Organizing, Designing, and Governing Information Systems in the Age of Artificial Intelligence

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Abstract

In times when organizations increasingly rely on artificial intelligence (AI) to enhance their information systems (IS), the effective organization, design, and governance of AI-enabled IS has become a critical but challenging task. While AI promises to introduce new strategic opportunities enabled by its various capabilities, it also amplifies the need for solid and well-structured strategic IS management practices. Organizations must balance technological innovation with appropriate measures for strategic alignment, long-term architectural soundness, and suitable governance mechanisms for AI technologies. In this dissertation, I argue that getting the fundamentals of strategic IS management right is a prerequisite for organizations to effectively leverage AI in their IS. The overarching research aim of this thesis is to guide organizations in organizing, designing, and governing IS in the age of AI.

To that end, I adopt a dynamic capabilities perspective to structure my work. From this perspective, I emphasize how organizations must continuously develop their strategic IS management capabilities in sensing, seizing, and transforming in order to keep up and adapt to the evolving digital landscape with AI technologies at its frontier. Accordingly, this thesis is structured along three research goals (RGs). First, I aim to guide organizations in the foundations for identifying and shaping opportunities for strategic use of information technologies (IT) such as AI (RG1). Thus, Essays 1 through 3 focus on the topics of reporting structures in large-scale agile software development, driving and shaping digital innovation by engaging in inter-organizational networks, and establishing an enterprise architecture management function to ensure strategic alignment of IT usage with business goals. Second, I aim to guide organizations in seizing identified opportunities by designing AI-enabled IS (RG2). Accordingly, Essays 4 through 6 focus on creating a better understanding of how the AI term can be understood from an IS perspective, how the collaboration between humans and AI-based applications in work systems can be conceptualized, and how organizations can design and execute such work systems in practice. Finally, I aim to guide organizations in governing AI-enabled IS (RG3). Hence, Essay 7 develops a method that helps organizations to iteratively and continuously transform their existing governance frameworks towards AI governance.

The essays included in my thesis are based on qualitative research approaches, including literature reviews, case studies, and design science research. Ultimately, this

dissertation contributes to the discourse on how organizations can develop their strategic IS management capabilities in the age of AI to enable organizations to design and manage AI-enabled IS that create value, while mitigating the associated complexities and risks.

Keywords: Strategic IS management, information systems, artificial intelligence, organizational design, IT governance, enterprise architecture, digital innovation.

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Finally, I want to thank my colleagues, co-authors, and friends at the FIM Research Center and the Fraunhofer FIT. The many collaborations throughout the years made the time worthwhile and fun. Thank you for putting up with me, cheering me up in times of setbacks, and celebrating with me in times of success.

Bayreuth, May 2025 *Moritz Schüll*

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Introduction to Organizing, Designing, and Governing Information Systems in the Age of Artificial Intelligence

Abstract

This dissertation focuses on the strategic IS management capability of organizations and the need for this capability to evolve in times of increasing adoption of AI technologies. With my work, I aim to guide organizations in organizing, designing, and governing AI-enabled IS. The dissertation comprises seven essays that are structured along three research goals. To the end of these research goals, this dissertation informs about how to organize for the development of IS, design AI-enabled IS, and establish a governance of AI-enabled IS. In the introduction to this dissertation, I first provide the overall motivation for my research (Section 1), the background to the strategic management of IS and AI-enabled IS (Section 2), and motivate and derive the three overall research goals (Section 3). Subsequently, I elaborate on the essays' research methods (Section 4). I then proceed to summarize the essays' results (Section 5) and discuss the results of this dissertation, review its limitations, and identify future research opportunities (Section 6).

Keywords: Strategic IS management, information systems, artificial intelligence, organizational design, IT governance, enterprise architecture, digital innovation.

Copyright Statement

Sections of this dissertation partly comprise content taken from the research papers included in this thesis. To improve the readability of the text, I omit the standard labeling of these citations.

Table of Contents – Introduction

1 Motivation

Today, IT-enabled capabilities support virtually all organizational functions and have an extensive positive impact on firms' competitive performance (Beese, Aier, et al., 2023; Beese, Haki, et al., 2023; Mikalef et al., 2021). Over the past decades, IT has evolved from a mere support function for businesses to a core driver of business strategy and innovation (Yoo et al., 2024). The evolution of IT from supporting business functions to driving competitive advantage has transformed strategic IS management into a core management discipline of modern organizations (Bharadwaj et al., 2013; Yeow et al., 2018). Effective IS management is critical to ensure that organizations derive value from their investments in IT, as well as to ensure the smooth operations of their businesses and business models that are increasingly driven by digital technologies (Kratzer et al., 2023). Research has even shown that strategic IS management capabilities contribute to the overall performance of organizations (Queiroz et al., 2018). Conversely, inadequate strategic IS management capabilities may lead to problems such as the misalignment of business and IT, wasted resources, and even business failures.

Yet, effective IS management is not easily achieved. Today, organizations' IS landscapes comprise many different systems and technologies, including long-lasting enterprise IS, such as customer relationship management or enterprise resource planning systems, as well as comparatively new technologies and approaches, such as AI technologies (T. Li & Chan, 2019). These landscapes often comprise systems from various vendors and combine different infrastructure technologies. For instance, systems may be hosted partially on the organization's own premises and partially on rented cloud infrastructure (Choudhary & Vithayathil, 2013). Meanwhile, organizations are required to ensure stable operations of their IT infrastructure while simultaneously driving IT-enabled business innovation (Kratzer et al., 2023). The need to balance control over the IT landscape with the ability to adapt to rapidly changing technologies, consumer behaviors, and competitive environments further complicates strategic IS management for today's organizations (Vaia et al., 2022).

As a result of these complexities, organizations often still struggle with foundational tasks of strategic IS management (Ahlemann et al., 2021; Lowry et al., 2024; Schmidt & Buxmann, 2011), which include organizing development processes, IT governance, enterprise architecture management (EAM), and lifecycle management of IT systems, among others (Riempp et al., 2008; Seddon, 2014). Regardless of specific technological

advancements, these fundamental tasks of strategic IS management remain essential. Organizations need to master these basics to leverage their IS investments for improved business capabilities, to adapt to new technologies, and to sustain competitive advantage (Arvidsson et al., 2014; Mikalef et al., 2021).

This becomes even more critical regarding fast-paced technological developments that promise business potential (Mikalef et al., 2021; Vaia et al., 2022), such as the recent developments of AI technologies. However, AI technologies also bring several demands and changes that organizations must address to design and manage AI-enabled IS successfully. These demands may pose challenges to organizations, even if they have an existing solid strategic IS management capability. Among others, they include a more data-centric development of AI-enabled IS, where data collection and continuous model refinement are integral to system development and usage (Benbya et al., 2021; Sundberg & Holmström, 2024). Humans no longer simply use AI-based applications, but AI-enabled IS rather build on a collaboration of human agents and AI-based applications, with the latter now also being considered to exhibit an agentic nature (Baird & Maruping, 2021; Murray et al., 2021). Due to the learning capabilities of such systems, organizations must now handle their emerging behavior, which might not have been foreseen during initial development (Murray et al., 2021). In turn, these aspects and characteristics of AI-based applications raise considerations of explainability and accountability, among many other ethical and social concerns, that were less pressing for IS based on traditional IT (Papagiannidis et al., 2025). Consequently, governance and risk management frameworks that encompass AI-specific considerations, including potential bias in models and data, decision-making transparency, and ethical concerns, are increasingly called for by researchers and practitioners (Mäntymäki et al., 2022a; Papagiannidis et al., 2023).

These new opportunities and challenges regarding AI technologies highlight the importance of having well-established strategic IS management practices to support and sustain the development and management of AI-enabled IS. Success in organizing, designing, and governing AI-enabled IS ultimately builds on strong strategic IS management capabilities that continuously evolve along with the frontier of AI technologies (Berente et al., 2021). Consequently, strategic IS management is conceptualized based on the dynamic capabilities framework in this thesis (Teece, 2007; Teece et al., 1997). Strong strategic IS management capabilities will be necessary to deal with the changes and challenges through AI technologies, and these capabilities

will also have to evolve along with the frontier of AI technologies. Conversely, without robust practices for organizing the general development of IS, organizations may lack the structure and processes needed to design and manage AI-enabled IS that integrate AI technologies effectively into the organization's broader IS landscape.

Given the previously outlined importance of getting the fundamentals of strategic IS management right for organizations' continued competitive performance, the promises that new AI technologies bring to the IS landscape, as well as the challenges that come with designing and managing IS that integrate these AI technologies, the overarching research aim of my dissertation is as follows:

Guiding organizations in organizing, designing, and governing IS in the age of AI

This research aim yields three further, more specific research goals around which this thesis is organized. I address these research goals in seven essays. With these essays, I seek to contribute to the IS discourse by creating insights into how organizations can identify and shape strategic opportunities for IT usage in their IS and how they may act on such opportunities, specifically regarding AI technologies.

The remainder of this introduction to my dissertation is structured as follows. First, I discuss the theoretical background of organizing for IS development, strategic management of IS, and AI-enabled IS. Based on these foundations, I derive and motivate three research goals (RGs), which structure this dissertation and the seven essays, and describe the research methods of these essays. I then summarize the essays' results and conclude with a discussion of the findings in light of the overall research aim, a review of this dissertation's limitations, and an outlook on potential future research opportunities. Following the introduction, the essays can be found.

All the essays included in this dissertation are the result of joint work with co-authors. Therefore, in the following I use the plural formulation *we* when referring to the essays and their content. The specific contributions of each essay's co-authors are described in Appendix A. Further, as the introduction to this dissertation partly comprises content from these research articles, I have omitted the standard indications of these citations to improve readability.

2 Background

This section provides the theoretical foundations and an overview of literature relevant to the overarching topic of this dissertation. As the goal of the thesis is to guide organizations in organizing, designing, and governing IS in the age of AI, in Section 2.1 the fundamentals of the strategic management of IS are presented. Then, in Section 2.2, the fundamentals of AI-enabled IS and the implications for strategic IS management practice and research are described. Finally, in Section 2.3, a framework for the structure of this thesis and the included essays is presented based on the dynamic capabilities framework by Teece (2007).

2.1 Strategic Information Systems Management

Strategic IS management is a research topic in the IS domain with a long history that has evolved extensively over time (B. Mueller & Urbach, 2021). Initially, IT was viewed as an operational tool that enables business efficiency, and IS management was largely considered to be concerned with the management of IT in the dedicated IT / IS department. However, over time IS became deeply embedded in organizations, corporate strategies, and business models (Bharadwaj et al., 2013; T. Li & Chan, 2019). In this context, the literature stream on digital transformation has emerged in strategic IS management research. It focuses on the transformation and changing role of IT as a mere tool towards being a strategic driver of business models and value creation in modern organizations (Vial, 2019).

Today, alongside the digital transformation of society and organizations, the focus of strategic IS management has evolved from a functional concern to a core management discipline of almost all organizations, shaping business models, competitive advantage, and organizational agility (Bharadwaj et al., 2013; Vaia et al., 2022; Vial, 2019). New business models emerged, which are natively integrating and enabled by digital technologies, such as digital platform ecosystems or data-driven business models (Hein et al., 2020; Kühne & Böhmann, 2019; Schreieck et al., 2022). Digital technologies such as cloud computing and the Internet of Things have further enabled organizations to automate and personalize services at a large scale (Gregory et al., 2018).

Strategic IS management today comprises a variety of tasks and is no longer only concerned with the provision and maintenance of IT infrastructure (Bharadwaj et al., 2013; D. Q. Chen et al., 2010; T. Li & Chan, 2019). While these tasks remain important,

and core tasks still include the management of an organization's IT infrastructure, today, strategic IS management includes tasks such as EAM, agile IT governance, and proactively driving digital innovation initiatives. Disciplines of strategic IS management, such as EAM and business-IT alignment, seek to ensure the alignment of IT investments and systems with business goals (Yeow et al., 2018). The development of agile IT governance models allows for flexible, decentralized decision-making in organizations (Gregory et al., 2018; Mikalef et al., 2021) and to build bimodal IT structures that allow for a balance between stable IT operations with agile innovation activities (Virag et al., 2024). Further, strategic IS management is also concerned with driving digital innovation initiatives that integrate new technologies into business processes, products, and services or facilitating technology-driven business model innovation that enables new ways of value creation for the organization (Choi & Pang, 2025; Nambisan et al., 2017). To that end, continuously evaluating new technology trends (e.g., AI, blockchain, quantum computing) and assessing their impact on the business and its processes has become essential to strategic IS management (Bharadwaj et al., 2013; T. Li & Chan, 2019).

2.2 Artificial Intelligence-Enabled Information Systems

AI technologies have been at the forefront of technological trends recently (Stohr et al., 2024; Yang et al., 2024). Today, the management of AI technologies and applications is a top concern for the strategic IS management practice in most organizations. For instance, the management consultancy Boston Consulting Group reports in a recent survey that currently 75% of executives consider AI technologies as a top strategic priority for their organizations (Boston Consulting Group, 2025). Societies have also started grappling with developments in the AI domain. For example, the European Union (EU) recently established AI-focused regulation with the so-called EU AI Act (European Parliament, 2024). Likewise, research related to AI applications and technologies has seen a significant surge recently (Papagiannidis et al., 2025).

