispositions to act in specific situations (Thatcher et al., 2018). Beyond individual characteristics, we know that IS characteristics, such as IS presenteeism (Suh and Lee, 2017) and pace of change (Ayyagari et al., 2011) influence how individuals perceive IS use stressors. Like individual characteristics, these can be changeable or non-changeable. Existing studies on IS characteristics focused the pure presence of IT (Suh and Lee, 2017) and its dynamic changes over time (Ayyagari et al., 2011), which are both hardly changeable for individuals and organizations in the digital age. We contribute IS design as a changeable IS characteristic impacting the perception of IS use stressors. The design of IS is changeable because it involves deliberate design features and configurations, allowing for adjustments to optimize user experience (Märtin et al., 2023). Our results empirically validate the impact of IS design on perceived IS use stress and reveal a significant mitigating effect of IS design features in the form of default setting and framing digital nudges on perceived hindrance IS use stressors. We thereby contribute to the stream of IS use stress that IS design is a changeable IS characteristic that influences IS use stressors. Based on the design of digital nudges in our online experiment, we postulate that IS design features that incorporate framing or default setting nudges minimize hinderance IS use stressors. For example, highlighting relevant information to reduce the load of information or pre-selecting a default option to reduce cognitive effort helps users mitigate the perception of hinderance IS use stressors. In addition, we contribute what IS design features mitigate perceived IS use stressors by theorizing and empirically validating that this is grounded in features that make IS design simple and provide clear and adequate information.

Digital nudging has been employed in various IS domains, including technology acceptance, privacy, and digital marketing research (e.g., Kroll and Stieglitz, 2021; Mirsch et al., 2017; Stryja et al., 2017). They all agree that digital nudging changes user behavior. Our findings demonstrate that digital nudging also influences user perception. Through investigating the impact of default setting and framing on users' perception of hindrance IS use stressors, this study uncovers the potential of digital nudging to mitigate perceived hindrance IS use stressors. As such, we empirically validate the potential of digital nudging to reduce the causes of negative consequences associated with IS use, including physical and mental health problems, reduced productivity, and decreased job performance (Tarafdar et al., 2015). We thereby extend the current understanding of the impact of digital nudging solely on user behavior by contributing its relevance in the field of user perception. Accordingly, we argue that research on digital nudging should shift its focus from user behavior to perception, investigating the impact of digital nudging on relevant IS research concepts based on perception, such as user satisfaction, perceived ease of use, and perceived usefulness. Our study highlights that digital nudging shapes users' cognitive and affective responses toward IS, leading to a more comprehensive understanding of its benefits in IS contexts. Our findings also emphasize the importance of considering users' perceptions in designing and implementing digital nudges.

Previous literature on individual characteristics has shown that various traits are relevant in the context of IS use, such as broad personality traits (Srivastava et al., 2015), behavior-specific traits like mindfulness (Pflügner et al., 2021), or IT-specific traits like personal innovativeness in IT or computer self-efficacy (Maier et al., 2019; Tams et al., 2018). We show that digital mindset as a dynamic IT-specific trait also plays an essential role in the context of IS use stress. Thus, we extend the previous discourse and show that dynamic IT-specific traits, which are less behavior-specific but influence the general sensemaking of IS and are independent from the IS at hand, play a role. Additionally, previous research has yielded equivocal findings on the influence of individual characteristics on the effectiveness of digital nudging (Ingendahl et al., 2021; Ridder et al., 2022). Our findings reveal that the digital mindset, representing a dynamic IT-specific traits, positively impacts the effectiveness of digital nudges on perceived hindrance IS use stressors. We see that default setting and framing lead to fewer feelings of being overwhelmed by the technological complexity and information when using IS. This effect is stronger for individuals with a high digital mindset. Through these results, we expand existing literature on IS use stress by arguing that dynamic IT-specific traits help us better explain how digital nudging can affect perceived IS use stress. Our results are also in line with previous research revealing effects of personality traits on IS use stress (Maier et al., 2019). In sum, to improve employee well-being using digital nudging, it is crucial to consider individual characteristics as they have an impact on the effectiveness of digital nudging.

