On the Management of Decentralized Value Networks

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Abstract

The emergence of decentralized value networks has introduced substantial opportunities and complexities for organizations, individuals, and broader society, profoundly transforming roles, relationships, and value exchange across organizational boundaries. To holistically address these dynamics, this dissertation aims to guide organizations in managing decentralized value networks through the lens of work systems theory. The study is structured around three primary research goals. The first research goal focuses on how organizations manage the core elements and processes within decentralized value networks. Essays 1 to 3 under this goal provide insights into frameworks and mechanisms at the core of decentralized value networks. The second research goal investigates how decentralized networks interface with customers and how value is created and delivered through products and services. Thereby, essays 4 to 6 contribute to this by examining different products and services of decentralized value networks. The third research goal investigates decentralized value networks' broader contextual and infrastructural aspects. Essays 7 and 8 elaborate on contextual factors and the strategic management of decentralized infrastructures. Henceforth, this dissertation provides a holistic perspective on the management of decentralized value networks, enabling both researchers and practitioners to navigate their complexities better, capture their opportunities, and anticipate their societal impacts.

Keywords: Decentralized value networks; Information systems; Decentralization technologies; Value creation

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Introduction to
On the Management of Decentralized Value Networks

Abstract

This dissertation aims to support organizations in managing decentralized value networks and overcoming the emerging challenges in adopting such value creation logics. It is structured along three research goals, providing different perspectives on decentralized value networks. The introduction is structured as follows: First, I motivate the relevance of my research. Second, I introduce the reader to the theoretical foundations of this dissertation, rooted in the emergence of decentralized information systems. Third, I outline the three research goals and the subsequent research questions of each essay. Fourth, I provide a detailed account of the research design of each essay. Fifth, I summarize the essays' results before, sixth, providing an overall summary of my dissertation and the theoretical and practical implications, limitations, and avenues for further research.

Keywords: Decentralized value networks; Information systems; Decentralization technologies; Value creation

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1 Motivation

In recent years, global market complexity, sustainability imperatives, and rapid technological advancements have posed significant challenges for businesses, prompting a comprehensive transformation in value-creation approaches (Buhl, 2013; Flak et al., 2022). Historically, organizations have relied on linear value chains as frameworks for orchestrating activities from raw material acquisition to the final delivery of products or services (Porter, 1998). However, as linear value creation became less effective, there has been a discernible shift toward novel forms of value capture and, most prominently, toward value networks (Gray et al., 2013). Even though no uniformly adopted definition of value networks exists, they can loosely be defined as "cluster[s] of economic actor[s] who collaborate[s] to deliver value to the end consumer and where each actor takes some responsibility for the success or failure of the network" (Pagani, 2013, p. 619). Thereby, value networks emphasize the contribution of multiple actors in more flexible and collaborative structures for value creation (Stabell & Fjeldstad, 1998).

Examples of the shift from linear value-chain to value networks can be observed in many industries, such as car manufacturing (Riasanow et al., 2017). For instance, the car wash maker Washtec increasingly collaborates with strategic partners such as research institutes to enhance the previously linear business model into a value network of integrated products and services (Ritter et al., 2023). Numerous factors have catalyzed this transition from linear value chains to value networks. First, increasing globalization challenges businesses to navigate complex and volatile supply chains (Buhl, 2013). Value networks offer the flexibility to respond promptly to these fluctuations by leveraging the strengths of various partners (Schemm & Legner, 2008). Second, customers demand personalized products, necessitating a more integrated service delivery approach (Rehm et al., 2017). Value networks allow for aggregating specialized capabilities and the customization of offerings to meet specific customer needs, thereby enhancing customer satisfaction and loyalty (Gray et al., 2013; van Dun et al., 2020). Third, and most importantly, information systems (IS) have enabled more effective and efficient cross-organizational information and data sharing (Babel et al., 2022; Bossler et al., 2024). These technologies facilitate the synchronization of activities among dispersed partners, making value networks more viable and efficient, while

simultaneously providing the capabilities from completely new forms of value capture in networks that disrupt traditional value creation (Ellinger et al., 2024).

More recently, decentralized IS have led to the increasing emergence of value networks, thus networks that use a decentralized IS to enable value creation (Chong et al., 2019). Even though a variety of definitions for decentralized value networks exist, I build upon the work of Stabell and Fjeldstad (1998) and Vervest et al. (2004), by referring to decentralized value networks as a group of entities collaborating in any given setting to create value by leveraging a decentralized technology.

Decentralized IS include, for instance, distributed ledger technologies (DLTs), which enable bypassing traditional intermediaries or incumbents within established value chains through a distributed network of entities. Thereby, the entities share an immutable, tamper-resistant chain of digital blocks, creating trust and transparency within the network and potentially providing the foundation for the disruption of established value chains (Chong et al., 2019; Ellinger et al., 2024). Other examples can be found in federated learning systems that enable decentralized collaboration among multiple stakeholders to develop machine learning models without sharing raw data (Zhang et al., 2024). This approach leverages participating entities' data and computational resources, fostering collaboration and enhancing model robustness while ensuring data privacy and security in the value network. Thus, hospitals can collaboratively develop artificial intelligence (AI) for disease diagnosis without compromising patient confidentiality (Choudhary et al., 2024).

The aforementioned examples demonstrate that decentralized value networks became a vocal interest point for IS as novel business models emerged for firms (Pagani, 2013; Rehm et al., 2017). While such value networks offer substantial opportunities for enhanced collaboration, innovation, and competitive advantage, organizations must navigate various challenges to realize their full potential (Zavolokina et al., 2020). These challenges include but are not limited to enabling technical interoperability, ensuring data privacy and security (Bossler et al., 2024), establishing effective governance (Lacity et al., 2024), building trust (Lockl & Stoetzer, 2021), achieving scalability (T. Guggenberger et al., 2022; Menon & Sarkar, 2016), managing costs (Rossi et al., 2019), and complying with regulations (Shaw et al., 2004). Hence, addressing these challenges is critical to ensure the success of value networks. Scholars, therefore, call for research to

explore both the significant potential and the vast challenges of such value networks (Ågerfalk et al., 2022; Marheine et al., 2021; Rossi et al., 2019).

IS research offers diverse theoretical perspectives for examining value networks, such as network theory, investigating the structure of relationships among actors within value networks (Sun et al., 2021), or boundary resources, focusing on enabling and regulating interactions between different actors and platforms within value networks (Eaton et al., 2015). One theory that has developed from the realization that a purely technical perspective can limit understanding and overlook the broader organizational impact of IS is the Work System Theory (WST) (Alter, 2013). WST extends the understanding of IS merely as a technical artifact by providing a comprehensive framework for analyzing and designing information systems within organizations. With decentralized value networks altering traditional structures by reducing dependency on central authorities, WST can help assess how these networks influence the roles and interactions of participants and the flow of information. In this context, Alter (2013) define a work system as a system in which human participants and/or machines perform work using information, technology, and other resources for internal or external value creation. WST thereby serves as a promising lens for investigating decentralized value networks. Due to its holistic approach to analyzing systems within organizations, WST provides a comprehensive view of decentralized networks (Laumer et al., 2016).