The research field on AI has existed for quite some time, with first dedicated research starting in the 1950s (Russell & Norvig, 2010). Despite this history and the current hype around AI technologies and their applications, no final definition of AI has emerged so far (Collins et al., 2021). The lack of conceptual clarity on the AI term is paramount for the motivation of Essay 4 in this dissertation, where we seek to address this concern. For the sake of the overarching research aim of this dissertation, which revolves around the concept of AI-enabled IS and the necessary strategic IS

management capabilities for their management, I follow the socio-technical systems perspective on IS (Bostrom & Heinen, 1977) and the conceptualization of AI by Berente et al. (2021). Thus, in this thesis I understand AI-enabled IS as socio-technical systems whose technical component uses technologies at the frontier of computing in terms of performance and scope, i.e., so-called AI technologies (Berente et al., 2021; Bostrom & Heinen, 1977).

This understanding of AI-enabled IS is beneficial for the research aim of this thesis for two reasons. First, the socio-technical systems perspective is well-established in the IS domain (Chatterjee et al., 2021; Sarker et al., 2019) and conceptualizes the social and technical components of an IS to be interacting (Sarker et al., 2019). Focusing on these interactions and the alignment of the two components, instead of a predominant focus on the technical component, is consistent with the differentiation of strategic IS management from IT management, as discussed in Section 2.1. Second, the conceptualization of AI as the frontier of computing in terms of performance and scope (Berente et al., 2021) allows an appropriate balance of abstracting from specific AI technologies – of which there are plenty (Benbya et al., 2021) – and focusing on the characteristics of AI applications in the interplay with other components in the context of an IS.

It is these characteristics of AI applications that challenge past assumptions about the differences between human and machine capabilities (Benbya et al., 2021; Murray et al., 2021). Several attempts at outlining these characteristics from an IS perspective can be found in the literature. Berente et al. (2021) describe AI applications to be characterized by their *autonomy*, i.e., the capacity to act without human intervention, their *ability to learn,* i.e., the ability to automatically improve during operation, and their *inscrutability,* i.e., the fact that underlying algorithms and models become increasingly opaque to humans. Both Murray et al. (2021) and Baird and Maruping (2021) focus on the *agentic nature* of AI applications but differ in the nuances of their conceptualization of agency. Baird and Maruping (2021) understand agency as the "capacity to learn, adapt, act autonomously, and be aware of the need to act without being prompted by users" (p. 316), which partially aligns with the characteristics described by Berente et al. (2021). Murray et al. (2021) focus on the ability of agentic AI applications to both develop protocols for new organizational routines and intentionally select actions in executing organizational routines. Thus, while differences in the nuances of AI applications' characteristics can be observed, based on

these existing papers, I understand AI applications from an IS perspective as technical components that (1) interact with other components of the IS in an *autonomous* way, i.e., without necessarily being prompted by another technical or human component, and that (2) flexibly adapt their behavior over time based on past experience and changing contingencies, i.e., exhibit an ability to *learn*.

Due to these characteristics of AI applications, they offer promising opportunities for business models and value creation but also confront the strategic IS management discipline with several challenges and risks (J. Li et al., 2021; Yang et al., 2024). These challenges include aspects such as the fact that AI applications may exhibit unexpected behavior due to the aforementioned inscrutability, as well as ethical challenges such as accountability issues (Faraj et al., 2018; Yang et al., 2024). Further, given the ongoing rapid development of AI technologies, strategic IS management needs to continuously monitor these developments to identify and purposely shape potential opportunities for the usage of these technologies to sustain competitive advantage (Krakowski et al., 2023). Consequently, a solid strategic IS management capability can be seen as important as ever for organizations to prevail in the age of AI.

To summarize, a study of strategic IS management in the age of AI has to consider the full breadth of strategic IS management capabilities, ranging from identifying strategic opportunities for innovative technology usage, to purposefully designing AI-enabled IS, to the continuous governance and transformation of AI-enabled IS. In the following, I will substantiate this perspective on strategic IS management theoretically.

2.3 A Dynamic Capability Perspective on Strategic Information Systems Management in the Age of Artificial Intelligence

To provide a sound theoretical foundation for my research and to structure this dissertation, in the following I derive a framework based on the dynamic capabilities framework (Teece, 2007; Teece et al., 1997) – also referred to as the dynamic capability view of the firm (Steininger et al., 2022) – that aligns my research goals with an understanding of key dynamic capabilities necessary for organizing IS development, as well as designing and managing AI-enabled IS.

The dynamic capabilities framework has become a major theory in management research and is also often applied in the IS domain (Steininger et al., 2022). It argues that to achieve a sustained competitive advantage, organizations have to "continuously create, extend, upgrade, protect, and keep relevant the enterprise's unique asset base"

(Teece, 2007, p. 1319). This is achieved by harnessing so-called dynamic capabilities (Eisenhardt & Martin, 2000; Teece, 2007). Dynamic capabilities are defined "as the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments" (Teece et al., 1997, p. 516). The dynamic capabilities view distinguishes between ordinary operational capabilities necessary for the daily operations of the organization and dynamic capabilities that enable strategic change by creating, extending, and modifying the organization's base of ordinary capabilities (Steininger et al., 2022) and resources (Yeow et al., 2018). Thus, dynamic capabilities are learned, stable patterns used by organizations to generate and modify operating routines (Zollo & Winter, 2002).

Today, dynamic capabilities are often disaggregated into three organizational actions or capacities toward strategic change (Haki et al., 2024; Steininger et al., 2022; Teece, 2007; Yeow et al., 2018): *sensing*, *seizing*, and *transforming*. The *sensing* capability is relevant for identifying and shaping strategic opportunities and threats (Teece, 2007), including the identification and assessment of technological opportunities and customer needs (Yeow et al., 2018). *Seizing* refers to the capability to address identified opportunities by developing new products, processes, or services in order to capture value (Teece, 2007; Yeow et al., 2018). Finally, *transforming* describes the organization's capability to "reconfigure assets and organizational structures as the enterprise grows" (Teece, 2007, p. 1335). This includes organizational restructuring, adjusting routines, and establishing governance structures (Yeow et al., 2018).

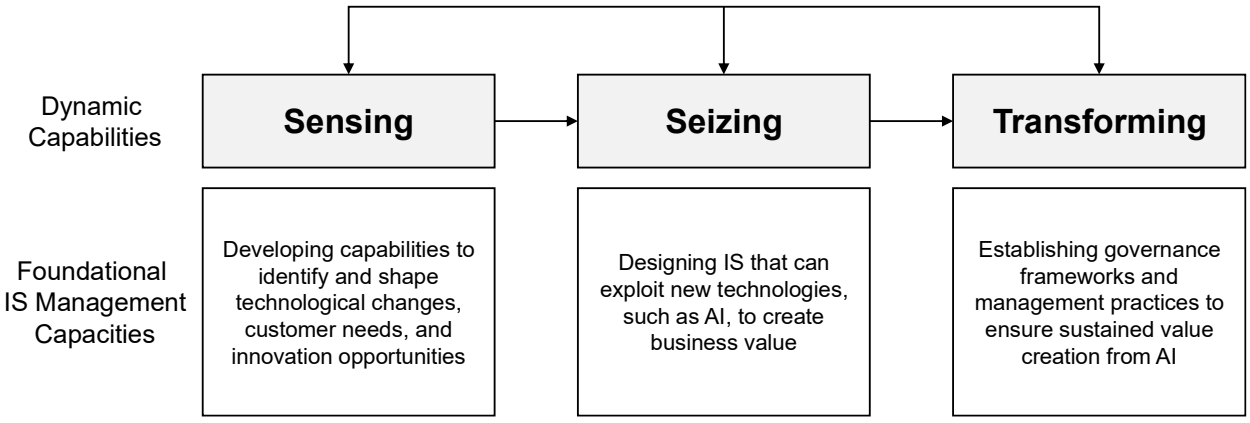

Figure 1. Strategic IS management in the age of AI as a dynamic capability, comprising the capacities to sense, seize, and transform, adapted from Teece (2007)

Using the dynamic capabilities framework as a foundation, in this thesis I conceptualize strategic IS management in the age of AI to include the capabilities of sensing, seizing, and transforming, which enable organizations to design and manage

AI-enabled IS effectively. As described above, today strategic IS management often is key to driving business innovation. Instead of the traditional focus of IS management on aligning IT with business goals, organizations must continuously evolve IS strategies to integrate new evolving technologies, such as AI, while still ensuring the operational stability of IT infrastructures. Therefore, strategic IS management in the age of AI can be understood to include dynamic capabilities that enable organizations to continuously adapt to technological and market changes. Figure 1 depicts this understanding of strategic IS management in the age of AI as a dynamic capability comprising the capabilities to sense, seize, and transform.

The *sensing* capability of strategic IS management in the age of AI is concerned with identifying emerging technology trends at the frontier of computing in terms of performance and scope, interpreting competitive advantages that may be achieved from them, and shaping innovation opportunities resulting from these technologies. Existing work in this area has investigated how organizations can engage in innovation networks and alliances to foster digital innovation (e.g., Lyytinen et al. (2016), Bockelmann et al. (2024)), how they can anticipate and explore disruptive technologies and innovation opportunities (e.g., Böttcher et al. (2022), Holotiuk et al. (2024)), as well as the roles of IT managers and chief information officers (CIOs) in this context (e.g., Schäper et al. (2025)). Studies also suggest that dedicated digital strategy units and IT governance structures contribute to and institutionalize an organization's capability to sense technology and market opportunities (Chau et al., 2020; Elazhary et al., 2023). Finally, an EAM function can also contribute to an organization's sensing capability by evaluating and ensuring that emerging technologies or identified opportunities for technology usage align with the organization's business goals and IS structures (Ahlemann et al., 2021). By steering the direction in which an organization's IS strategy and IS structures evolve, the EAM function can shape opportunities for using emerging technologies such as AI. Overall, the focus in this area is on organizational structures that are necessary to identify and shape emerging technology trends and that provide organizations with the necessary foundation to be ready to act upon them. In this thesis, the term *organizing for IS development* will be used to refer to efforts in this regard.

The *seizing* capability of strategic IS management in the age of AI is concerned with designing AI-enabled IS to seize the identified opportunities of AI technologies. Thus, in this thesis, the term *designing AI-enabled IS* will be used to refer to efforts in this

regard. Existing work in this area has studied how data increasingly becomes a strategic asset necessary for seizing AI-based opportunities (e.g., Günther et al. (2022)). Further, research has explored how AI-based agents may collaborate with humans in various settings of delegation (e.g., Baird and Maruping (2021), Guggenberger et al. (2023)) and how interactions between AI-based agents and human agents may be conceptualized (e.g., Hinsen et al. (2022)). These contributions lay an important foundation for organizations to be able to seize AI-related opportunities and integrate AI-based applications into their work systems.

Finally, the *transformation* capability of strategic IS management in the age of AI is concerned with ensuring that governance and risk management approaches evolve and transform alongside the AI-enabled IS in an organization. Throughout this thesis, the term *governing AI-enabled IS* will be used to refer to efforts in this regard. Research in this area has started to explore topics and principles of AI governance (e.g., Papagiannidis et al. (2025)) and initial proposals for AI governance frameworks have been made (e.g., Wirtz et al. (2022), Schneider et al. (2023)). The initial insights from the literature form a basis for the transformation capability of strategic IS management in the age of AI. Yet, this capability will need to evolve continuously alongside the ever-evolving technology frontier of AI.

3 Derivation of Research Gaps and Research Questions

Based on and in line with the overall research aim of guiding organizations in organizing, designing, and governing IS in the age of AI, I derive three specific research goals:

(RG1) *Guiding the organization of IS development*

(RG2) *Guiding the design of AI-enabled IS*

(RG3) *Guiding the governance of AI-enabled IS*

		Sensing - Developing capabilities to identify and shape technological changes, customer needs, and innovation opportunities	**Seizing** - Designing IS that can exploit new technologies, such as AI, to create business value	**Transforming** - Establishing governance frameworks and management practices to ensure sustained value creation from AI
RG1: Guiding the organization of IS development	**Essay 1:** Reporting in Large-Scale Agile Organizations – Insights and Recommendations from a Case Study in Software Development	**X**		
	Essay 2: Digital Innovation in the Public Sector: A Resourcing Perspective on How the Public Sector Collaborates with the Private Sector	**X**	X	
	Essay 3: Legitimating an Enterprise Architecture Management Function – A Process Perspective	**X**	X	X
RG2: Guiding the design of AI-enabled IS	**Essay 4:** How to Consider the Artificial Intelligence Term? A Categorization System to Strengthen Research Impact	X	**X**	
	Essay 5: Teaming Up with Intelligent Agents — A Work System Perspective on the Collaboration with Intelligent Agents		**X**	
	Essay 6: Designing Human-AI Hybrids: Challenges and Good Practices from a Multiple Case Study		**X**	X
RG3: Guiding the governance of AI-enabled IS	**Essay 7:** Towards Systematic AI Governance — A Transformation Method		X	**X**

Figure 2. Positioning of this dissertation's research goals and essays in the overarching research framework. Each RG focuses on one dynamic capability in particular (highlighted)

These three RGs guide this dissertation, and the included essays are structured according to them. The RGs align closely with the previously described understanding of strategic IS management as a dynamic capability. Figure 2 depicts how the three

RGs and the essays fit into the overarching framework of my thesis. In the following, I describe each RG in more detail by elaborating on the research gaps and research questions of each essay that contribute to the RG, respectively.