6.2 Practical Implications

Our study also carries practical implications. Our findings provide organizations with a changeable IS characteristic and changeable individual characteristic to mitigate IS use stress. Based on our findings, organizations should include digital nudges into the design of their websites to reduce the termination of booking or purchasing processes. That way, organizations can decrease financial losses. In addition, organizations can use our findings to increase their internal employees' well-being and job performance by reducing the cognitive effort required by employees while working with these systems (Tarafdar et al., 2015). As we reveal that the effects of digital nudging exceed user behavior, organizations can implement digital nudges to change user perceptions, such as user satisfaction, perceived ease of use, or perceived usefulness or organizational IS. As their positive effects on productivity and performance have been demonstrated (Davis, 1989; Tarafdar et al., 2010), digital nudging provides organizations with a powerful tool to increase productivity and performance when interacting with IS. Furthermore, our results demonstrate that a digital mindset strengthens the impact of digital nudges on perceived hindrance IS use stressors. Therefore, organizations should introduce mechanisms that foster employees' digital mindset to bolster the effectiveness of digital nudges. As research suggests that training can promote a digital mindset (Solberg et al., 2020), such mechanisms might include training programs. For organizations, understanding perceptions of their employees or customers while using their IS is crucial to develop appropriate interventions (Karwatzki et al., 2017). By implementing digital nudges and training programs, organizations can help employees perceive less hindrance IS use stressors and enhance their well-being. Given that digital nudging is more effective in mitigating IS use stress for users with a high digital mindset, organizations should prioritize displaying digital nudges to such users. Organizations can use the questionnaires employed in this study to identify users with a high digital mindset.

6.3 Limitations and Future Research

There remain limitations to our findings which also offer possibilities for future research. While our study identifies the digital mindset as a relevant individual characteristic in the context of IS use stress and digital nudging, future research could explore other frequently investigated concepts such as personal innovativeness with IT or computer self-efficacy (Maier et al., 2019; Tams et al., 2018). We deliberately chose the digital mindset due to its changeability, enabling individuals and organizations to take action (Hildebrandt and Beimborn, 2024), and demonstrated its impact on the relationship between digital nudging and perceived hindrance IS use stressors. However, other traits may influence digital nudging and IS use stress differently or not at all. Thus, future research could identify and cluster traits to enhance our understanding of their characteristics and specific contexts that influence digital nudging and IS use stress. Additionally, our study focused solely on default setting and framing as forms of digital nudging, but there is a broad range of other digital nudges that could impact the perception of hindrance IS use stressors. Future research could explore these other forms to understand their potential effects. While we focused on lowering hindrance IS use stressors, future research could investigate how digital nudging influences positive, challenge IS use stressors. Finally, while our study delves into the broad phenomenon of IS use stress, our method is limited to the specific domain of car booking. Despite our deliberate experimental design and inclusion of various checks and pre-experiments, further research is needed to determine the generalizability of our findings to different contexts.

7 Conclusion

To mitigate IS use stress in our everyday life — such as when renting a car online—it is crucial to understand which factors affect our perception of IS use stressors. This study contributes to IS use stress research by demonstrating the impact of digital nudging integrated into IS design on perceived hindrance IS use stressors. We show how individual traits, like digital mindset, affect the effectiveness of digital nudging in mitigating IS use stress. Through an online experiment, we identify default setting and framing as effective forms of digital nudging in mitigating perceived hindrance IS use stressors. We find that the digital mindset strengthens the impact of digital nudging. Our research broadens the understanding of IS use stress by highlighting IS design as a significant factor. Moreover, we stress the importance of considering individual characteristics when designing digital nudges. Organizations can utilize our findings to mitigate IS use stress and its negative consequences by integrating digital nudges and implementing training programs that foster the digital mindset.

Appendix

Table 3. Measurement items

Construct (Cronbach s α)	Question	Loading
Hindrance IS use stressors (Maier et al., 2021) (0.931)	I had several hassles during the decision-making.	0.717
	I had constraints find the best option.	0.708
	I had unclear instructions on how to find the best option.	0.759
	I had to deal with unclear information.	0.763
	The information of the individual options were unclear.	0.713
	The information of the individual options were confusing.	0.774
	It was stressful to identify relevant information for decision-making.	0.768
	I had hassles to identify relevant information for decision-making.	0.758
	I had to deal with unstructured information.	0.768
	I had conflicts during the decision-making.	0.772
	I had unclear information to find the best option.	0.719
	I had inadequate resources to find the best option.	0.732
	I had to deal with a lot of text and information.	0.712
	I had to deal with a high complexity of add-on options.	0.716
Digital mindset (Hildebrandt and Beimborn, 2024) (0.734)	If I developed a digital product, I would always make sure that it could be very variably used for different unanticipated use cases.	0.722
	If I developed a new digital product, I would always provide possibilities for alternative use cases.	0.786
	When using digital products, I always think about what else I could use them for besides their intended functions.	0.731
	I always see the generated data from new digital products or services as a main business resource.	0.796
	I always think of collecting as much data as possible to ground my decisions.	0.743
	When I think about new digital products, I always think of the data involved and its potentials.	0.794
	I always think about combining different (digital) components when solving problems.	0.803
	When solving problems, I always consider combining different (digital) components rather than building something from scratch.	0.766
	When I tackle problems, I always think about combining existing (digital) solutions.	0.789
	I believe choosing risky options always helps to be successful.	0.788
	I would consider working on a high potential project, even if the probability of failure is high.	0.728
	I believe that the potential revenue of choosing a risky option is always worth it, even if the probability of loss is high.	0.804
	I always would consider risky options when making decisions in a professional context.	0.786