The rapid adoption of decentralized value networks is transforming the ways organizations coordinate activities, share information, and leverage technology across organizational boundaries (Bossler et al., 2024; Engert et al., 2024). Yet, both practitioners and scholars face significant challenges in understanding how decentralized networks affect not only processes and participants, but also the resulting products, services, and broader organizational environment (Berger et al., 2024). WST can illuminate these complexities by providing a holistic framework to analyze the interactions among people, technology, and organizational context, highlighting the urgent need for further research to guide effective management and value creation in these decentralized settings.

Thus, in order to holistically understand the potential and challenges of decentralized value networks, I define the overall research aim of my dissertation as follows:

To guide organizations in managing decentralized value networks.

This research aim directs the thesis towards addressing a range of fundamental inquiries related to decentralized value networks. Thereby, I focus on contributing diverse perspectives on managing decentralized value networks under a work systems theory lens. Thus, this dissertation reflects and acts on multiple calls for future research on decentralized value networks and their impact on our society, organizations, and individuals (Pagani, 2013; Rehm et al., 2017; Vial, 2019). To ensure a holistic perspective on this phenomenon, my dissertation consists of eight essays that cover different aspects of work systems.

The introduction of this dissertation is organized as follows. First, I motivated my dissertation. Second, I outline both the technical and conceptual underpinnings of decentralized value networks and explain how work system theory shapes the analytical perspective of the dissertation. Third, I derive three overarching research goals (RGs) as a framework for the subsequent eight essays. Fourth, I detail the methodological approaches to investigate the central research questions. Fifth, I provide summaries of the primary findings from each essay. Sixth, the introduction concludes with a reflection on the key results, a discussion of relevant limitations, and suggestions for directions for future research.

Next to this introduction, the main body of the dissertation comprises the aforementioned eight essays.

Since each essay represents collaborative research with various co-authors, the plural pronoun “we” is used throughout these sections, and the typical citation labels have been omitted to enhance the readability and overall flow of the content.

2 Foundations

2.1 Decentralized information systems as enablers

The emergence of digital technologies and the widespread implementation of digital solutions facilitated an ongoing digital transformation across all sectors. These advancements allow organizations to achieve cost savings through automated processes, elevate service offerings by providing tailored experiences to users, and even explore new value-capture logic. Despite these benefits, digital transformation presents several significant obstacles. Reliance on centralized digital infrastructures has intensified concerns related to data security, the likelihood of system failures, and the possible decline of digital sovereignty in an increasingly globalized and interconnected environment. Addressing these challenges is crucial for organizations striving to achieve long-term and inclusive digital transformation across all sectors.

Inspired by these challenges, in recent years, a new class of technologies has emerged, commonly referred to as decentralization technologies (Fridgen et al., 2024). This class encompasses systems that operate without a central controlling authority, promoting transparency, security, and efficiency across various applications (Fridgen et al., 2024; Sunyaev et al., 2021). These technologies are reshaping conventional business models and organizational structures by enabling more distributed and autonomous systems (T. Guggenberger, Lockl, et al., 2021). One fundamental aspect of decentralized technologies is their ability to enhance data privacy and security in distributed networks, which is paramount in today's digital age (W. Li et al., 2023). Decentralized systems thereby reduce vulnerability to attacks or data breaches and hold the potential to democratize access to information and participation in digital economies (Fridgen et al., 2024).

Among the most prominently discussed examples of decentralized IS are DLTs, such as blockchain, which underpin secure and transparent peer-to-peer transactions by reducing reliance on centralized intermediaries and lowering transaction costs (TAC) (Sunyaev et al., 2021). Decentralized autonomous organizations (DAOs) leverage DLT and smart contracts to distribute governance and automate decision-making, enabling collective management and value creation without the need for a central governing body, thus enabling inter-organizational processes (Rossi et al., 2019).

Federated learning further contribute to decentralized value networks by allowing multiple parties to collaboratively develop machine learning models while keeping underlying datasets local (Zhang et al., 2024). This decentralizes the process of knowledge generation, ensuring that sensitive information remains with its owner, which is especially pertinent in regulated sectors such as healthcare. By preserving privacy and supporting regulatory compliance, federated learning allows organizations to jointly innovate and derive value from distributed data assets without relinquishing control over their information.

Additionally, privacy-enhancing technologies (PETs) further support decentralized value networks by safeguarding sensitive information throughout the data lifecycle (Fridgen et al., 2024). This is crucial in enabling secure interactions and information exchanges within decentralized networks. PETs protect sensitive data throughout its lifecycle, allow computations or verifications without exposing private information, and help participants maintain control over their data when engaging in decentralized activities.

Despite their substantial potential to enable decentralized value networks, decentralized technologies face several challenges (Zavolokina et al., 2020). Technical complexities, such as ensure scalability and security while maintaining high performance across a distributed network, remain significant obstacles (T. Guggenberger et al., 2022). Another critical challenge lies in the regulatory landscape. As decentralized technologies disrupt traditional business models and operations, they often outpace regulatory frameworks, leading to legal uncertainties, e.g. in adopting blockchain-based financial services (Sedlmeir et al., 2022). Moreover, and most notably, integrating decentralized technologies within inter-organizational networks poses substantial organizational challenges, ranging from necessary governance mechanisms to organizational change management.

2.2 Emergence of decentralized value networks

Research on value capture mechanisms date back to the 1990s within the strategic management domain. Yet, the term value often remains ambiguous, and research has developed a broad range of definitions (Kohli & Grover, 2008; Melville et al., 2004). In the context of this dissertation, I define value as being produced for all stakeholders through an organization's activities and focusing on tangible or intangible economic outcomes (Schryen, 2013). Thereby, value influences customer interaction and investment trust, guarantees long-term profit, and affects competitiveness and resource distribution (Auweiler et al., 2025; Buchwald et al., 2014; Harrison & Wicks, 2013).

As conceptualized by Porter (1998), the linear value chain model represents a sequential series of activities through which firms add value to their products or services. This model typically encompasses primary activities and support activities. The linear value chain emphasizes efficiency, cost minimization, and the optimization of internal processes, operating under the assumption of relatively stable and predictable market conditions. However, the increasing complexity of global markets, accelerating technological advancements, and changing customer demands have rendered linear value capture less effective (F. Li & Whalley, 2002). Consequently, there has been a discernible shift towards value networks, which offer more flexible and collaborative structures for value creation.

Hence, Stabell and Fjeldstad (1998) suggest a more differentiated understanding of value capture in firms by providing different types of value configurations. Thereby, as one possible configuration, value networks “create value by facilitating a network relationship between their customers using a mediating technology” (Stabell & Fjeldstad, 1998, p. 414). While this definition emphasizes the network relationship between the firm and its customers, more recent work extends the idea to a network of different entities, including other organizations and customers (Gray et al., 2013; Pagani, 2013; Rehm et al., 2017). Thus, a value network creates value by facilitating interactions among different types of stakeholders of a firm through an intermediate technology (Gray et al., 2013). The following table 1 highlights the difference between a value chain and a network.