3.1 RG1: Guiding the Organization of Information Systems Development

Firms must be able to deal with unexpected threats, unprecedented changes in market behavior, and quickly take advantage of emerging opportunities in order to survive in modern business environments (Mikalef et al., 2021). Because IT plays a crucial role for the successful performance of today's organizations in these environments (Y. Chen et al., 2014; Mikalef et al., 2021), continuous adjustments to and development of new IS become necessary to ensure optimal strategic alignment with the organization's goals (Beese, Haki, et al., 2023). Hence, the first research goal of this dissertation is to support organizations in organizing the development of IS.

To that end, organizations need to first establish structures that allow them to monitor changes in technologies, competitive environments, or demands of customers. This enables organizations to identify and shape new strategic opportunities to use IT and develop IS (Teece, 2007). Organizations need to be able to constantly recognize change and transition between "short-lived, temporary competitive advantages" (Vaia et al., 2022, p. 662). To achieve this, practitioners and researchers alike have been applying and studying agile IS development approaches over recent years (Goh et al., 2013; Nazir et al., 2024). Agile IS development approaches promise innovation processes that enable quick, iterative development of IS by cross-functional, self-managed teams (Vaia et al., 2022), thereby challenging the traditional functional separation between the IT function and business units (L. Mueller et al., 2024).

However, organizations that apply agile IS development approaches often face tensions between the autonomy of agile teams and the necessary overall control and strategic alignment (L. Mueller et al., 2024; Virag et al., 2024). Yet, overall strategic alignment of IS development and business strategy is necessary for an organization to realize value from its IT investments (Henderson & Venkatraman, 1999). In traditional project management, project and program reporting has been shown to be positively associated with overall portfolio performance (Müller et al., 2008) and to enable strategic alignment of projects (Avison et al., 2004). However, traditional reporting as a means of organizational oversight seems to contradict the principles of agile IS development approaches. Thus, to enable the development of a reporting approach

that integrates with agile IS development approaches, we ask the following research question:

What are the challenges of reporting in large-scale agile organizations that should be considered in the development of a reporting approach for large-scale agile organizations? (Essay 1)

Second, next to being able to monitor changes in their surroundings, organizations also need to establish structures that allow them to shape potential opportunities and proactively drive the development of new opportunities (Teece, 2007). Regarding the development of IS, this entails establishing organizational settings that enable the exploration of potential applications of IT and that foster digital innovation.

Research has shown that digital innovation is happening in a distributed and combinatorial manner, contrasting the literature on innovation without pervasive digital technologies (Yoo et al., 2024; Yoo et al., 2010). The literature argues that this is due to the fact that digital objects are – in contrast to physical objects – easily distributed, edited, and recombined with other digital objects and digital infrastructures (Faulkner & Runde, 2019; Kallinikos et al., 2013; Yoo et al., 2010). This, in turn, enables different actors, such as organizations, to temporarily cooperate and foster digital innovation (Lyytinen et al., 2016).

Despite these insights from prior studies, many organizations still struggle with driving their digital innovation and digital transformation. This is also true for public sector organizations, which are often described as lackluster regarding digital innovation and IT-enabled innovation (Benbunan-Fich et al., 2020). Public sector organizations are often subject to rigid structures and governance frames that restrict experimentation and innovation (Sundberg & Holmström, 2024). However, research has highlighted that public-private partnerships (PPPs) could be a potential driver of successful digital innovation in the public sector (Brogaard, 2021). Therefore, we ask the following research question:

How can we conceptualize the development of digital innovation in PPPs from a resourcing perspective? (Essay 2)

Third, organizations need to establish organizational structures that enable them to keep an overview of the various IS that are being used and developed throughout the organization. While specific reporting procedures, IS development initiatives, and

innovation projects may be carried out by individual teams, departments, or business units in an organization, organizations need to ensure strategic alignment of all these initiatives to achieve overall success of IT usage in their various IS (Lowry et al., 2024). An established means to achieve alignment between local and organization-wide IT demands and IS development initiatives is the enterprise architecture (EA) approach (Hanseth & Modol, 2021).

The EA approach allows organizations to understand their current state of the enterprise architecture, which comprises the organization's IT and business components, such as strategic goals, business processes, and IT systems, as well as their interdependencies (Haki et al., 2020; Schmidt & Buxmann, 2011). The aim of the EA approach is to define a target architecture based on the overall strategic goals and derive actions that guide the organization in developing towards this target architecture (Ahlemann et al., 2021). In prior work, researchers and practitioners have developed a variety of frameworks and guidelines for managing the EA (i.e., EA management (EAM)) (Kotusev & Kurnia, 2021). The EAM is typically carried out by a so-called EAM function, which usually comprises a team of one or multiple (enterprise) architects (Kotusev et al., 2023).

While we know a lot about carrying out EAM, research is scarce on how to implement an EAM function in organizations that did not follow the EA approach previously (Levy & Bui, 2019). Yet, establishing an EAM function is essential to enable suitable structures for the development of IS. As research has shown that the success of strategic management and long-term planning in organizations – such as EAM – largely depends on cultural and social aspects (Lange et al., 2016), I deem it necessary to investigate how an EAM function can be legitimized in organizations. Next to the existing methodological knowledge on carrying out EAM, this represents a significant gap in the knowledge on EAM. Thus, we ask the following research question:

How is legitimacy attained during the process of establishing an EAM function?
(Essay 3)

3.2 RG2: Guiding the Design of Artificial Intelligence-Enabled Information Systems

Building on RG1, which focuses on the organizational structures needed to enable organizations to develop and adjust IS in general, RG2 focuses on enabling organizations to design AI-enabled IS. AI technologies represent one of the major

technological developments in the current IS landscape and organizations are identifying increasingly ample opportunities to apply these technologies (Berente et al., 2021; Mikalef & Gupta, 2021). In order to seize these opportunities, organizations need to be able to design AI-enabled IS properly.

However, as touched upon in the motivation section of this dissertation, the AI term is used for widely different things at the moment and is often considered to be an umbrella term (Ågerfalk et al., 2022). While there have been some attempts to find a definition of the AI term (e.g., Russell and Norvig (2010)), no dominant definition has emerged yet, and the term is being used vastly differently by different authors (Collins et al., 2021; Mikalef & Gupta, 2021). The lack of a definition is concerning, as it may lead to problems in cumulative knowledge building about AI (Collins et al., 2021). As different researchers and practitioners may have different concepts in mind when using the AI term, this may lead to problems in knowledge transfer and a potential disconnect between and among researchers and practitioners. Studies have tried to develop classification systems that seek to structure the different types of technological artifacts, which are being referred to with the AI term, into subclasses (e.g., Grashoff and Recker (2023)). However, such classifications tend to be static and do not account for the continuously evolving nature of AI (Berente et al., 2021). Technology that may be considered AI today may become common computing capabilities in a few years' time, quickly rendering static classification systems outdated. To address these issues and to enable a more nuanced conversation about AI and its potential use cases in IS, we ask:

How can we develop an understanding of the AI term that fosters a cumulative research tradition and accounts for the future evolution of AI? (Essay 4)

The categorization system developed in Essay 4 enables researchers and organizations to more clearly specify what they mean when they are using the AI term. Leveraging this clarity, organizations can identify and describe concrete use cases for AI technologies in work systems precisely. It enables a nuanced conversation about AI and its usage in organizations and facilitates the identification and transfer of relevant knowledge for a specific understanding of the AI term.

Still, implementing AI technologies in organizations requires more than clarity in the understanding of the AI term. AI-based applications are increasingly characterized by an agentic nature, allowing them to learn, bear responsibility for tasks and outcomes,

act autonomously, and make decisions under uncertainty (Baird & Maruping, 2021). This stands in contrast to traditional IT systems (Berente et al., 2021; Hofmann et al., 2024). It requires researchers and organizations to consider how human agents can collaborate with such agentic, AI-based applications (*intelligent agents*) in productive work environments. While most existing research revolves around bilateral human-AI interactions, implementing intelligent agents into organizational work systems requires a broader systems perspective (Hofmann et al., 2024). So far, insights and guidance are scarce on how to holistically design work systems in organizations that leverage the collaboration of human and intelligent agents (Fabri et al., 2023; Hofmann et al., 2024). There is a lack of research that equally considers the role of both types of agents when conceptualizing collaboration between human and intelligent agents (Fabri et al., 2023). This is concerning, as intelligent agents' current and future capabilities will enable collaborative settings in work systems, where not only humans delegate tasks to intelligent agents but also vice versa (Baird & Maruping, 2021; Guggenberger et al., 2023). A focus on individual interactions will not be sufficient to understand and design such work systems. The lack of knowledge on how to describe design choices of such work systems and collaborative constellations between human and intelligent agents impedes researchers' and practitioners' abilities to identify and understand issues of collaboration between human and intelligent agents. Researchers are therefore calling for an architectural approach to human-AI collaboration in work systems (Hofmann et al., 2024). To address this gap and to provide a means for researchers and practitioners to holistically describe and purposefully architect work systems that leverage collaboration between human and intelligent agents, we ask:

How can we conceptualize the collaboration between humans and intelligent agents in work systems? (Essay 5)

While Essay 4 provides a categorization system for the precise usage of the AI term and Essay 5 focuses on a holistic conceptualization of human and intelligent agents from a work systems perspective, I acknowledge that in practice, organizations still struggle to implement AI-enabled IS and to realize value from them (Shollo et al., 2022; Stohr et al., 2024). The purposeful implementation of work systems where human and intelligent agents collaborate on joint tasks or processes is becoming increasingly important for organizations (Stohr et al., 2024). Throughout Essay 6, this type of work system is referred to as a *human-AI hybrid* (Fabri et al., 2023; Rai et al., 2018). When

transferring initial prototypes and pilots of such human-AI hybrids into productive AI-enabled IS that generate value, organizations often face challenges or lack the necessary capabilities. This is due to organizations failing to adjust established routines and processes (Stohr et al., 2024; Weber et al., 2022), uncertainties of integrating intelligent agents with existing work systems (Lee et al., 2023; Shollo et al., 2022), and a general lack of consideration of socio-technical factors (Asatiani et al., 2021). Thus, understanding these challenges of organizations and identifying potential solutions represents a highly relevant research topic. Yet there is currently still a scarcity of knowledge in this regard (Wang et al., 2024). As long as we lack such structured empirical insights, our ability to transfer existing theoretical knowledge on the collaboration of human and intelligent agents – such as the model developed in Essay 5 – into practice is impeded. Consequently, a disconnect between research and practice may arise, leading to human-AI hybrids that may not perform optimally or as intended (Hemmer et al., 2024). To address this gap and to facilitate cumulative knowledge building of research and practice on the collaboration of human and intelligent agents, we ask:

What are the challenges and good practices for the construction and execution of human-AI hybrids? (Essay 6)

3.3 RG3: Guiding the Governance of Artificial Intelligence-Enabled Information Systems

Finally, next to the capabilities for sensing and seizing technological opportunities in respect to AI-enabled IS, organizations also need to be able to manage the implemented AI-enabled IS over their lifecycle. This includes the governance of AI-enabled IS, in particular the continuous transformation of regulatory and institutional structures as well as the management of threats (Teece, 2007). In this regard, RG3 seeks to guide organizations in establishing a governance of AI-enabled IS.

Establishing a governance for AI-enabled IS is crucial, as the use of AI technologies comes with potentially unwanted or unintended outcomes in many organizational use cases (Papagiannidis et al., 2025). Recently, research has started to suggest that the unique features of AI applications, e.g., agentic behavior and the capability to learn, should be attended to with dedicated governance efforts (Papagiannidis et al., 2023). Further, companies have to ensure the compliance of their AI-enabled IS with newly emerging AI regulations (Schneider et al., 2023), such as the AI Act of the EU

(European Parliament, 2024) or the presidential executive order in the United States of America (The White House, 2023).

However, while research has started to investigate the governance of AI-enabled IS, we still lack guidance on how to deploy abstract ethical principles for the use of AI technologies in practice (Mäntymäki et al., 2022a; Papagiannidis et al., 2025). This is further complicated by the continuously evolving nature of AI technologies (Berente et al., 2021), which requires organizations to constantly reconsider their AI governance approach (Papagiannidis et al., 2025). Therefore, organizations must develop the capability to continuously transform their AI governance approach to keep up with emerging technologies and regulations. Thus, we ask the following research question:

How can organizations transform their governance framework towards a systematic AI governance? (Essay 7)

4 Thesis Structure and Research Design

This thesis comprises seven essays. These essays address the research goals that I describe in Section 3 and reflect the cumulative nature of this dissertation. Following this introduction, the essays are included. Essays 1 through 3 address RG1, Essays 4 through 6 address RG2, and Essay 7 addresses RG3. For a consolidated overview, Table 1 lists all seven essays under the respective research goal they address and provides their publication outlets and publication status.