Table 4. Descriptive statistics and bivariate correlations; Note: square root of AVE is included on the diagonal of bivariate correlations. *** p<0.001, ** p<0.01, *p<0.0

#	Construct	Mean	STD	CR	AVE	1	2
1	Hindrance IS use stressors	5.04	1.03	0.863	0.519	0.720	
2	Digital mindset	5.50	0.75	0.905	0.543	0.398**	0.737

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Paper VIII

FOSTERING THE DIGITAL MINDSET TO MITIGATE TECHNOSTRESS

AN EMPIRICAL STUDY OF EMPOWERING INDIVIDUALS FOR USING DIGITAL TECHNOLOGIES

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Valta, M., Hildebrandt, Y., & Maier, C. (2024). Fostering the Digital Mindset to Mitigate Technostress: an Empirical Study of Empowering Individuals for Using Digital Technologies. *Internet Research, Vol. 34 No. 6, pp. 2341-2369*

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Appendix

PUBLICATIONS

SCIENTIFIC JOURNALS (PEER REVIEWED)

Hildebrandt, Y., & Beimborn, D. (2024). Measuring the Digital Mindset: Development and Validation of a Multidimensional Scale. *The DATA BASE for Advances in Information Systems*, 2024. (VHB JOURQUAL 4 Rating: B) https://doi.org/10.1145/3701613.3701618

Valta, M., Hildebrandt, Y., & Maier, C. (2024). Embracing the Digital Mindset to Overcome IS Use Stress: An Empirical Study of Empowering Individuals for Using Digital Technologies. *Internet Research*, 2024. (VHB JOURQUAL 4 Rating: B) https://doi.org/10.1108/INTR-09-2022-0766

CONFERENCE PROCEEDINGS (PEER REVIEWED)

Hildebrandt, Y., Zaza, S., Armstrong, D., & Beimborn, D. (2024). IT Reinvention: A Configurational Perspective of IT Specific Traits. In *Proceedings of the 2024 Computers and People Research Conference 2024 (CPR'24).* Murfreesboro, USA. https://doi.org/10.1145/3632634.3655865

Mittermeier, F., Hund, A., Beimborn, D., Frey, J., & Hildebrandt, Y. (2024). Externalizing Digital Options Thinking: How Corporate Venture Builders Generate Opportunities to Invest in Digital Innovation. In *Proceedings of the Thirty-Second European Conference on Information Systems (ECIS).* VHB JOURQUAL 4 Rating: A)

Finze, N., Hildebrandt, Y., & Wagner, H-T. (2023). The Role of IT Identity and Paradoxes in Explaining Avoidance Strategies. In *Proceedings of the Forty-Fourth International Conference on Information Systems (ICIS)*, Hyderabad. (VHB JOURQUAL 4 Rating: A)

Hildebrandt, Y., & Beimborn, D. (2023). Affordance Perception Through a Digital Mindset: A Dual Process Theory Perspective. In *Proceedings of the Forty-Fourth International Conference on Information Systems (ICIS)*, Hyderabad. (Best Paper Nominee) (VHB JOURQUAL 4 Rating: A)

Hildebrandt, Y., & Beimborn, D. (2023). Digital Mindset Profiles for Innovating: The Relationship Between Digital Mindset and IT Reinvention. In *Academy of Management Annual Meeting Proceedings 2023*, Virtual. https://doi.org/10.5465/AMPROC.2023.17563abstract

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Hildebrandt, Y., Valta, M., & Beimborn, D. (2022). Quantifying the Digital Mindset: Development of a Measurement Instrument. In Proceedings of *Proceedings of the 2022 Computers and People Research Conference (CPR'22)*, Atlanta, Georgia, USA. https://10.1145/3510606.3550202.

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OTHER PUBLICATIONS

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