Table 1: Comparison between Value Chain and Network (adapted from Stabell & Fjeldstad 1998)

	Value Chain	**Value Network**
Value creation logic	Transformation of inputs into products	Linking partners
Primary technology	Long-linked	Mediating
Main interactivity relationship logic	Sequential	Meshed
Business value system structure	Interlinked chains	Layered and interconnected networks

Thereby, the mediating technology plays a crucial role in value networks by facilitating exchange relationships among customers distributed in space and time (Peppard & Rylander, 2006). This technology enables clients or customers who are interdependent, linking them through a networking service provided by the firm itself. For instance, telephone companies and retail banks rely on mediating technology to connect customers who can communicate with each other, thereby creating value for all parties involved (F. Li & Whalley, 2002).

Hence, value networks, as systems of interconnected actors exchanging tangible and intangible value, have long been recognized in organizational theory and practice (F. Li & Whalley, 2002; Stabell & Fjeldstad, 1998). However, the advent of digitalization has fundamentally transformed the landscape of value creation and exchange, introducing new possibilities for collaboration, coordination, and innovation among network participants (Goswami et al., 2012; Gray et al., 2013). In particular, the rise of decentralized information systems has enabled entirely new forms of value networks, exemplified by blockchain-based supply chain platforms, which facilitate transparent, secure, and efficient interactions between distributed stakeholders without the need for centralized oversight (Zavolokina et al., 2020).

Examples for decentralized value networks include blockchain-based supply chain platforms like the Global Shipping Business Network that provide intermediary services among network participants, such as enabling the transfer of verifiable information and payments between parties (Chong et al., 2019). These networks create value by displacing traditional entities from established value chains; for example, a

blockchain-driven interbank cash transfer system can operate independently of central banks. Additionally, data spaces, such as Catena-X, a German data space project specifically designed for the demands of the automotive industry (Steiner & Münch, 2024), function as value networks of data by enabling organizations to share and reuse data through distributed infrastructures and collaborative governance frameworks. This decentralized approach addresses the limitations of centralized platforms and bilateral integrations by enhancing flexibility, trustworthiness, and self-determination over shared data (T. M. Guggenberger et al., 2025). Further examples of such decentralized value networks can be found in the context of big data (Schermann et al., 2014), tokenization of assets (Sunyaev et al., 2021), or Internet-of-Things (IoT) -based, cyber-physical systems (Martin et al., 2021).

Ensuring effective governance mechanisms while successfully delivering value remains a critical challenge for decentralized value networks, yet addressing them effectively can accelerate the redefinition of how firms co-create and deliver value in the digital age. Henceforth, given the technical and organizational complexity of decentralized value networks, research requires a holistic approach to investigate them.

2.3 Evolution of the work systems theory

As the theoretical foundations of this dissertation, I draw on the body of work system literature. Originating in the tradition of socio-technical theory, the concept of the work system highlights the fundamental interplay between social and technical elements within organizational contexts (Bostrom & Heinen, 1977). Bostrom and Heinen (1977) argue that effective design and redesign of organizational systems rely on integrating these interacting subsystems. This idea resonates with our focus on the collaboration between human and intelligent agents. Expanding on this foundation, Alter (2013) offers a comprehensive formulation of WST, defining a work system as a configuration in which people and/or machines carry out processes and activities using information, technology, and other resources to produce products or services for various customers. This broad definition encompasses various systems within organizational contexts, including information systems, projects, supply chains, and more. Each type of work system highlights its specialized functions but remains aligned with the central tenets of WST. According to this perspective, processes and activities are

central, requiring carefully aligning participants, technologies, and informational resources (Laumer et al., 2016). Work systems also exist within wider organizational environments that shape strategies, define operational boundaries, and provide infrastructure (Alter, 2013). This holistic understanding is particularly relevant when examining decentralized value networks, where sociotechnical integration and alignment occur across distributed and dynamic settings.

At its core, WST posits that a work system consists of human participants and/or machines that execute processes and activities utilizing information, technology, and other resources to generate products or services for customers. WST's theoretical foundations are anchored in three primary components: the definition of a work system, the Work System Framework (WSF), and the Work System Life Cycle model (WSLC). The Work System Framework (WSF) identifies nine crucial elements that form the basis of understanding a work system's structure, function, and environment during stable periods. These elements include processes and activities, participants, information, and technology within the work system, while customers and products/services often straddle the boundary between internal and external dimensions. Environment, infrastructure, and strategies exist outside the work system but still impact its operations. This framework inherently supports IT professionals and business analysts in recognizing and comprehending IT-reliant systems within organizations (Laumer et al., 2016).

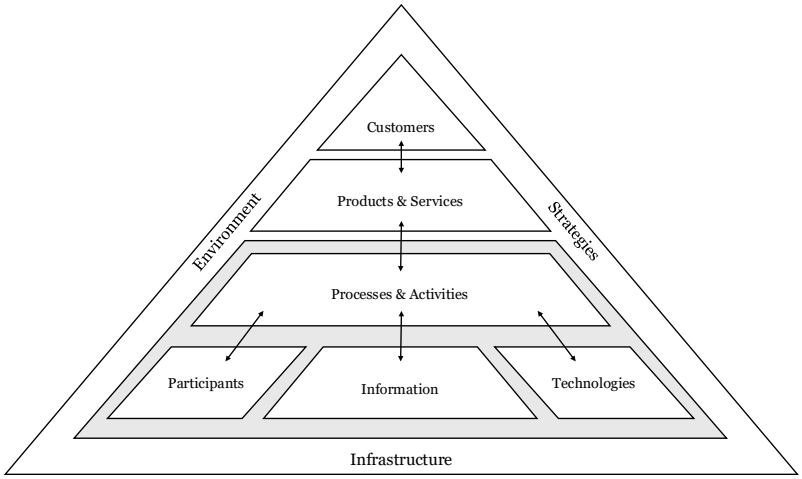

Figure 1: Work Systems Theory, own illustration based on Alter (2013)

Complementing the static view of the WSF, the Work System Life Cycle model (WSLC) offers a dynamic perspective on how work systems evolve over time (Alter, 2013).

Unlike the System Development Life Cycle (SDLC), which is predominantly project-oriented, the WSLC views work systems as continuously evolving entities. This model accounts for planned changes, occurring through formal projects with distinct phases, and unplanned changes, which emerge from adaptations, workarounds, and improvisations. This iterative evolution of work systems underscores the fluidity and adaptability that characterizes organizational systems.

Henceforth, WST provides a lens through which to view systems in organizations, emphasizing that any type of system, not just information systems, should be considered work systems by default unless explicitly intended to analyze fully automated systems. This framework advances the understanding of organizational systems by categorizing them as work systems, elucidating the intrinsic role of information systems (IS) as a component of these systems rather than as standalone entities.