Table 1. The essays and how they address the three research goals of this thesis

Title	Publication outlet	VHB 2024 / VHB JQ3	Publication status
RG1: Guiding the organization of IS development			
Essay 1: Reporting in Large-Scale Agile Organizations – Insights and Recommendations from a Case Study in Software Development	Information Systems and e-Business Management	C / C	Published as Schüll et al. (2023) Building upon Philipp et al. (2022)
Essay 2: Digital Innovation in the Public Sector: A Resourcing Perspective on How the Public Sector Collaborates with the Private Sector	Information and Organization	B / B	Under review (3rd round after major revisions)
Essay 3: Legitimating an Enterprise Architecture Management Function – A Process Perspective	Journal of Information Technology	A / A	Major revision (after 1st round of reviews)
RG2: Guiding the design of AI-enabled IS			
Essay 4: How to Consider the Artificial Intelligence Term? A Categorization System to Strengthen Research Impact	Journal of the Association for Information Systems	A / A	Submitted
Essay 5: Teaming Up with Intelligent Agents — A Work System Perspective on the Collaboration with Intelligent Agents	Scientific journal	A / B	In preparation for submission Building upon Jakob et al. (2024)
Essay 6: Designing Human-AI Hybrids: Challenges and Good Practices from a Multiple Case Study	Proceedings of the 45th International Conference on Information Systems	A / A	Published as Mayer et al. (2024)
RG3: Guiding the governance of AI-enabled IS			
Essay 7: Towards Systematic AI Governance — A Transformation Method	Information & Management	B / B	Submitted

Overall, my research follows pragmatist and interpretivist assumptions (Goldkuhl, 2012; Orlikowski & Baroudi, 1991) and I mainly apply qualitative empirical research methods. Several of my essays seek to develop frameworks, categorizations, and recommendations with the goal of being useful and applicable for strategic IS management in organizations and, thus, expressing a pragmatist stance (Goldkuhl, 2012; Orlikowski & Baroudi, 1991). However, in my work I also recognize that organizational realities are socially constructed and that meanings around IS and management practices emerge through interaction and interpretation, thus expressing an interpretivist stance (Goldkuhl, 2012; Orlikowski & Baroudi, 1991). In the following, I describe the individual research approaches of the essays included in this thesis.

In Essays 1 through 3, we conduct case studies following Yin (2014) to address RG1. As our goal in Essay 1 is to investigate the challenges of reporting in large-scale agile organizations that should be considered in the development of a reporting approach for large-scale agile organizations, the case study approach was selected. It allows us to gather in-depth insights from a real case organization that applies agile development methodologies in a large-scale setting. The case organization, a large German car manufacturing company, offers rich insights into the challenges of implementing a reporting approach into agile development processes. Overall, we follow a two-phased approach for data collection and analysis. In the first iteration, we conduct 12 semi-structured interviews with practitioners and collect case data, such as documentation or presentations. From this dataset, we then extract a set of reporting practices, challenges, as well as potential remedies to these challenges. We do so following the guidelines for qualitative data analysis by Miles et al. (2014), combining inductive and deductive identification of descriptive codes, which we subsequently group into pattern codes and overarching categories. In the second iteration of the study, we conduct another round of 11 semi-structured interviews to gather feedback and validate the identified challenges. Ultimately, this allows us to identify seven unique challenges as well as three recommendations for developing a reporting approach in large-scale agile organizations.

In Essay 2, we study how public-private partnerships (PPPs) can foster digital innovation. We do so by employing resourcing theory following Feldman (2004). Our case, a consortium of over fifty organizations from the public and private sectors, has yielded several innovative solutions based on digital technologies in the domain of digital identity management. We engage with the case starting in 2021 and collect

various sources of evidence. Our data set includes documentation, messages, the shared digital storage of the consortium, as well as 16 interviews with participants of the consortium, both from the public and the private sector. These data are analyzed following the approach by Gioia et al. (2013). By building on a theoretical model by Auschra and Sydow (2023), we proceed to conceptualize the consortium as a goal-directed network to study network-level resourcing in the pursuit of digital innovation. Our findings reveal that characteristics of digital technologies are reflected in the digital innovation processes in goal-directed networks, aligning with earlier works on digital innovation by Yoo et al. (2010), Lyytinen et al. (2016), Nambisan et al. (2017), and others. Further, our findings reveal the necessity of dissemination practices that consolidate innovations developed in distributed sub-groups in goal-directed networks so as to ensure network-level resourcing. Using these insights, we propose a model of resourcing for digital innovation in PPPs.

In Essay 3, our goal is to understand how legitimacy is attained during the process of establishing an EAM function, as an effective EAM function represents an important foundation for the development of IS in organizations. To that end, we investigate the case of a large German manufacturing company of medical aids that decided to establish an EAM function. We observe and engage with the case over a period of several years, conduct interviews, and collect case data, which allows us to observe the legitimation strategies applied by the EAM function over time. Again, we analyze the collected data following the guidelines by Gioia et al. (2013). We then embark on assembling a process model of EAM legitimation by making sense of the themes identified from the data analysis from an institutional perspective, employing the established literature on institutional theory by, among others, DiMaggio and Powell (1983) and Suchman (1995). To do so, we dissect the process of establishing the EAM function at the case organization into three episodes, allowing us to identify repeated patterns as well as changes in legitimation strategies. Next to the specific legitimation strategies identified from the case, our proposed process model describes the changing roles of the EAM function by conceptualizing it as a boundary-spanning function that operates and seeks to legitimize itself at the intersection of business and IT stakeholders.

Essays 4 through 6 address RG2. In Essay 4, we seek to unpack the term ‘AI’ and look under the hood of its usage in order to make sense of the characteristics that the term is used to describe. We motivate our research in the fact that researchers and

practitioners alike are applying the AI term to a wide range of technologies and activities. Various scholars have been calling for AI's definitional problem to be addressed (e.g., Ågerfalk et al. (2022), Grashoff and Recker (2023), Collins et al. (2021), Mikalef and Gupta (2021)). These authors point out negative consequences arising from the AI term being used as an umbrella term, such as a lack of cumulative knowledge building, the complication of cooperation among researchers and/or practitioners, fragmentation of research contributions into silos, and difficulties in distinguishing AI from IT in a particular context. Building on a systematic literature review that follows the guidelines by Kitchenham and Charters (2007) and Okoli (2015), we identify characteristics from AI-related research papers that prompted their authors to use the AI term. In our literature review, we analyze the abstracts and introduction sections of 282 research papers published in the senior scholar's basket of journals (AIS, 2022), ten selected management journals, and the International Conference on Information Systems. We systematically code these texts following the guidelines for qualitative data analysis by Gioia et al. (2013) and Miles et al. (2014) to understand how the papers motivate their research and which properties of the research topics motivate the use of the AI term. Building on the idea of family resemblance (Faulkner & Runde, 2013; Wittgenstein et al., 2009), we assemble an extendable property structure (i.e., a categorization system) which helps users to precisely describe the properties of a research topic that are relevant to the consideration of AI in a particular context. This categorization system allows future usage of the AI term by researchers and practitioners to be more nuanced, thereby enabling cumulative knowledge building and strengthening the transfer of knowledge in the field of AI. In the pursuit of guiding the design of AI-enabled IS (RG2), this represents an important foundation that allows for conceptual clarity when talking about 'AI' and designing IS that leverage technology commonly referred to as 'AI'.

In Essay 5, we develop a conceptualization of the collaboration between humans and intelligent agents in work systems by conducting a systematic literature review. As AI technologies are driving the capabilities of intelligent agents, intelligent agents are being integrated into ever more organizational processes. Motivated by the fact that prior research on the collaboration between humans and intelligent agents mostly focuses on individual interactions, we adopt a work system theory perspective based on the work by Alter (2008, 2013). In our literature review, we systematically analyze literature from the Association for Information Systems eLibrary, Web of Science, and

EBSCOhost. We follow the guidelines by Webster and Watson (2002) and vom Brocke et al. (2015). By analyzing a final set of 45 papers using a concept matrix (Webster & Watson, 2002), we identify 16 dimensions that describe important aspects of bi- and multilateral collaboration of human and intelligent agents in work systems. Building on work system theory, we seek to theorize the relationships between these identified dimensions and assemble a conceptual framework that allows us to describe, understand, and research the peculiarities and design choices of task-centered collaboration of human and intelligent agents in work systems.

In Essay 6, we apply a multiple case study approach following Eisenhardt (1989) and Yin (2014). The goal of this essay is to gather actionable insights into the challenges and good practices for implementing organizational settings (i.e., work systems) where human agents and AI-based agents are collaborating on joint tasks or processes. Such organizational settings are referred to as *human-AI hybrids* throughout Essay 6. Similarly to Essay 5, we build on the work system theory by Alter (2013) to conceptualize human-AI hybrids and the lifecycle of such work systems. To that end, we develop a research model that distinguishes between the construction and execution phases along the lifecycle of human-AI hybrids. Using this research model, we engage with four empirical cases where human-AI hybrids have been implemented in practice. For each case, we conduct interviews and collect additional case data, such as documents and videos. In total, we conduct over 10 hours of interviews and collect 41 case documents throughout this study. Following the guidelines by Gioia et al. (2013) and Miles et al. (2014), we then proceed to analyze this dataset using a coding approach that combines inductive coding of the raw data and deductive aggregation of these codes into themes and aggregate dimensions by using the constructs derived from our research model as sensitizing concepts (Bowen, 2006). Ultimately, this yields nine challenges, of which five refer to the construction and four to the execution of human-AI hybrids, as well as nine good practices, of which six refer to the construction and three to the execution of human-AI hybrids. Further, we identify two distinct roles, the organizational and the technical implementer, which are important throughout the whole lifecycle of human-AI hybrids.

Finally, Essay 7 addresses RG3. In this essay, we follow the design science research (DSR) paradigm (Hevner et al., 2004; Peffers et al., 2007) and apply situational method engineering in this context (Henderson-Seller & Ralyté, 2010). In this essay, we seek to understand how organizations can transform their existing governance

framework towards a systematic governance of AI-enabled IS. This is motivated by the fact that in the current discourse on AI governance, certain scholars are arguing that specificities of AI-enabled IS may demand new, tailored governance approaches (e.g., Gasser and Almeida (2017), Papagiannidis et al. (2023), Schneider et al. (2023), Wirtz et al. (2022)), while others are arguing that adequate governance of AI-enabled IS can be achieved with existing governance frameworks (e.g., Seppälä et al. (2021)). Based on this motivation, we follow the six-step approach by Peffers et al. (2007) to develop a method that enables organizations to systematically transform their existing governance framework in a way that considers aspects specific to AI-enabled IS. To that end, we derive five design objectives that are informed by a review of the extant IT and AI governance literature as well as semi-structured interviews with 14 experts. Building on the insights from the literature, the interviews, and two focus group workshops, we develop a method to guide the transformation process of organizations to implement AI governance. This method represents the DSR artifact developed in Essay 7 (March & Smith, 1995). We demonstrate and evaluate the artifact with all interview experts, as well as with two focus group workshops, and iteratively adjust the design, if necessary. Next to the artifact, we also derive several implications for future research on the governance of AI-enabled IS.

5 Summary of Results

In the following, I summarize the results of the seven essays included in this dissertation. In line with my overarching research aim and the three RGs, the results provide insights for organizations to organize IS development, as well as for designing and managing AI-enabled IS. As already mentioned in Section 1 of this introduction, all the essays are the result of joint work with co-authors and, therefore, I use the plural formulation *we* when referring to the results of the essays.

5.1 Essay 1: Reporting in Large-Scale Agile Organizations – Insights and Recommendations from a Case Study in Software Development

In Essay 1, we provide insights into how organizations may combine reporting mechanisms with agile methodologies in large-scale organizations. Building on previous research, in particular the work by Stettina and Schoemaker (2018), we highlight differences in reporting responsibilities across organizational levels and roles, with Agile Teams being responsible for development-oriented reporting, Agile Masters for process-oriented reporting, and Product, Program, and Portfolio Owners for product-oriented reporting. We identify six challenges of combining reporting structures with agile methodologies. These challenges include, e.g., a lack of understanding regarding the purpose behind required reports, limitation of agile teams' autonomy due to reporting demands, and delays in the reporting chains due to the size of large-scale agile organizations. For each of the identified challenges, we also analyze what the determining aspects of the challenge are (either related to aspects of agile methodologies or the large scale of the organization) and how the challenge impacts the organization on the different organizational levels. Finally, to approach the development of a reporting approach in large-scale agile organizations, we also derive three recommendations. These include the consistent usage of goal-setting practices and the linkage of goals across organizational levels, the differentiation of automation approaches for reporting, and the tracking of trends in reports over time.

Our contributions to research and practice are multifaceted. First, we advance the understanding of reporting in large-scale agile organizations – a relatively underexplored area in IS research – by documenting challenges that may arise in practice. Further, we provide recommendations on how to address these challenges when designing and implementing a reporting approach in large-scale agile organizations. We describe how automation may be used for reporting and which types of reporting in large-scale agile organizations may be suitable for such automation.

Finally, we provide three guiding questions that enable practitioners to consciously consider potential points of friction that arise when implementing a reporting structure into a large-scale agile organization.

5.2 Essay 2: Digital Innovation in the Public Sector: A Resourcing Perspective on How the Public Sector Collaborates with the Private Sector

In Essay 2, we conduct a single-case study to explore how PPPs can be set up and managed to foster digital innovation. We do so by adopting the resourcing theory (Feldman, 2004) and building on recent conceptual work on goal-directed networks by Auschra and Sydow (2023). From the case study, we build a model representing a mid-range theory of how PPPs can be set up and managed to foster digital innovation. We find that in PPPs, digital innovation is driven by decentralized, cross-sector innovation clusters that emerge inside the network and revolve around specific use cases of digital technologies. Importantly, these decentralized, cross-sector innovation clusters typically operate in parallel and build on the network's central digital technology platform in combination with digital assets specific to the use case. Thus, these innovation clusters reflect the distribution of innovation agency described in general digital innovation literature (Nambisan et al., 2017; Yoo et al., 2012). Further, our model theorizes dissemination practices as a necessary concept to reconsolidate the digital innovations developed in the innovation clusters. These dissemination practices allow for the digital innovations to be disseminated back into the overall network's pool of assets and being used for further resourcing cycles. We differentiate three types of dissemination practices, all of which are facilitated by the digital nature of resources. First, *forwarding practices* enable the quick dissemination of digital assets, facilitated by their easy transferability (Hinings et al., 2018). For instance, this includes the easy transfer of program code via repositories. Second, *decomposing practices* facilitate the dissemination of core building blocks of a digital innovation, facilitated by the layered modular architecture of digital innovation (Yoo et al., 2024; Yoo et al., 2010). This includes, for instance, the exposure of underlying services of a digital product or service via an application programming interface (API) for usage by other products and services from other innovation clusters in the network. And third, *bundling practices* enable the easy preparation of digital objects for recombinatory use in other innovation clusters in the network. For instance, this includes the dissemination of digital objects as standalone code libraries ready for reuse in other projects.