This is of particular importance as the sole focus of IS as a technical artifact leads to a restricted view of its use in organizations, potentially ignoring important complementary aspects for successful adoption. Ultimately, this poses the risk of the failure of IS adoption (Baghizadeh et al., 2020). Examples of such failures include implementing the Enterprise Resource Planning (ERP) tool SAP at the German retail discounter Lidl, which led to sunk costs of €500 million (Saran, 2018). One of the reasons for the failure included Lidl's wish to customize the complex IS to match its own processes and procedures, ignoring the interplay between technology and processes. This illustrates that IS projects often fail to succeed comprehensively or at least generate less value than initially promised. Research highlights that often insufficient specifications, thus, a discrepancy between the technical artifact and its desired capability, are a root cause for these problems (Appan & Browne, 2012). Hence, a practical and theoretical need exists for a more holistic approach, such as the WST. The practical application of WST is evident across various domains, such as supply chains (Heeß et al., 2024) or the IoT (Krotov, 2017).

Thus, WST offers a robust analytical framework for analyzing decentralized value networks because it provides a comprehensive framework that encompasses not only technologies but also the activities, participants, information flows, and organizational context that shape value creation (Alter, 2013). WST recognizes that work systems in interorganizational contexts are dynamic arrangements in which human and

technological elements interact to produce products and services for various stakeholders. By considering both the internal workings and the broader environment in which a system operates, WST enables researchers and practitioners to systematically assess how decentralization transforms roles, relationships, and value exchange within and across organizations (Laumer et al., 2016). This holistic perspective is essential for capturing the complexities and opportunities presented by decentralized value networks.

3 Derivation of Research Gaps and Research Questions

To achieve the overarching research objective of guiding organizations in managing decentralized value networks, I deduce three distinct RGs, informed by the WST (Alter, 2013):

(RG1) *Managing activities, participants, information, and technologies of decentralized value networks.*

(RG2) *Managing customers and products or services of decentralized value networks.*

(RG3) *Managing the environment, infrastructure, and strategies of decentralized value networks.*

To address RG1, I investigate the foundational capabilities of decentralized value networks, including their systems, activities, participants, information flows, and technological infrastructures. Building on this understanding, I step forward to RG2, which necessitated an examination of products or services of decentralized value. Finally, addressing RG3, I investigate environmental, infrastructural, and strategic implications of decentralized value. This dissertation contributes to a deeper understanding of decentralized value networks by pursuing these three RGs.

3.1 RG_1: Managing activities, participants, information, and technologies of decentralized value networks.

The first research goal of my dissertation aims to examine activities, participants, information, and technologies (Alter, 2013) of decentralized value networks.

As the value-capture mechanisms of a firm change, so do their actions, individuals involved, data, and tools or methods employed. Exploring value networks in their systems architectures, stakeholder interactions, and regulatory pressures suggests an impact on various aspects of these networks. For example, data ecosystems face multifaceted challenges in complex operations in a decentralized environment. Ensuring data is correctly logged and verified can be difficult in a system without a centralized authority (T. Guggenberger, Lockl, et al., 2021). One frequently discussed technology to ensure verifiable data is blockchain. Blockchain's decentralized nature removes the need for a central authority in transactions, potentially eliminating intermediaries or

"disintermediation." However, as the technology matures, it has been observed that new intermediaries often emerge, a process termed re-intermediation (Chalmers et al., 2021). This happens when new forms of coordination and oversight are required, reintroducing intermediary roles previously deemed unnecessary in the original blockchain design (Zeiß et al., 2024). Intermediaries are crucial in managing transaction administration and execution. Although blockchain has revitalized interest in reducing or transforming intermediaries, the frequent incidences of re-intermediation necessitate a deeper understanding of how blockchain reshapes the functions and presence of intermediaries in various ecosystems. Existing studies lack substantial insights into the conditions leading to the emergence of new intermediaries and their differences from traditional gatekeepers (Feulner et al., 2022). Furthermore, the influence of blockchain architectures, stakeholder interactions, and regulatory pressures on the transition from disintermediation to re-intermediation are not fully explored (Feulner et al., 2022). More research is needed to identify how blockchain might reshape existing business models or market roles, clarify the fate of institutional intermediaries, and understand how blockchain technology influences institutional intermediaries' responsibilities (Giaglis et al., 2002). To address this knowledge gap and to examine how blockchain reconfigures intermediaries across various use cases, we pose the following research question:

How and under what conditions do blockchain solutions transition from disintermediation to re-intermediation, and what factors most significantly drive this transition?

(Essay 1)

Yet, despite recognizing blockchains' advantages, considerable progress remains to be made before these technologies are effectively integrated within organizations and widely accepted by the market. Specifically, the decentralization of blockchain technology poses significant challenges for application deployment (Zavolokina et al., 2020). These issues are relevant not only for the execution of individual projects but also for the development of entire ecosystems. Organizations can embrace new technologies through IT projects, thereby facilitating their transformation and growth in the digital era (McLeod et al., 2012). Consequently, companies aiming to incorporate blockchain-based applications undertake projects focused on blockchain implementation in the

early strategic or proof-of-concept stages (T. Guggenberger et al., 2020). However, in recent years, these applications have advanced considerably, with businesses beginning to move from prototypes to pilot programs or full-scale operational deployments. As project complexity increases and resources remain limited, effective management becomes crucial to ensure success. The inherent characteristics of blockchain as an emerging digital technology (EDT) introduce novel challenges, requiring businesses to develop new strategies for managing these implementation projects. In particular, the decentralization aspect that fosters cross-organizational collaboration in many blockchain projects necessitates organizational adaptation (Zavolokina et al., 2020). Hence, it is imperative to precisely establish the objectives and scope of blockchain projects. Project management literature recommends using the iron triangle, consisting of time, budget, and scope, as a fundamental framework for these projects. However, recent studies argue that these criteria are insufficient for providing a comprehensive evaluation of a project's success (Shenhar et al., 2001). Building on the notion that success metrics vary with the complexity of the technology, it is suggested that blockchain implementation projects require a more specialized approach. The need for further research in this area is highlighted by the fact that recent studies often overlook the impact of intra- and inter-organizational dynamics on project management (Zavolokina et al., 2020). In summary, current literature does not adequately investigate how to effectively define the success of blockchain projects. In order to close this gap, we present the following research questions:

Which success criteria can be used for the evaluation of blockchain projects?

How do success criteria differ in their relative importance?

(Essay 2)

Even though emerging technologies such as blockchain have the potential to change value capture mechanisms, scholars have recently emphasized that such technologies should be viewed in isolation and combination. Most prominently, literature discusses the convergence of blockchain, the IoT, and AI, which enables the emergence of the machine economy and economically autonomous machines referred to as machine economy entities (MEEs) (Jöhnk et al., 2021). Companies are exploring ways to integrate autonomous machines into their operations with applications across industries

such as logistics, passenger transport, and financial markets. These developments present opportunities and challenges for businesses, economies, and society at large (Ågerfalk, 2020; Hartwich et al., 2023). According to Gartner, half of the business leaders predict a significant impact on their businesses due to the machine economy by 2030, contributing 22% of their revenue (Scheibenreif & Raskino, 2022). While literature has begun exploring this phenomenon from different angles, a shared vision for stakeholders, including developers, policymakers, businesses, and investors, is yet to be established (Duda et al., 2024). This lack of consensus creates fragmentation and interoperability issues. The existing literature lacks a structured approach to guide practitioners in developing machine economy applications towards a shared vision. A capability-based perspective, which allows a technologically-neutral view, can help stakeholders evaluate their current status and guide the development of new machine economy applications, thereby facilitating strategic decisions and investment. Examining the machine economy from this capability-based perspective could further steer academic discourse and practical efforts in the field. Thus, we ask the following research questions:

Which capability areas do machine economy entities have?

How can machine economy entities mature?

(Essay 3)

3.2 RG_2: Managing customers and products or services of decentralized value networks.

Furthermore, value networks fundamentally shape how value is captured within firms and ecosystems, which products and services are provided, and how customers perceive them (Alter, 2013). Hence, scholars investigated value networks and the role of digital technologies within them from a customer-centric perspective. Considering the complexity of coordination necessary to create value networks, it remains imperative to investigate how customers apprehend and experience the newly created value proposition of the network. This remains particularly important in sectors with a high degree of services and customer-centricity, such as health care or finance.

One possible measurement instrument to investigate such impact of technologies on

individuals, particularly within healthcare, is the Health-related quality of life (HRQoL) (Bakas et al., 2012). Thereby, various factors, like chronic diseases, can impact HRQoL. Digital technology can support ameliorating chronic health conditions, like bladder dysfunctions, by providing interventions, e.g., through mobile devices like mental health apps for managing mild psychological disorders or diet apps for lifestyle changes (Marcolino et al., 2018). Nonetheless, measuring the impacts of these digital technologies, particularly on intangible outcomes like HRQoL, is complex (Kalf et al., 2021). Technology assessment in healthcare often overlooks these factors, despite studies indicating their influence on the quality of life. Current discourse on the impact of digital technologies on individuals calls for a stronger focus on humanistic and intangible outcomes. Early studies have shown how HRQoL models can be employed in technology assessments (Kalf et al., 2021). However, there is no recorded HRQoL model incorporating the effects of digital technologies in healthcare specifically. Consequently, we pose the following research question:

How can the HRQoL-model be extended to assess the influence of digital technologies within health care?

(Essay 4)

Next to the health care domain, customers' perception of decentralized value networks is critical in the finance sector, where privacy and trust concerns are prevalent. Most prominently, research discussed the adoption of value networks built upon blockchain technology in the financial sector.

In the financial sector, the 2008 global financial crisis led to a loss of trust in traditional banking systems, with customers becoming disillusioned with central institutional intermediaries. This loss of trust coincided with the emergence of decentralized finance (DeFi) technologies, such as blockchain and cryptocurrencies like Bitcoin (Nakamoto, 2008). Proponents of these technologies argue they can provide a trust-free alternative to traditional financial systems. Previous studies show that trust is a significant factor for technology acceptance (Venkatesh et al., 2012), with more users trusting the algorithms of systems like Bitcoin over established institutions (Lustig & Nardi, 2015). While instances of high adoption rates of DeFi applications in turbulent financial systems, such as Argentina or Venezuela, exist, the effect of distrust in traditional systems

on DLT adoption within a stable economic system, like Europe, remains unexplored. Research thus lacks empirical evidence on whether distrust in traditional financial intermediaries positively influences DeFi adoption. Hence, we pose the following research question:

Does distrust in established financial intermediaries affect the adoption of Decentralized Finance positively?

(Essay 5)

Next to consumer-oriented blockchain applications, one often mentioned area of application for blockchain in the finance sector is the global bond market. The bond market, worth USD 133 trillion, with the US corporate bond market at USD 10 trillion (Bartram et al., 2023), has established players and processes requiring high levels of coordination, leading to significant TAC and inefficiencies. This can discourage smaller investors or firms, create market vulnerabilities, and distort pricing mechanisms due to elevated bid-ask spreads, increased market impact costs, and difficulties in processing large trades efficiently (Kleinbauer & Stone, 2021). Two ways of reducing TAC include reducing transactions or integrating external activities into a company (Williamson, 1985). Digital technologies, specifically blockchain, also hold potential to decrease TAC by replacing trusted intermediaries and maintaining tamper-resistant ledgers, increasing market trust. Early pilot projects by multinational financial institutions showed the potential of blockchain-based bonds (Axelsen et al., 2023). However, extant literature on bond markets often neglects a focus on utilizing blockchain, leaving a research gap in designing efficient blockchain-based markets. To address this, a design science research (DSR) process is applied to examine how a blockchain-based bond system can be designed to reduce TAC in bond markets. Aiming to fill this gap in the research, we ask the following question:

How can a blockchain-based bond system be designed to reduce transaction costs in bond markets?

(Essay 6)

3.3 RG_3: Managing the environment, infrastructure, and strategies of decentralized value networks.

Value networks at their core represent a shift from internal organization of value capture towards coordination with multiple players. Hence, coordination with other entities in the firm's environment, corresponding infrastructure, and strategies (Alter, 2013) is imperative for successfully managing value networks. Yet, many value networks fail in practice due to a lack of management of these factors.

For instance, public sector organizations face increasing pressure to digitize their operations, service delivery, and public value propositions due to changing citizens' expectations and competitive situations (Sundberg & Holmström, 2024). Digital innovation is critical for these organizations to keep pace with rapid digital transformations. Without a systematic approach to stimulating such innovation, the public sectors risk falling behind and losing relevance (Magnusson et al., 2020). Partnerships between the public and private sectors can drive successful digital innovation. Estonia's successful e-residency program, enabled by a public-private partnership, is a testimony to this assertion. However, this doesn't ensure guaranteed success for digital innovation in the public sector, and there have been instances of failed partnerships that aimed to introduce new digital solutions (Benbunan-Fich et al., 2020). Though there is research on public-private partnerships (PPPs), it does not adequately consider digital innovation. Digital technologies require new forms of organization and exhibit unique traits, impacting how innovation can emerge. Therefore, specific attention to digital innovation within the context of PPPs is warranted to understand how these collaborations can successfully foster digital innovation, create public value, and offer guidelines for shaping future PPPs (George et al., 2024). Thus, we pose the following research question:

How do PPPs foster digital innovation?

(Essay 7)

The global COVID-19 pandemic has caused widespread disruption and economic damage. As of January 2021, global deaths exceeded 2.7 million, and repeated waves of infection have created economic recessions. Such crises have affected workforces globally, notably in the US, where over 40 million lost their jobs by the end of May 2020.

Measures to curb the pandemic, including business restrictions and societal lockdowns, have forced companies to adapt through digitalization initiatives to maintain productivity. This has seen a rise in remote working tools, digital sales channels, and advanced personal exchange platforms. Furthermore, companies have explored EDTs, such as AI and DLT, to support these changes. While some EDTs, such as extended reality and quantum computing, are not yet widely used, IoT, AI, and DLT have found numerous applications in combating COVID-19. These technologies provide diagnosis and treatment improvements, low-cost self-testing, and tracking systems, and can reinforce global supply chains. The exploration raises questions about these technologies' future use and impact in the face of global pandemics. Hence, we pose the following research questions:

What role do IoT, AI, and DLT and their convergence play in combating the COVID-19 pandemic or future crises?