Our theoretical contribution is multi-faceted. First, by applying the resourcing perspective (Feldman, 2004) and the concept of network resourcing (Auschra & Sydow, 2023) to digital innovation in PPPs, we provide a new understanding of how the process of digital innovation can be managed in such cases. Thereby, we also provide an empirical validation of the conceptual model by Auschra and Sydow (2023). Second, in building our theoretical model we develop a mid-range theory on resourcing for digital innovation in PPPs. We contribute to the literature on digital innovation in PPPs by theorizing cross-sector innovation clusters and dissemination practices as specific concepts in such cases, driven by the characteristics of digital objects and digital innovation processes.

Our work also has managerial implications. It informs managers of PPPs on how to develop digital innovation in their networks. Based on our findings, network managers should consider fostering the emergence of decentralized, cross-sector innovation clusters around specific use cases, which in turn contribute to the overall network goals. Further, our insights on the development of digital innovation via cross-sector innovation clusters may be used to design and evaluate policies aimed at promoting digital innovation in PPPs, and future policies should be designed in a way that facilitates the forming of such clusters in PPPs.

5.3 Essay 3: Legitimating an Enterprise Architecture Management Function – A Process Perspective

In Essay 3, we build on institutional theory following DiMaggio and Powell (1983) and Suchman (1995) to develop a process model that describes how an EAM function can build legitimacy in an organization after being newly established. In doing so, we conceptualize the relationship between business and IT stakeholders in an organization to be the legitimation environment of the EAM function, which is in line with the literature considering the EAM a boundary-spanning function at the intersection of IT and business (Ahlemann et al., 2021; Kotusev & Kurnia, 2021). We find that the EAM function plays different roles in this environment throughout the legitimation process. While it initially serves predominantly as an information provider, its role evolves via that of a selective broker to ultimately represent an institutionalized gatekeeper that coordinates the interface between business and IT stakeholders and represents a strategic partner to the chief information officer (CIO). Further, the process model developed in Essay 3 identifies a variety of pragmatic, moral, and cognitive legitimation mechanisms that can be applied by EAM functions,

structured according to the established types of legitimation strategies by Suchman (1995). Finally, the model also identifies the importance of organizational leadership priorities, which in turn influence the EAM functions legitimation environment via leadership decisions. In developing this model, we provide guidance for organizations on how to legitimize a new EAM function, which represents an important building block for an organization's capability to coordinate IS development (Boh & Yellin, 2006).

Our contributions to literature and practice are multifaceted. First, we extend our understanding of how the portfolio of enacted legitimation mechanisms and, thus, legitimation strategies of an EAM function change and evolve over time. We argue that applying pragmatic and moral mechanisms is vital for EAM functions during the early stages, echoing legitimation literature in other domains (Greenwood et al., 2002; Suddaby et al., 2017). Second, we reinforce the notion of EAM as a boundary-spanning function between business and IT (Ahlemann et al., 2021) and contribute a new understanding of three distinct roles that an EAM function can play in this context. Third, we contribute novel insights into the entanglement of organizational leadership with EAM legitimation, which help in understanding how EAM legitimacy on the one hand influences and on the other hand is influenced by leadership priorities.

5.4 Essay 4: How to Consider the Artificial Intelligence Term? A Categorization System to Strengthen Research Impact

In Essay 4, we develop a categorization system that allows the categorization of research topics relying on the 'AI' term. To that end, we conduct a systematic literature review covering eight major journals in the IS domain (i.e., the senior scholar's basket of journals (AIS, 2022)), the proceedings of the International Conference on Information Systems (ICIS), and ten of the most prestigious strategy and management journals according to the SCImago Journal Rank (SCImago, 2024). The developed categorization system comprises three dimensions: *AI artifact*, *subject*, and *context*. These dimensions are related to each other, as the AI artifact is placed in the context and stands in a certain relationship with the subject, which we refer to as activity perspective and that constitutes key perspectives of IS research in general (Orlikowski, 1992): the subject *develops* or *uses* the AI artifact. Each dimension comprises several themes, which in turn comprise multiple concepts. These themes and concepts allow the categorization system's user to further specify the respective dimension regarding their understanding of the AI term. In total, we identify 12 themes and 64 concepts.

We contribute to the discourse on the conceptualization of AI in the IS domain (e.g., Ågerfalk et al. (2022), Collins et al. (2021), van Giffen et al. (2022)). To that end, the categorization system addresses two major concerns of AI-related research in the IS domain. First, existing approaches to statically define the AI term or approaching it using classification approaches suffer from becoming outdated quickly. This is due to the ongoing rapid development of AI technologies (Berente et al., 2021). By embracing the family resemblance perspective (Wittgenstein et al., 2009), our categorization system offers flexible categories without fixed boundaries and remains adaptable for future developments in the realm of AI. Second, as IS research on AI flourishes in a variety of domains, the development of disconnected knowledge silos has become a concern (Ågerfalk et al., 2022; Grashoff & Recker, 2023). Our categorization system facilitates the explication and differentiation of specific properties that characterize one's understanding of the AI term. This, in turn, facilitates cumulative knowledge building in research and practice, as the categorization system enables the identification of work that adheres to the same understanding of the AI term.

5.5 Essay 5: Teaming Up with Intelligent Agents — A Work System Perspective on the Collaboration with Intelligent Agents

In Essay 5, we develop a framework to conceptualize the collaboration of human and intelligent agents in work systems. Our systematic review of the literatures on human-robot interaction and human-computer interaction yields 16 dimensions, which describe important design considerations of work systems that leverage collaboration between human and intelligent agents. We identify four main aspects that the dimensions may be grouped into: *agents and team*-related aspects, aspects related to *communication*, aspects related to the *environment*, and aspects related to *task processing*. Using work system theory as a theoretical lens (Alter, 2013), we develop a task-centered framework based on these dimensions, which facilitates the description of structural and dynamic aspects of the collaboration between human and intelligent agents. The framework highlights key design choices and dependencies in work systems where humans and intelligent agents collaborate, moving beyond individual human-computer interactions towards a holistic work system perspective. Building on this framework, we then propose an initial concept of a modeling approach that enables the visual representation and design of work systems where human and intelligent agents collaborate. This concept may serve as a foundation for the future development of a practical modeling tool, e.g., for enterprise architects.

We contribute to the discourse on the collaboration of human and intelligent agents in two ways. First, we extend existing research by identifying 16 design dimensions that describe how human and intelligent agents interact beyond isolated tasks. Further, in doing so we shift the focus from a human-centric interaction perspective towards a task-centered perspective that considers collaboration beyond individual interactions. Second, by developing a framework building on these dimensions, we provide a structured conceptualization of the collaboration of human and intelligent agents in work systems, thereby advancing theory on incorporating intelligent agents into work systems as active participants and contributing to the literature on the design of AI-enabled IS. By proposing the initial concept of a modeling approach for the collaboration of human and intelligent agents in work systems, we identify a variety of future research opportunities.

5.6 Essay 6: Designing Human-AI Hybrids: Challenges and Good Practices from a Multiple Case Study

In Essay 6, we conduct a multiple-case study of four successful implementations of human-AI hybrids to investigate challenges and good practices for human-AI hybrid construction and execution from practical experience. First, based on work system theory following Alter (2013), we derive a research model that conceptualizes human-AI hybrids as work systems where human agents collaborate with AI agents on joint processes or tasks. Further, building on this work system-based understanding of human-AI hybrids, we derive two lifecycle phases of human-AI hybrids, i.e., the *construction* and *execution* phases, which are related to the work system lifecycle model described in the literature (Alter, 2008, 2013). Using this research model, our multiple-case study yields five challenges of human-AI hybrid construction and four challenges of human-AI hybrid execution, as well as six good practices of human-AI hybrid construction and three good practices of human-AI hybrid execution. From these insights, we learn that the construction phase is predominantly focused on architectural concerns, relating to aspects such as infrastructure and technologies of the work system, while the execution phase shifts the focus to concerns related to the dynamics among participants (including intelligent agents as participants) of the work system, such as collaboration and complementarity of skills.

Additionally, Essay 6 reveals the importance of the two distinct roles of *organizational* and *technical implementers* throughout the construction and execution of human-AI hybrids. From our cases, we learned that organizational implementers represent

stakeholders explicitly responsible for incorporating human-AI hybrids into the overall organization, including integration into the organization's processes, the necessary change management, as well as ensuring appropriate training of human agents. In contrast, technical implementers are responsible for ensuring that the human-AI hybrid implementation meets the functional and performance requirements of the respective use case, which includes responsibility for installation, configuration, and testing of AI agents, among others.

We contribute to the literature on how to implement AI-based agents into IS. Thereby, we address the current scarcity of structured empirical insights into challenges and good practices of designing AI-enabled IS. Crucially, we contribute to attenuating a potential disconnect between research and practice (see Section 3.2) by guiding researchers and practitioners in designing AI-enabled IS and facilitating knowledge transfer between theory and practice. Our findings are also relevant for practice, as our good practices and the identification of the roles of organizational and technical implementers offer actionable guidance for organizations designing AI-enabled IS.

5.7 Essay 7: Towards Systematic AI Governance — A Transformation Method

In Essay 7, we design, develop, and evaluate a method for transforming corporate governance frameworks towards a systematic AI governance, following a DSR approach. The method is intended to be applied by organizations that already have established existing (IT) governance frameworks and mechanisms as part of their strategic IS management capability. First, we derive five design objectives based on existing scientific literature to structure the design and evaluation process. These design objectives emphasize the need for the developed artifact to guide the governance transformation process while allowing for enough flexibility to account for organizational specificities, and to foster a transformation process that cumulatively builds on existing governance mechanisms while only adding additional governance measures where necessary. By developing the method, we find that to achieve a framework of mechanisms that is capable of governing AI-enabled IS, organizations need to establish an iterative process of governance transformation and focus on an organization-wide AI governance strategy. This is reflected in the iterative, four-step process that is underlying the resulting method artifact. Our results show that AI governance cannot and should not be thought of in isolation from other domains of corporate governance, such as data governance or IT governance. The interviewees in

our study emphasized the necessity of a cumulative approach to AI governance, building on and integrating with established governance mechanisms – thereby reinforcing one of our initial design objectives. Further, our results show that there is no need for a dedicated AI governance unit or department. Nevertheless, our results also reveal that dedicated AI governance mechanisms may be necessary in some cases to complement already existing mechanisms.

The results of Essay 7 have multiple theoretical and managerial implications. First, the resulting nuanced understanding of AI governance and its position among other domains of corporate governance challenges existing conceptualizations of AI governance in the literature. We challenge the need for a dedicated AI governance unit but emphasize a targeted utilization of dedicated AI governance mechanisms. Second, by conceptualizing AI governance as a process that combines the characteristics of a life cycle and a teleological process (van de Ven & Poole, 1995), i.e., an iterative process of continuous transformation, we encourage an understanding of AI governance that aligns with existing definitions of AI technologies as the continuously evolving frontier of computing in terms of performance and scope (Berente et al., 2021). Hence, we posit an understanding of AI governance as the ever-evolving frontier of technology governance. Finally, we contribute a method that provides guidance to governance practitioners in organizations seeking to capture value from AI-enabled IS while addressing potential risks associated with their usage. Our method may serve as a blueprint for practitioners to develop an AI governance that is well-integrated into their established governance framework.

6 Discussion and Conclusion

In this final section of the introduction to my dissertation, I discuss my results in light of the overarching research aim of *guiding organizations in organizing, designing, and governing IS in the age of AI*. To that end, I provide a brief summary of the introduction of this thesis in Section 6.1, followed by the discussion of the contributions to theory and implications for practice in Section 6.2. In Section 6.3, I review the limitations of my dissertation. I conclude with an outlook on future research opportunities in Section 6.4.

6.1 Summary

This dissertation is motivated by the rapid advancement of capabilities and potential benefits of AI-enabled IS, and the demands they pose on the strategic management of IS in order to realize these potentials and to benefit from AI technologies' capabilities in organizations. In line with this motivation and the overarching research aim, I structured this dissertation along three research goals, one of which each essay included in this dissertation contributes to. The essays rely on various methods, including systematic literature review, case study research, and design science research.

First, this thesis provides guidance for organizations to organize for IS development (RG1). Essay 1 investigates the challenges of systematic reporting in large organizations that apply agile software development methodologies and provides actionable recommendations for developing a reporting approach in such large-scale agile organizations. Essay 2 investigates how organizations, and in particular public sector organizations, can engage in cross-sector partnerships to foster the development of digital innovations. Essay 3 develops a process model of how EAM functions gain legitimacy in organizations. As an effective EAM function represents an important building block of strategic IS management and contributes to the alignment of IS development efforts to business strategy, the results of Essays 1 through 3 provide guidance for organizations regarding several important areas of strategic IS management.