Which resulting implications for research, practice, and policy can be identified?

(Essay 8)

This dissertation comprises eight research essays, each aligned with the research objectives delineated in this section. Specifically, Essays 1 to 3 engage with RG1, Essays 4 through 6 explore RG2, and Essays 7 and 8 examine RG3. Table 2 presents a comprehensive overview of the essays, detailing their respective publication outlets alongside their current publication statuses. For a broader perspective on my scholarly contributions not encompassed within this dissertation, please consult Appendix B.

Table 2: Essays on the three research goals of this dissertation

Title	Publication outlet	VHB JQ3 ranking	Publication status
RG_1: Examining the impact of decentralized value networks on activities, participants, information, and technologies.			
Essay 1: Beyond Disintermediation: A Multiple Case Study of Emerging Intermediary Roles in Blockchain Applications" *Earlier version published as:* Shedding Light on the Blockchain Disintermediation Mystery: A Review and Future Research Agenda	Electronic Markets Proceedings of the 30th European Conference on Information Systems (ECIS)	B B	Under review (2nd round after major revisions) Published as Feulner et al. (2022)
Essay 2: You Can't Manage What You Can't Define: The Success of Blockchain Projects Beyond the Iron Triangle	Proceedings of the 42nd International Conference on Information Systems (ICIS)	A	Published as T. Guggenberger, Stoetzer, et al. (2021)
Essay 3: Forecasting the Emerging Machine Economy: Towards a Maturity Model	Technological Forecasting & Social Change	B	Under review
RG_2: Examining the impact of decentralized value networks on customers and products or services.			
Essay 4: A Model to Assess the Impact of Digital Technologies on the Health-Related Quality of Life	International Journal of Technology Assessment in Health Care	B	Published as Lockl et al. (2022)
Essay 5: Breaking Banks – The Multi-Faceted Influence of Distrust in Banks on the Adoption of Decentralized Finance *Earlier version published as:* Trust-Free Banking Missed the Point – The Effect of Distrust in Banks on the Adoption of Decentralized Finance	*In preparation for submission* Proceedings of the 29th European Conference on Information Systems (ECIS)	 B	 Published as Lockl and Stoetzer (2021)
Essay 6: Designing the Future of Bond Markets: Reducing Transaction Costs Through Tokenization	Electronic Markets	B	Published as Cisar et al. (2025)
RG_3: Examining the impact of decentralized value networks on the environment, infrastructure, and strategies.			
Essay 7: Digital Innovation in the Public Sector: A Resourcing Perspective on How the Public Sector Collaborates with the Private Sector	Information & Organization	B	Under review (3rd round after major revisions)

Title	Publication outlet	VHB JQ3 ranking	Publication status
Essay 8: Emerging Digital Technologies to Combat Future Crises: Learnings From COVID-19 to Be Prepared for the Future	International Journal of Innovation and Technology Management	C	Published as T. Guggenberger, Lockl, et al. (2021)

4 Research Designs

This section presents an overview of the research designs applied across the eight essays to address the stated research goals and questions. In the following, I provide a description of the specific research approaches, data collection strategies, and analytical techniques utilized to examine the research questions. Table 3 displays a summary of the selected research designs.

Table 3: Essays on the Three Research Goals of this Dissertation

Title	Research design
RG1: Managing activities, participants, information, and technologies of decentralized value networks.	
Essay 1: Beyond Disintermediation: A Multiple Case Study of Emerging Intermediary Roles in Blockchain Applications	**Case study research** • Multiple case study approach • Triangulation of various data sources, including eight interviews with experts, with open, axial, and selective coding of the data. • Deriving two pathways to re-intermediation
Essay 2: You Can't Manage What You Can't Define: The Success of Blockchain Projects Beyond the Iron Triangle	**Interview study** • Inductive research approach with a qualitative interview study • Open, axial, and selective coding of 12 interviews • Triangulation of findings with related literature to derive an updated framework of project success criteria
Essay 3: Forecasting the Emerging Machine Economy: Towards a Maturity Model	**Maturity model development** • Iterative development of a maturity model following the established guidelines for such, including a review of literature as well as 14 qualitative interviews to derive an alpha version of the model • Evaluation of the model in a focus group discussion, as well as eight qualitative interviews
RG2: Managing customers and products or services of decentralized value networks.	
Essay 4: A Model to Assess the Impact of Digital Technologies on the Health-Related Quality of Life	**Survey research** • Survey in an exemplary scenario of an IoT wearable with a sample of n = 349 • Data analysis through partial-least squares structural equation modeling (PLS-SEM) • Validation of our proposed TA-HRQoL model
Essay 5: Breaking Banks – The Multi-Faceted Influence of Distrust in Banks on the Adoption of Decentralized Finance	**Survey research** • Adaptation of a technology acceptance research model • Quantitative-empirical survey with a sample of n = 264 respondents • Validation of large parts of our proposed research model
Essay 6: Designing the Future of Bond Markets: Reducing Transaction Costs Through Tokenization	**Design science research** • Development of a blockchain-based bond market prototype • Iterative development of the prototype with a subsequent demonstration of its capabilities and a qualitative evaluation
RG3: Managing the environment, infrastructure, and strategies of decentralized value networks.	
Essay 7: Digital Innovation in the Public Sector: A Resourcing Perspective on How the Public Sector Collaborates with the Private Sector	**Case study research** • Single case study • Triangulation of various data sources, including 16 interviews with experts, three-step analysis of qualitative data following Gioia et al. (2013) • Derivation of an extended model of resourcing in PPPs
Essay 8: Emerging Digital Technologies to Combat Future Crises: Learnings From COVID-19 to Be Prepared for the Future	**Research commentary** • Review and synthesis of literature on EDTs in the wake of the COVID-19 pandemic • Derivation of a framework that displays the interplay of all investigated technologies

In ***Essay 1***, we applied a case study approach to explore how blockchain technology influences disintermediation. Due to the varied effects of different blockchain technologies, we opted for a multiple-case study framework to capture a broad spectrum of impact and allows us to analyze complex, real-world issues (Yin, 2014). We reviewed the literature and identified literature on intermediation in electronic markets to provide a suitable conceptual foundation for our case analysis. Using theoretical sampling, we selected two cases from the finance and supply chain sectors, due to their promising potential for blockchain applications. Data collection involved gathering public information, project documentation, and conducting eight semi-structured interviews with experts over three months. The interviews, lasting 35 to 60 minutes, resulted in 91 pages of transcripts, offering detailed insights into each case. Following the recommendations of Corbin and Strauss (1990) we analyzed the data using a three-phase coding process comprising open, axial, and selective coding. During open coding, we labeled relevant data passages, refined these codes, developed categories in axial coding, and finally unified categories in the selective coding phase to prepare our case analysis. We held multiple workshops with all participating researchers to ensure robust and reliable findings. Our analysis resulted in an updated perspective on disintermediation in blockchain systems, proposing a distinction between centralized and decentralized intermediation.

In ***Essay 2***, we carried out an interview study, following the recommendations of Myers and Newman (2007), to inductively identify the criteria and dimensions that define the success of blockchain software development projects. The findings aim to enhance the understanding of evaluating such projects and their success factors. We approached companies involved in implementing blockchain-based information systems and developed a set of interview guidelines featuring open-ended questions. This approach allowed interviewees to provide unrestricted responses and offered the opportunity for unexpected insights. We interviewed professionals working on 12 different blockchain projects, conducting debriefing sessions to discuss new themes and cross-reference them with previous interviews. A final meeting was held to review the entire data set before commencing the coding process. The interviews were recorded and transcribed, yielding 176 pages of transcripts. Over four weeks, we conducted three rounds of coding, each followed by workshops where all authors reviewed the results.

By coding qualitative data and triangulating it with relevant research literature (Flick et al., 2004), we identified six success dimensions and 29 criteria for evaluating success in blockchain projects. Lastly, we asked each interview participant to rate the identified success criteria in terms of their relative importance. This resulted in a quantitative assessment of the relevance of each success dimension for the blockchain projects in which the interviewees participated.

In ***Essay 3***, we employed the methodology of Becker et al. (2009) to develop a maturity model, which closes the gap in the literature on the capabilities of a future economy based on economically autonomous acting machines. Following the eight-stage process outlined by Becker et al. (2009), we began with a clear definition of the problem to ensure our maturity model met a relevant need. We then compared existing maturity models to identify best practices and areas for improvement. Next, we determined the optimal development strategy for our model, considering scope and stakeholder needs. The process involved iterative development, implementation, evaluation, and decision-making stages to assess the model's effectiveness and refine it based on feedback. Initially, we conducted a literature review to compare potential components of other maturity models with our Machine Economy Entity Maturity Model (MEEMM). Recognizing a limited understanding of maturity in machine economy applications, we opted for a top-down approach, defining generic maturity stages before specifying relevant practices. We decided on a staged maturity model, comprising distinct levels, to provide a structured framework for progression. During iterative development, we conducted 14 semi-structured interviews with industry experts, following theoretical sampling principles, that informed the refinement of our maturity model. We coded and analyzed the interview data, evolving our initial assumptions into stages, sub-dimensions, and dimensions. Iterative workshops helped integrate these findings into the model. In the transfer and implementation phases, we developed an online platform for companies to assess their maturity using our model. We disseminated the model through practice-oriented publications, incorporating feedback to refine its applicability further. For evaluation, we conducted a focus group discussion with doctoral candidates and semi-structured interviews with industry experts to gather comprehensive feedback. This process led to refinements in the model's terminology and structure, ensuring clarity and applicability. Practitioners confirmed the model's relevance

in supporting companies in achieving digital maturity. The evaluation culminated in the confirmation of our maturity model, demonstrating its potential to guide the development of future machine economy entities.

In ***Essay 4***, we developed an adapted model to measure the impact of digital technologies on the health-related quality of life (TA-HRQoL). Following the model development, we conducted an online survey targeting individuals with bladder dysfunction to evaluate our model. We began the survey, as suggested by established procedure (Hair et al., 2013), with collecting indicators from pre-validated questionnaires whenever available, or derived items from existing literature relevant to HRQoL studies, particularly those focusing on bladder dysfunction. Our objective was to tailor these indicators to our study context, ensuring relevance by adapting declarative content where necessary. Our initial questionnaire encompassed reflective and formative measurement models and single-item measures. To ensure reliability and validity, we performed a pretest on these models. We encountered no issues with missing data or problematic response patterns during pretesting, leading us to refine the questionnaire by removing formative measurements. We scrutinized convergent validity, utilizing outer loadings according to established standards for retaining or revising items. The survey's introduction clarified our study's objectives, process, and privacy protocols to participants, who indicated consent before proceeding. For sampling, we targeted individuals suffering from or assisting someone with bladder dysfunction, requiring participants to be at least 18 years old and proficient in English or German. Ultimately, we analyzed 349 complete responses through a partial least squares structural equation modelling (PLS-SEM). The results of our analysis generally support our TA-HRQoL model, showing significant relations among almost all hypotheses.

In ***Essay 5***, we adapted a technology acceptance research model from Kim et al. (2009) to address the distinct features of financial services, particularly concerning DeFi. While the model itself builds upon scholarly work in the technology acceptance research domain (Davis, 1989), key modifications included reinterpreting 'Initial Trust in Mobile Banking' as 'Distrust in Banks', mediated by 'Propensity to Distrust', 'Structural Assurances', and 'Disrepute of Banks'. We thereby formulated seven hypotheses addressing factors like social influence, relative benefits, and structural assurances on behavioral intention to use DeFi. The data collection involved a survey constructed

from established literature to explore these constructs, with items evaluated on a seven-point Likert scale. To guarantee respondents had foundational knowledge about DeFi and traditional finance, introductory details were provided within the survey. Furthermore, the survey included control questions to confirm participants' usage of financial services, enhancing data reliability by filtering out those unaffected by central institutions. The following validation processes include a pre-test involving IT and banking professionals to ensure empirical feedback on survey items. The SmartPLS 3 tool was employed to test the survey's validity and reliability, calculating metrics like Cronbach's Alpha for internal consistency. While most constructs met the validity requirements, Propensity to Distrust was dropped due to low average variance extracted and problematic cross-loading scores, which suggested it did not fit well within the model's context. Finally, we retrieved a sample of 264 valid responses to our survey, exceeding the recommended PLS-SEM sample size. The results of our data analysis show that even though our model generally confirms existing relationships from technology acceptance research, we could not confirm our main hypothesis that distrust in banks positively influences the behavioral intention to use DeFi.

In **Essay 6**, we aimed to close the gap in design knowledge to reduce the high TAC and lack of blockchain-based solutions in bond markets through the DSR paradigm. We created a blockchain-based bond token prototype to lower TAC in bond markets by addressing inefficiencies. Based on Peffers et al. (2007), our methodology involved six steps: problem identification, defining solution objectives, designing and developing the artifact, demonstration, evaluation, and communication. In the first step, we identified issues in bond markets by reviewing literature and conducting expert interviews, which helped us articulate meta-requirements (MRs). Proceeding to step two, we defined design objectives (DOs) derived from the MRs. Our DOs identified complex market designs and manual processes as primary contributors to TAC in bond markets. We aimed to reduce TAC by minimizing settlement delays, streamlining processes, and enhancing market access. In step three, we designed and developed the artifact, refining it iteratively through feedback from industry experts. This process involved regular consultations with researchers in diverse blockchain-related fields to ensure a comprehensive perspective. In step four, we demonstrated the artifact's functional architecture, addressing legal and regulatory requirements before implementing the

technology. The evaluation stage focused on the successful realization of our objectives. Finally, in the communication phase, we disseminated theoretical and practical findings via academic publications, detailing the artifact's source code and documentation. Throughout our research project, we engaged with experts from the field through purposive sampling, conducting 14 semi-structured interviews to gather insights on our artifact. Interviews lasting around 45 minutes were recorded, transcribed, and analyzed using MAXQDA software. Our findings contribute to the broader understanding of blockchain's potential in financial markets and align with interdisciplinary research initiatives in financial product tokenization.