Second, this thesis provides guidance for organizations to design AI-enabled IS (RG2). I approach this goal by first tackling the problem of ambiguity in the usage of the term 'AI'. In Essay 4, we develop a categorization system that helps its users to specify their understanding of the AI term in a more nuanced way. In essence, this helps researchers

and organizations avoid conceptual ambiguity when describing and designing AI-enabled IS. In Essay 5, we conceptualize the collaboration between humans and intelligent agents in work systems, enabling organizations to describe AI-enabled IS, their design choices, and dependencies among tasks and agents. Essay 6 then provides insights into challenges as well as good practices of designing AI-enabled IS and provides guidance on which aspects to focus on throughout the lifecycle of constructing and executing AI-enabled IS.

Third, this thesis provides guidance for organizations to govern AI-enabled IS (RG3). To that end, in Essay 7 we develop a method that guides organizations in transforming their existing (IT) governance frameworks towards systematic AI governance. The method emphasizes that AI governance transformation is an iterative process that needs to be integrated with existing governance mechanisms while continuously evaluating and attending to potential risks and opportunities specific to AI-based applications.

6.2 Contributions to Theory and Implications for Practice[1]

Addressing the overarching research aim and the research goals of this thesis, its results contribute to the understanding of how organizations can organize for the development of IS as well as design and manage AI-enabled IS. The dynamic capabilities framework by Teece (2007) has shaped the research goals of my thesis, with each research goal focusing on guiding organizations in the necessary dynamic capabilities for strategic IS management in the age of AI. Just like all of the essays included in this thesis build on existing theories and concepts from IS and management research, the results of this thesis also have both theoretical and practical implications.

The results of Essays 1 through 3 help organizations in organizing their IS development structures, with a focus on enabling the identification and shaping (*sensing capability*) of technological opportunities. The essays guide organizations in organizing their IS development efforts in a way that allows them to identify changing customer needs and monitor development progress (Essay 1), as well as shape innovation opportunities (Essay 2) and the strategic alignment of IS (Essay 3). Essay 1 hypothesizes potential tensions and benefits of combining agile software development methodologies with

[1] Each essay also contains a dedicated discussion and / or contribution section, where a more detailed description of each essays' contributions for theory and implications for practice can be found.

formal reporting structures, building on existing work on autonomy and coordination challenges of agile teams (e.g., Dingsøyr and Moe (2014), Kasauli et al. (2021), Nyrud and Stray (2017)) and reporting as a tool for coordination (e.g., Dingsøyr et al. (2018), Hackman (1986)). We contribute to the understanding of challenges as well as potential remedies that can guide the development of a reporting approach in large-scale agile organizations, which in turn contributes to organizations' sensing capability. In Essay 2, we build on the work by Auschra and Sydow (2023) on goal-directed networks, as well as by Yoo et al. (2010) and Yoo et al. (2024), among others, on digital innovation. We contribute to the literature on PPPs by conceptualizing PPPs as goal-directed networks and applying resourcing theory (Feldman, 2004) to theorize how PPPs can foster digital innovation. We develop a model that extends the understanding of network resourcing in cases with pervasive digital technologies, and we identify cross-sector innovation clusters and dissemination practices as important theoretical constructs. We thereby contribute insights into organizational structures, such as PPPs, for shaping digital innovation opportunities as part of organizations' sensing capability. In Essay 3, we build on a process theoretical understanding of legitimation (Baba et al., 2021; Botzem & Dobusch, 2012; Suddaby et al., 2017) and initial works on EAM functions from an institutional theory perspective (Brosius et al., 2018; Levy & Bui, 2019; Weiss et al., 2013). We contribute to the literature on EAM institutionalization by developing a process model of EAM legitimation, reinforcing the understanding of EAM as a boundary-spanning function at the intersection of business and IT in organizations, and identifying three roles that an EAM function may play at this intersection throughout the process of legitimation. We contribute insights into organizational structures that provide organizations with the necessary foundation to be ready to act upon opportunities as part of their sensing capability.

The results of Essays 4 through 6 help organizations to design AI-enabled IS and, therefore, *seize* identified opportunities to use AI technologies. The essays guide organizations in unambiguous usage of the AI term and identification of relevant IS research in the IS domain following their particular understanding of AI (Essay 4), conceptualizing the collaboration of human and intelligent agents in work systems (Essay 5), and challenges and good practices in constructing and executing human-AI hybrids (Essay 6). In Essay 4, we contribute to the academic discourse on the AI term, its current ambiguity, and its usage as an umbrella term for a variety of technologies and concepts (Ågerfalk et al., 2022; Collins et al., 2021; van Giffen et al., 2022). We

develop a categorization system that allows researchers and practitioners to sharpen the meaning of the AI term and enables them to be precise about what they consider to be 'AI'. Thereby, we address concerns that IS research on AI may suffer from a lack of cumulative knowledge building and develop fragmented silos of research contributions (Ågerfalk et al., 2022; Grashoff & Recker, 2023). In Essay 5, we contribute to the literature on human-AI collaboration by building on work by Hinsen et al. (2022) and identifying design dimensions of the collaboration between human and intelligent agents in work systems. We contribute to our understanding of human-AI collaboration by theorizing the relations between these dimensions and developing a conceptual framework of task-centered collaboration between human and intelligent agents in work systems. This provides insights for organizations' seizing capability, thereby enabling them to build AI-enabled IS. We also derive potential directions for future research from this framework. In Essay 6, we address a call for further research and empirical insights into human-AI hybrids (Fabri et al., 2023) and build on work system theory (Alter, 2013). We again contribute to the literature on human-AI collaboration, by identifying and structuring several challenges and good practices for the construction and execution of human-AI hybrids. Further, we contribute a conceptualization of two key roles for designing human-AI hybrids in organizations, i.e., the *organizational* and *technical implementer*, as well as insights into the focus of their respective work throughout the human-AI hybrid life cycle. Again, this provides insights for organizations' seizing capability, thereby enabling them to build AI-enabled IS.

The results of Essay 7 enable organizations to govern and continuously *transform* their governance of AI-enabled IS. Essay 7 contributes to the ongoing academic discourse on AI governance (Mäntymäki et al., 2022b; Papagiannidis et al., 2025; Wirtz et al., 2022) by developing a method that seeks to incorporate existing theoretical insights from the established corporate and IT governance discourses while attending to the newly emerging risks and governance challenges arising from the usage of AI-based applications in organizations.

Aligned with the three research goals of this dissertation, the practical implications of my work are threefold. First, practitioners may use the results of Essays 1 and 2 to purposefully design organizational structures in ways that enable their organizations to gather and utilize insights from their agile software development teams in a systematic way, as well as create cross-sectoral collaborations with other organizations

that foster the development of digital innovations. Additionally, the results of Essay 3 enable practitioners to pursue a more targeted legitimacy build-up of an EAM function in their organization, a vital yet so far underexplored step in establishing one of the core functions of strategic IS management. Second, the results of Essay 4 enable a more specific and nuanced usage of the AI term, avoiding ambiguity and facilitating the transfer of knowledge regarding specific aspects of AI technologies or artifacts. The results of Essays 5 and 6, in turn, may be utilized by practitioners to describe and design AI-enabled IS in their organizations, providing them with useful tools to architect the usage of intelligent agents in the organization's work systems. And third, practitioners may draw on the results of Essay 7 to evolve their governance of IS and ensure the systematic governance of AI-enabled IS.

6.3 Limitations

As is the case with most research projects, my dissertation and the work in the included essays are subject to certain limitations. In the following, I will elaborate on three overarching limitations, while I kindly refer to the essays' discussion sections for more details on the limitations of each individual essay.

First, AI technologies and IS research on their development and application in organizations are still rapidly evolving. As discussed earlier, Berente et al. (2021) even conceptualize AI as "a continually evolving frontier of emerging computing capabilities" (p. 1433). Yet, the insights created in this thesis rely on the current state-of-the-art AI technologies and practices in organizations, with many of the studied organizations still in the early stages of AI adoption. Consequently, future developments in AI technologies may render some insights of this thesis less relevant or outdated as new advancements emerge. Still, I tried to incorporate this into my research, and we addressed this aspect in several of the essays included in this dissertation. For example, in Essay 4, we squarely center our approach on conceptualizing the AI term on the fact that the AI landscape will continue to evolve. We, therefore, build a categorization system based on the family resemblance idea (Wittgenstein et al., 2009), which embraces the possibility of future updates as AI evolves. Further, in Essay 7, we design our approach to AI governance transformation in such a way that it emphasizes the continuous evolution of AI technologies.

Second, my thesis mostly relies on qualitative research methods, such as case studies, which may limit the generalizability of findings to broader contexts or other industries

than the studied cases operate in. Further, this focus on qualitative methods may introduce bias into my thesis' results, as they rely on the perspectives of a limited number of participants and interviewees. Again, I tried to mitigate this limitation in each of the essays, e.g., by incorporating different data sources (including interviews, documents, and observations) and extant literature to triangulate the findings. I deem it a promising direction for future research to conduct further studies to test and complement this thesis' findings.

Third, in several of the included essays (e.g., Essays 2, 3, and 7), we develop management models based on empirical data that we collected from case studies, interviews, and document analysis. While in the cases of Essays 2 and 7 we were actively involved in the empirical cases as they unfolded over time, the scientific analysis and sense-making leading to the design of the management models was conducted (mostly) ex-post. With the exception of the partial evaluation of the results through interviews with practitioners and focus group discussions in Essay 7, the models were not evaluated in the sense that they were applied to cases with an ex-ante intention to follow the approaches prescribed in the respective management model. Thus, while in each of the models we included data from diverse sources for triangulation (e.g., interviews, observations, documents), the generalizability of these results may not be guaranteed. Therefore, I see the necessity for future research to evaluate the developed management models in other case organizations.

6.4 Future Research

In light of this dissertation's results and the previously outlined limitations, I see various potentials for future research. Just like my work was motivated by and addressed calls for future research from the literature (e.g., Auschra and Sydow (2023), Fabri et al. (2023), Levy and Bui (2019), Ågerfalk et al. (2022)), I see further ideas and directions in which more research can be conducted and how future research may build upon this thesis' results.

Regarding RG1, *guiding the organization of IS development*, the included essays investigate how organizations can improve their capability to sense and shape opportunities for strategic technology usage. However, I did not focus on how emerging technologies like AI can themselves be used to improve the sensing capability of organizations in this regard. Yet, AI technologies may have an impact on how organizations conduct their reporting, how they plan and manage their enterprise

architecture, or how they interact and collaborate with other organizations in partnerships. For example, AI technologies such as distributed machine learning or split learning may enable innovation partnerships to identify and shape innovation opportunities while avoiding sharing data among partners (Thapa et al., 2022). While my essays on RG1 focus on how to conduct these foundational functions of strategic IS management in general, future research may find it fruitful to investigate how these functions in organizations may leverage emerging technologies like AI to evolve their practices.

Considering RG2, *guiding the design of AI-enabled IS*, the included essays investigate how organizations may seize AI-related opportunities by designing IS that effectively integrate AI technologies. I see great research opportunities in building on the empirical results of Essay 6 and the conceptual framework developed in Essay 5. Future research could explore how we can use the knowledge gathered from practitioners about the design of human-AI hybrids to develop the practical design and modeling tool for the collaboration of human and intelligent agents in work systems, which we envisioned and presented an initial idea of in Essay 5. Such a tool may help organizations use the existing practical knowledge for the design and management of AI-enabled IS in a more systematic and scientifically sound way.

Further, my work regarding RG2 so far has focused on the intra-organizational usage of AI technologies. Yet, modern organizations collaborate with other organizations no longer only in identifying and shaping digital innovation opportunities (as we studied in Essay 2). Rather, organizations also increasingly collaborate with other organizations in creating and capturing value in networks, as is evident by the vibrant research streams on digital platforms and ecosystems (Hein et al., 2020; Tan et al., 2025). Purposely positioning and operating in such networks has become a major concern in strategic (IS) management for many organizations. Hence, I see opportunities for future research to investigate how AI technologies in inter-organizational networks, such as digital platforms, may impact the possibilities of value creation and capture. As digital platforms represent a vital source of data for AI technologies and AI services are becoming part of digital platforms (Alt, 2021), AI-enabled inter-organizational IS in practice will certainly benefit from a scientific perspective on their conceptualization, design, and management.

Finally, for RG3, *guiding the governance of AI-enabled IS*, the included essay investigates how organizations may transform and continuously update their

framework for the governance of AI-enabled IS. As AI evolves, the continuous transformation approach developed in Essay 7 will become increasingly relevant. Currently, regulatory developments on AI, such as the EU AI Act (European Parliament, 2024) or similar efforts in other regions, bring increasing dynamics to the domain of AI governance, both from a societal and organizational perspective (Gengler & Schmalenbach, 2024; Papagiannidis et al., 2025). As these regulations develop and become effective, future research will be needed to incorporate their demands into the organizational AI governance frameworks. Building on the results of Essays 4, 5, and 7, I encourage future research to investigate how these future regulatory demands may be incorporated into the design and management of AI-enabled IS right from the beginning. Future research should focus on creating tools (such as the aforementioned modeling tool for AI-enabled IS) that ensure compliance by design. Such tools exist in other areas, such as the Control Objectives for Information and Related Technology (COBIT) framework for IT governance (McIntosh et al., 2024) or business process modeling patterns which organizations can adopt to ensure compliance with the EU's general data protection regulation (Agostinelli et al., 2019).

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Appendices

Appendix A: Declarations of Co-Authorship and Individual Contributions

In the following, I describe the co-authors' contributions to the essays.[2]

Essay 1: Reporting in Large-Scale Agile Organizations – Insights and Recommendations from a Case Study in Software Development

This research paper was co-authored by Moritz Schüll, Peter Hofmann, Pascal Philipp, and Nils Urbach. The co-authors contributed as follows:

Moritz Schüll (co-author)
Moritz Schüll contributed to this paper as lead author. He initiated the research project by formulating the idea to research the tensions between reporting structures and agile methodologies. He developed the research project and the methodological approach. Further, Moritz conducted the case study, data collection, interviews, and analysis of the data. He generated and interpreted the results of the study and formulated most parts of the manuscript. Thus, Moritz' co authorship is reflected in the entire research project.

Peter Hofmann (subordinate co-author)
Peter Hofmann contributed to the project by introducing his methodological knowledge as well as his experience and feedback. He supported in the data analysis and interpretation. Further, Peter reviewed and edited parts of the manuscript and provided feedback throughout the revision process.

Pascal Philipp (subordinate co-author)
Pascal Philipp especially contributed to the project by co-developing the research idea and introducing his methodological knowledge as well as his feedback. He supported the development of the methodology and provided feedback throughout the revision process.

Nils Urbach (subordinate co-author)
Nils Urbach especially contributed to the project by introducing his methodological knowledge as well as his experience and feedback. He provided feedback throughout the writing and revision process.

[2] I submitted signed copies that declare the authors' individual contributions with this thesis.

Essay 2: Digital Innovation in the Public Sector: A Resourcing Perspective on How the Public Sector Collaborates with the Private Sector

This research paper was co-authored by Tobias Guggenberger, Moritz Schüll, Jens-Christian Stoetzer, and Nils Urbach. The co-authors contributed as follows:

Tobias Guggenberger (co-author)

Tobias Guggenberger contributed to the research project by conceptualization of the study, including the formulation of overarching research goals and aims. He was responsible for the design of the methodology, data collection, and analysis of the study data. Additionally, Tobias Guggenberger prepared the initial draft of the manuscript, created visualizations and presentations of the data, and engaged in critical review and revision of the manuscript. He was also responsible for the administration of the project. Therefore, his authorship is reflected throughout the entire research project.

Moritz Schüll (co-author)

Moritz Schüll contributed to the research project by conceptualization of the study, including the formulation of overarching research goals and aims. He was responsible for the design of the methodology, data collection, and analysis of the study data. Additionally, Moritz Schüll prepared the initial draft of the manuscript, created visualizations and presentations of the data, and engaged in critical review and revision of the manuscript. He was also responsible for the administration of the project. Therefore, his authorship is reflected throughout the entire research project.

Jens-Christian Stoetzer (co-author)

Jens-Christian Stoetzer contributed to the research project by conceptualization of the study, including the formulation of overarching research goals and aims. He was responsible for the design of the methodology, data collection, and analysis of the study data. Additionally, Jens-Christian Stoetzer prepared the initial draft of the manuscript, created visualizations and presentations of the data, and engaged in critical review and revision of the manuscript. He was also responsible for the administration of the project. Therefore, his authorship is reflected throughout the entire research project.

Nils Urbach (co-author)

Nils Urbach contributed to the research project by critical review, commentary, and revision of the manuscript. He provided oversight and mentorship throughout the research process. Therefore, his authorship is reflected in the entire research project.

Essay 3: Legitimating an Enterprise Architecture Management Function – A Process Perspective

This research paper was co-authored by Tobias Guggenberger, Moritz Schüll, David Schwarzer, and Nils Urbach. The co-authors contributed as follows:

Tobias Guggenberger (co-author)

Tobias Guggenberger contributed to the research project by analysis of the study data, visualization, and presentation of the data. He engaged in critical review and revision of the manuscript. He also provided oversight and mentorship throughout the research process. Therefore, his authorship is reflected throughout the entire research project.

Moritz Schüll (co-author)

Moritz Schüll contributed to the research project by conceptualization of the study, including the formulation of overarching research goals and aims. He was responsible for the design of the methodology, data collection, and analysis of the study data. Additionally, Moritz Schüll prepared the initial draft of the manuscript, created visualizations and presentations of the data, and engaged in critical review and revision of the manuscript. He was also responsible for the administration of the project. Therefore, his authorship is reflected throughout the entire research project.

David Schwarzer (co-author)

David Schwarzer contributed to the research project by conducting data collection and analysis of the study data. Additionally, David Schwarzer engaged in critical review and commentary of the manuscript. Thus, his authorship is reflected throughout the entire research project.

Nils Urbach (co-author)

Nils Urbach contributed to the research project by critical review, commentary, and revision of the manuscript. He also provided oversight and mentorship throughout the research process. Therefore, his authorship is reflected throughout the entire research project.

Essay 4: How to Consider the Artificial Intelligence Term? A Categorization System to Strengthen Research Impact

This research paper was co-authored by Moritz Schüll, Dominik Protschky, Peter Hofmann, and Abayomi Baiyere. The co-authors contributed as follows:

Moritz Schüll (co-author)

Moritz Schüll contributed to the research project by conceptualization of the study, including the formulation of overarching research goals and aims. He was responsible for the design of the methodology, data collection, and analysis of the study data. Additionally, Moritz Schüll prepared the initial draft of the manuscript, created visualizations and presentations of the data, and engaged in critical review and revision of the manuscript. He was also responsible for the administration of the project. Therefore, his authorship is reflected throughout the entire research project.

Dominik Protschky (co-author)

Dominik Protschky contributed to the research project by conceptualization of the study, including the formulation of overarching research goals and aims. He was responsible for the design of the methodology, data collection, and analysis of the study data. Additionally, Dominik Protschky prepared the initial draft of the manuscript, created visualizations and presentations of the data, and engaged in critical review and revision of the manuscript. Therefore, his authorship is reflected throughout the entire research project.

Peter Hofmann (co-author)

Peter Hofmann contributed to the research project by conceptualization of the study, including the formulation of overarching research goals and aims. He was responsible for the design of the methodology and analysis of the study data. Additionally, Peter Hofmann prepared the initial draft of the manuscript, created visualizations and presentations of the data, and engaged in critical review and revision of the manuscript. Therefore, his authorship is reflected throughout the entire research project.

Abayomi Baiyere (co-author)

Abayomi Baiyere contributed to the research project by critical review, commentary, and revision of the manuscript. He also provided oversight and mentorship throughout the research process. Therefore, his authorship is reflected throughout the entire research project.

Essay 5: Teaming Up with Intelligent Agents — A Work System Perspective on the Collaboration with Intelligent Agents

This research paper was co-authored by Aaron Jakob, Moritz Schüll, Peter Hofmann, and Nils Urbach. The co-authors contributed as follows:

Aaron Jakob (co-author)

Aaron Jakob contributed to the research project by conceptualization and formulation of the overarching research goals and aims, data collection, and analysis of study data. He was responsible for drafting the initial manuscript and creating data visualizations and presentations. Therefore, his authorship is reflected throughout the entire research project.

Moritz Schüll (co-author)

Moritz Schüll contributed to the research project by conceptualization and development of the research objectives, data analysis, and drafting of the initial manuscript. He also contributed to data visualization and provided critical review, commentary, and revisions. Therefore, his authorship is reflected throughout the entire research project.

Peter Hofmann (co-author)

Peter Hofmann contributed to the research project by conceptualization and formulation of the research goals and aims, as well as the development and design of the research methodology. He was involved in the analysis of study data, drafting of the initial manuscript, and data visualization. Additionally, he provided critical review, commentary, and revisions. Therefore, his authorship is reflected throughout the entire research project.

Nils Urbach (co-author)

Nils Urbach contributed to the research project by critical review, commentary, and revision of the manuscript. He also provided oversight and mentorship throughout the research process. Therefore, his authorship is reflected throughout the entire research project.

Essay 6: Designing Human-AI Hybrids: Challenges and Good Practices from a Multiple Case Study

This research paper was co-authored by Valentin Mayer, Moritz Schüll, Onur Aktürk, and Tobias Guggenberger. The co-authors contributed as follows:

Valentin Mayer (co-author)

Valentin Mayer initiated and co-developed the research project. He contributed by developing the paper's theoretical foundation, conducting and analyzing the interviews, and developing the research framework and results. Further, he engaged in textual elaboration, especially in the introduction, theoretical background, method, results, discussion, and conclusion sections. He also participated in research discussions and provided feedback on the paper's content and structure. Thus, Valentin Mayer's co-authorship is reflected in the entire research project.

Moritz Schüll (co-author)

Moritz Schüll initiated and co-developed the research project. He contributed by developing the paper's theoretical foundation, conducting and analyzing the interviews, and developing the research framework and results. Further, he engaged in textual elaboration, especially in the introduction, theoretical background, method, results, discussion, and conclusion sections. He also participated in research discussions and provided feedback on the paper's content and structure. Thus, Moritz Schüll's co-authorship is reflected in the entire research project.

Onur Aktürk (co-author)

Onur Aktürk contributed to the project by conducting the interviews. Further he supported data analysis and interpretation.

Tobias Guggenberger (co-author)

Tobias Guggenberger co-developed the research project. He provided mentorship and feedback on the paper's content and structure. He also engaged in textual elaboration with respect to reviewing and editing of the entire manuscript during the submission and the revision process.

Essay 7: Towards Systematic AI Governance — A Transformation Method

This research paper was co-authored by Dominik Protschky, Moritz Schüll, and Nils Urbach. The co-authors contributed as follows:

Dominik Protschky (co-author)

Dominik Protschky contributed to the research project by conceptualization of the study, including the formulation of overarching research goals and aims. He was responsible for the design of the methodology, data collection, and analysis of the study data. Additionally, Dominik Protschky prepared the initial draft of the manuscript, created visualizations and presentations of the data, and engaged in critical review and revision of the manuscript. He was also responsible for the administration of the project. Therefore, his authorship is reflected throughout the entire research project.

Moritz Schüll (co-author)

Moritz Schüll contributed to the research project by conceptualization of the study, including the formulation of overarching research goals and aims. He was responsible for the design of the methodology, data collection, and analysis of the study data. Additionally, Moritz Schüll prepared the initial draft of the manuscript, created visualizations and presentations of the data, and engaged in critical review and revision of the manuscript. He was also responsible for the administration of the project. Therefore, his authorship is reflected throughout the entire research project.

Nils Urbach (co-author)

Nils Urbach contributed to the research project by critical review, commentary, and revision of the manuscript. He also provided oversight and mentorship throughout the research process. Therefore, his authorship is reflected throughout the entire research project.

Appendix B: Other Publications

Table 2. Overview of other publications

Reference	VHB 2024 / VHB JQ3	Publication state
Meierhöfer, S., Schüll, M. & Buck, C. (2024). Etablierung von Enterprise Architecture Management in kleinen und mittleren Unternehmen: Erkenntnisse aus einer Fallstudie. *Wirtschaftsinformatik & Management*, 16(3). https://doi.org/10.1365/s35764-024-00530-5	D / n.a.	Published
Protschky, D., Schüll, M. & Urbach, N. (2024). Governance von künstlicher Intelligenz – Eine Methode zur Transformation vorhandener Governance-Mechanismen in Unternehmen. *Wirtschaftsinformatik & Management*, 16(3). https://doi.org/10.1365/s35764-024-00531-4	D / n.a.	Published
Becker, D., Deck, L., Feulner, S., Gutheil, N., Schüll, M., Decker, S., Eymann, T., Gimpel, H., Pippow, A., Röglinger, M., & Urbach, N. (2024). Lohnt sich Microsoft 365 Copilot? Eine Potenzialanalyse für Unternehmen und Bildungseinrichtungen. *Bayreuther Arbeitspapiere zur Wirtschaftsinformatik*, 72. https://doi.org/10.5281/zenodo.13859937	n.a.	Published
Philipp, P., Schüll, M., & Matthes, F. (2022). Investigating the Establishment of Goals in Large-Scale Agile Development. *PACIS 2022 Proceedings*. https://aisel.aisnet.org/pacis2022/164	C / C	Published

Reporting in Large-Scale Agile Organizations – Insights and Recommendations from a Case Study in Software Development[3]

Authors

Moritz Schüll, Peter Hofmann, Pascal Philipp, Nils Urbach

Abstract

Application of agile software development methodologies in large-scale organizations is becoming increasingly common. However, working with multiple teams and on multiple products at the same time yields higher coordination and communication efforts compared to single-team settings for which agile methodologies have been designed originally. With the introduction of agile methodologies at scale also comes the need to be able to report progress and performance not only of individual teams but also on higher aggregation of products and portfolios. Due to faster iterations, production of intermediate work results, increased autonomy of teams, and other novel characteristics, agile methodologies are challenging existing reporting approaches in large organizations. Based on 23 interviews with 17 practitioners from a large German car manufacturing company, this case study investigates challenges with reporting in large-scale agile settings. Further, based on insights from the case study, recommendations are derived. We find that combining reporting and agile methodologies in large-scale settings is indeed challenging in practice. Our research contributes to the understanding of these challenges, and points out opportunities for future research to improve reporting in large-scale agile organizations by goal-setting and automation.

Keywords: Large-scale agile, software development, reporting, case study.

[3] This essay has been published in:
Schüll, S., Hofmann, P., Philipp, P., & Urbach, N. (2023). Reporting in Large-Scale Agile Organizations - Insights and Recommendations from a Case Study in Software Development. *Information Systems and e-Business Management, 21*, 571–601. https://doi.org/10.1007/s10257-023-00643-1

Digital Innovation in the Public Sector: A Resourcing Perspective on How the Public Sector Collaborates with the Private Sector[4]

Authors

Tobias Guggenberger, Moritz Schüll, Jens-Christian Stoetzer, Nils Urbach

Extended Abstract

Public sector organizations are under increasing pressure to digitalize their services, operations, and public value creation (Benbunan-Fich et al., 2020; Dawson et al., 2016; Magnusson et al., 2020). While digital innovation is seen as a key enabler of this transformation, the public sector faces structural barriers, such as rigid, formal structures, that make innovation more difficult than in the private sector (Selten & Klievink, 2024; Sundberg & Holmström, 2024). One approach to address these barriers is public-private partnerships (PPPs). However, the success of PPPs in driving digital innovation remains mixed, which highlights the need for a more nuanced understanding of how they operate.

To address this, we adopt a resourcing theory perspective to explore how PPPs can support digital innovation. Resourcing theory focuses on how organizations enact resources to create value (Feldman, 2004). Applied to PPPs, this lens allows us to study how public and private actors work together to develop digital innovations. We build on the network-resourcing framework by Auschra and Sydow (2023) and extend this model to account for the specifics of PPPs and resourcing for digital innovation. Therefore, we ask the following question:

How can we conceptualize the development of digital innovation in PPPs from a resourcing perspective?

We approach this research goal through a qualitative case study of a large PPP involving 55 public and private organizations, following Yin (2014). The study examines how digital innovation emerged within the PPP and how resources were collaboratively shared and enacted in practice. We find that established resourcing practices described in prior theory are indeed present and relevant in the specific case

[4] At the time of publication of this thesis, this essay is in the review process of a scientific journal. Thus, I provide an extended abstract that covers the essay's content.

of PPPs and the resourcing for digital innovations. Further, we extend the existing theory. First, we observe that resourcing happens in decentralized innovation clusters, smaller groups within the PPP that collaborate more closely around specific goals. Second, we identify the role of dissemination practices, which are mechanisms used to spread innovations developed within innovation clusters across the overall network. These practices are essential for translating local innovation into network-level assets that are available for future resourcing cycles.

In summary, our paper contributes to the understanding of how PPPs can foster the development of digital innovations. It extends existing resourcing theory by highlighting the roles of innovation clusters and dissemination practices. Finally, our paper also provides actionable insights for practitioners seeking to design and manage PPPs to foster the development of digital innovations.

Keywords: Digital innovation, public sector, public-private partnerships, resourcing, case study.

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Legitimating an Enterprise Architecture Management Function – A Process Perspective[5]

Authors

Tobias Guggenberger, Moritz Schüll, David Schwarzer, Nils Urbach

Extended Abstract

The enterprise architecture (EA) approach and enterprise architecture management (EAM) are recognized as a discipline of strategic IS management, through which organizations seek to align local and enterprise-wide IT demands. EAM enables organizations to assess their current IT landscape, define a desired target architecture, and implement a roadmap to achieve this future state (Aier & Weiss, 2012). Typically, an EAM function (a team of enterprise architects) is tasked with implementing and managing this approach.

Research has shown that the success of EAM functions largely depends on the organizational legitimacy of the EAM function (Dang & Pekkola, 2016). Prior studies have demonstrated that without sufficient legitimacy, EAM initiatives are likely to fail (Kohansal et al., 2022). Yet, limited research has examined how legitimacy is attained and sustained by an EAM function (Levy & Bui, 2019). To address this gap, we ask:

How is legitimacy attained during the process of establishing an EAM function?

We conducted a single case study of a large German manufacturer of medical aids, which established an EAM function over several years. Using an institutional perspective (DiMaggio & Powell, 1983; Scott, 1987) and a process-theoretical lens (Pettigrew, 1992; van de Ven & Huber, 1990), we analyze how the EAM function evolved over time, how it engaged with its stakeholders, and how it strategically adapted its legitimation strategies to changing expectations and pressures. Our findings reveal that building legitimacy for an EAM function is an evolving process shaped by changing roles of the EAM function at the intersection of business and IT stakeholders. We identify multiple legitimation mechanisms that were employed throughout the process at MedCorp. Importantly, these mechanisms were not static

[5] At the time of publication of this thesis, this essay is in the review process of a scientific journal. Thus, I provide an extended abstract that covers the essay's content.

but dynamically adapted across different episodes, reflecting changes in organizational support, resource availability, and business needs.

We synthesize our findings into a process model of EAM legitimation, which conceptualizes the EAM function as a boundary-spanning entity that operates at the intersection of business and IT stakeholders. Our model highlights how the EAM function must continually re-position itself at this intersection and adjust its legitimation strategies. We contribute to EAM and IS management literature by offering a detailed account of how legitimacy is attained by an EAM function. Practically, we provide enterprise architects and IT leaders with actionable guidance on how to navigate stakeholder dynamics and proactively manage legitimacy to support the institutionalization of EAM within their organizations.

Keywords: Enterprise architecture management, institutional theory, legitimacy, case study, process theory.

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How to Consider the Artificial Intelligence Term? A Categorization System to Strengthen Research Impact[6]

Authors

Moritz Schüll, Peter Hofmann, Dominik Protschky, Abayomi Baiyere

Extended Abstract

Researchers and practitioners have used the AI term with a variety of meanings (Grashoff & Recker, 2023). Often, AI is used as a classifying term or as the parent class of classification systems that (hierarchically) structure technological artifacts into subclasses (e.g., computer vision, knowledge representation, or natural language processing). Depending on the perspective, this results in different taxonomies and typologies. Although AI definitions and AI-related classification systems (e.g., for organizing research fields) come with advantages, we highlight two complications arising from the high variability in the term's use.

First, AI classification systems expire. Classification systems are defined in advance and are often difficult to adapt. However, the research topics that one would classify as AI are not static, as "AI is a continually evolving frontier of emerging computing capabilities" (Berente et al., 2021). This causes classification systems and definitional approaches for the AI term to become outdated. Second, cumulative knowledge building suffers due to information loss. We see that AI-labeled research flourishes in different fields, some of which have a long research tradition. However, the means to organize research fields and give them their identity can also be a source of inefficiencies if appropriate tools are not found to ensure rigorous knowledge transfer between these research fields. Researchers in the IS domain have noted that contributions on AI from our discipline "remain mostly separated, leading to a fragmented and scattered picture of relevant phenomena and issues" (Grashoff & Recker, 2023, p. 2). The disconnect may lead to a pseudo-accumulation of knowledge as we take over the knowledge that is labeled with the same AI class but does not have a congruent set of properties (Collins et al., 2021). If not attended to, this can lead to an incoherent foundation and inhibit cumulative knowledge building around AI.

[6] At the time of publication of this thesis, this essay is in the review process of a scientific journal. Thus, I provide an extended abstract that covers the essay's content.

Furthermore, the disconnect between research and industry may manifest in data collection biases and issues in knowledge transfer, as people have different narratives and understandings of the AI term. Hence, we ask:

How can we develop an understanding of the AI term that fosters a cumulative research tradition and accounts for the future evolution of AI?

To approach this research goal, we conduct a systematic literature review (Kitchenham & Charters, 2007; Okoli, 2015). Importantly, we approach our research goal from a socio-technical perspective, which is deeply embedded in the IS discipline (Sarker et al., 2019), and inspired by a technology-in-practice understanding (Orlikowski, 2000). Thus, a better understanding of what constitutes the AI term from an IS perspective must incorporate aspects that go beyond the mere technological artifact and also account for the social context and the artifacts' development and usage therein (Orlikowski, 2000). Therefore, our study not only focuses on defining technological AI artifacts, but results in an extendable property structure (categorization system) that allows researchers to describe and differentiate the AI term regarding the AI artifact, its context, and the subject involved in developing or using it.

Keywords: Artificial intelligence; definition; categorization system; family resemblance.

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Teaming Up with Intelligent Agents — A Work System Perspective on the Collaboration with Intelligent Agents[7]

Authors

Aaron Jakob, Moritz Schüll, Peter Hofmann, Nils Urbach

Extended Abstract

The collaboration between human and intelligent agents based on artificial intelligence (AI) technologies offers significant potential for improving productivity in organizational work systems. Beyond automation, such collaboration allows humans and intelligent agents to leverage their complementary strengths (Dellermann et al., 2019). As intelligent agents become more widespread, their collaboration with human agents is expected to extend beyond isolated, individual interactions. Yet, despite growing interest in human-AI interaction, research has largely focused on such isolated, individual interactions. Consequently, there is limited guidance on how to design work systems that consider collaboration between human and intelligent agents from a task-centered perspective and that consider broader work system dynamics.

This gap is problematic for two reasons. First, intelligent agents differ from traditional IT tools due to their increasing agency and autonomy (Berente et al., 2021). Second, without a system-level perspective, both researchers and practitioners lack a common foundation to describe, analyze, and design organizational work systems that leverage the collaboration between human and intelligent agents. Related fields such as human-computer interaction (HCI) and human-robot interaction (HRI) have explored relevant aspects in this regard, yet the information systems (IS) discipline has only recently begun to integrate these insights into developing initial concepts and frameworks for the collaboration of human and intelligent agents beyond individual interactions (Braun et al., 2023). However, a conceptual framework that allows for the

[7] At the time of publication of this thesis, this essay is in preparation for submission to a scientific journal. Thus, I provide an extended abstract that covers the essay's content. An earlier version of this essay has been published in:
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comprehensive, task-centered design of work systems that leverage the collaboration between human and intelligent agents is still missing. Therefore, we ask:

How can we conceptualize the collaboration between humans and intelligent agents in work systems?

To answer this question, we conducted a systematic literature review spanning research from HCI, HRI, and IS. Based on this review, we identify 16 dimensions that characterize the collaboration between human and intelligent agents. These dimensions include factors related to agent and team roles, communication, environment, and task-processing. We then integrate these dimensions into a conceptual framework grounded in Work System Theory (Alter, 2013). This framework enables a task-centered understanding of the collaboration of human and intelligent agents in work systems. It represents a tool to describe work system design choices and their implications. In addition, we propose an initial graphical notation to visually represent work systems that leverage task-centered collaboration of human and intelligent agents. This notation supports the conceptualization and communication of complex collaborative work system designs. Our contribution lies in moving beyond a narrow interaction view to offer a systemic, task-oriented framework for the collaboration between human and intelligent agents. Our framework supports both theoretical exploration and practical design of such work systems and lays a foundation for future research on AI-enabled IS in organizations.

Keywords: Human-AI collaboration, intelligent agents, artificial intelligence, work system.

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Designing Human-AI Hybrids: Challenges and Good Practices from a Multiple Case Study[8]

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Abstract

The increasing adoption of artificial intelligence (AI) in organizations has led to the emergence of human-AI hybrids, where human and AI agents collaborate on joint tasks. This paper presents a multiple case study exploring the challenges and good practices of constructing and executing such hybrid systems. Using a work system theory perspective, we identify nine challenges and nine good practices from four successfully implemented real world cases of human-AI hybrids, structured along the work system lifecycle. In line with our socio-technical approach, we identify two major stakeholder roles involved in the construction and execution of human-AI hybrids, the technical implementer and the organizational implementer, each of which faces unique challenges and applies different good practices. This research contributes to the growing body of knowledge on the implementation of human-AI hybrids in organizations and provides practical insights for managers and implementers seeking to successfully integrate AI into their work systems.

Keywords: Human-AI hybrids, work system theory, multiple case study, human-AI collaboration.

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Towards Systematic AI Governance — A Transformation Method[9]

Authors

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Extended Abstract

Artificial intelligence (AI) technologies present organizations with significant opportunities, yet they also introduce novel governance challenges due to their complexity, autonomy, and potential for far-reaching impact (Papagiannidis et al., 2023). As AI systems become increasingly embedded in organizational processes, the question arises whether existing information technology (IT) governance frameworks are sufficient to address the unique demands of AI-based information systems (IS) or whether distinct approaches to AI governance are required.

While the field of IT governance is well-researched and offers a variety of frameworks and best practices (Tiwana & Konsynski, 2010; Vaia et al., 2022), the emerging discourse on AI governance so far remains fragmented. Proponents argue that AI's specific features, such as learning capabilities, autonomy, and black box nature, warrant bespoke governance mechanisms (Papagiannidis et al., 2023). Other scholars question whether AI differs significantly enough from other digital technologies to necessitate new governance models (Mäntymäki et al., 2022; Seppälä et al., 2021).

Despite growing interest, there is limited integration between the AI governance literature and established IT governance knowledge. This disconnect creates a pressing lack of systematic understanding of how organizations can transform existing governance structures to incorporate AI-specific concerns, while building on proven IT governance principles. To address this gap, we ask:

How can organizations transform their governance framework towards systematic AI governance?

To answer this question, we developed an AI governance transformation method using a Design Science Research (DSR) approach. This method guides organizations through

[9] At the time of publication of this thesis, this essay is in the review process of a scientific journal. Thus, I provide an extended abstract that covers the essay's content.

the process of adapting their current (IT) governance frameworks to address the challenges and requirements of AI-enabled information systems. Our work draws on existing literature from IT governance and organizational governance, while being grounded in empirical observations of current AI governance initiatives.

Our findings reveal that most real-world AI governance efforts are currently localized, i.e., are owned by specific business departments or innovation teams, and thus lack coherence at the organizational level. In contrast, our method outlines an iterative, organization-wide transformation process that enables the strategic alignment and continuous evolution of AI governance. Crucially, our findings challenge recent calls for entirely new AI governance structures. Instead, we demonstrate that effective AI governance can emerge through the transformation of existing governance frameworks, without the need to establish separate or isolated governance units.

Keywords: AI governance, design science research, IT governance, governance transformation.

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