In ***Essay 7,*** we conducted a single case study to explore how PPPs foster digital innovation, guided by the resourcing perspective. Following established case study methodologies (Dubé & Paré, 2003; Yin, 2014), we employed a criterion-based theoretical sampling approach to identify a case likely to yield insights into PPPs that promote digital innovation. Our case, IdentNet, is a project under Germany's Secure Digital Identities program involving 55 partners from both private and public sectors. To gather data, we immersed ourselves in IdentNet, leveraging our access to various evidence sources, such as documentation, digital workspaces, and participant observations. We attended around 170 meetings, reviewed extensive written materials, and analyzed digital communications from IdentNet. Further, we conducted 16 semi-structured interviews with stakeholders from the public and private sectors within IdentNet, selected through proportional quota sampling. This approach allowed us to adjust our questions and hypotheses as new insights emerged. For data analysis, we adopted a three-step coding method based on Gioia et al. (2013). Initially, we curated and structured the data with MAXQDA software, performing open coding to generate first-order concepts. These concepts were then grouped into second-order themes aligned with resourcing theory. Through workshops, we refined these themes and aggregated them into dimensions. In the final stage, we integrated these dimensions into a coherent model, highlighting resourcing practices, network dynamics, and dissemination practices crucial for digital innovation in PPPs. The resulting model sheds light on how the public and private sectors collaboratively innovate and evolve within digital ecosystems, offering valuable insights into the unique aspects of PPP-driven digital

innovation. Our findings propose a theoretical model for future studies on PPPs and digital innovation.

Finally, in ***Essay 8,*** we aim to contribute to the literature stream of the potential of EDTs in response to grand challenges, such as the COVID-19 pandemic. We do so by reviewing current literature on the topic and deriving a framework for the interplay between each investigated EDT. Based on this review, we derived implications for policymakers and practitioners responding to future crises. Hence, the essay is classified as a research commentary as we did not conduct a methodological approach but relied on the experiences of all co-authors in academia and practice while conceptualizing our findings.

In conclusion, this dissertation is grounded in a pragmatist philosophical stance (Goldkuhl, 2012; Simpson, 2018). The research objectives of the essays are primarily shaped by practical observations and are informed by the ontological and epistemological assumptions associated with pragmatism. This perspective emphasizes the importance of addressing real-world challenges and generating actionable insights relevant to theory and practice.

5 Summary of Results

In this section, I will summarize the results of the eight essays. The results provide insights into various dimensions of the management of decentralized value networks.

5.1 Essay 1: Beyond Disintermediation: A Multiple Case Study of Emerging Intermediary Roles in Blockchain Applications

In Essay 1, we examine how blockchain technology influences intermediation by analyzing two case studies: TradeLens, a permissioned blockchain initiative in global shipping, and MakerDAO, a DeFi protocol. We observe that blockchain-based systems typically modify instead of completely removing intermediaries, leading to new forms of governance, compliance, and technical dependencies (Feulner et al., 2022).

We detail how TradeLens uses a permissioned blockchain to modernize and streamline shipping processes to reduce inefficiencies and delays. However, this approach has led to the formation of new intermediaries, with IBM and Maersk taking on significant roles in managing governance, membership, and data stewardship. In contrast, MakerDAO, built on a permissionless blockchain, was designed to decentralize the issuance of the stablecoin DAI. Yet, we find that MakerDAO relies on centralized entities such as stablecoin providers, external oracles, and key token holders to ensure governance and stability.

Our analysis identifies two distinct re-intermediation patterns within blockchain ecosystems. The first pattern, observed in TradeLens, represents a centralized re-intermediation approach typical of business-to-business blockchain applications. Initially, participants in TradeLens expressed concerns over the high degree of centralization, fearing power imbalances. In response, we note that the platform gradually incorporated more decentralized governance elements, allowing participating entities to exert greater influence, illustrating a shift toward a more balanced model while maintaining some central control for compliance and operational stability.

The second pattern, which we associate with MakerDAO, follows a different trajectory. Operating within the DeFi sector, MakerDAO utilizes a public permissionless blockchain governed by a democratic yet complex governance system. Despite its fundamentally decentralized governance, many users depend on centralized intermediaries. This

reflects a shift from a purely decentralized model to a hybrid one, where centralized actors re-emerge to address specific operational, regulatory, or technical needs.

Both cases illustrate re-intermediation (Giaglis et al., 2002; Zeiß et al., 2024), however, their pathways diverge. Permissioned systems such as TradeLens transform from centralized to increasingly decentralized models, incorporating wider stakeholder input over time. In contrast, permissionless systems like MakerDAO shift from decentralized architectures to hybrid configurations, reintegrating central intermediaries when needed. These findings lead us to question the deterministic perspective of blockchain as a purely disintermediating technology. Instead, we highlight how blockchain restructures intermediation by redistributing authority and trust while addressing practical and regulatory limitations. This refined viewpoint aids in the design of blockchain solutions and contributes to theoretical debates on intermediation within electronic markets.

5.2 Essay 2: You Can't Manage What You Can't Define: The Success of Blockchain Projects Beyond the Iron Triangle

In Essay 2, we recognized the critical factors for assessing blockchain projects and presented them within a structured framework. To accomplish this, we conducted 12 interviews with project managers, IT consultants, and Chief Technology Officers responsible for blockchain projects in Germany and Switzerland. Utilizing these interviews, we conducted a multi-stage coding process to extract relevant success criteria and dimensions. These findings were then integrated into the existing framework of project success criteria by Shenhar and Dvir (2007), specifically tailoring it for blockchain projects. We identified six success dimensions and 29 success criteria, providing insight into the criteria useful for comprehensively evaluating blockchain projects. To further explore the relative importance of these success dimensions, we recontacted interview participants and requested them to rank the dimensions in order of significance. The dimensions *Impact on customer* and *Impact on environment* were deemed highly important by the interviewees. Interestingly, in contrast to conventional project management literature (Shenhar et al., 2001; Thomas & Fernández, 2008), the dimension *Efficiency* was given comparatively lower importance. Additionally, the relative significance of *Business* and *Direct success* dimensions increased when projects were more

closely aligned with operational systems, highlighting the differing importance of success criteria.

This essay contributes in several ways. Firstly, we identified a new success dimension, *Impact on environment,* and extended the initial model by Shenhar and Dvir (2007). The consolidated success criteria emphasize the need for companies to think beyond traditional criteria when executing blockchain projects. Secondly, within the dimensions proposed by Shenhar and Dvir (2007), we uncovered additional success criteria specific to blockchain projects, demonstrating the required modifications to understanding conventional success dimensions for blockchain projects. Lastly, we assessed the identified success dimensions in terms of their relative importance and discussed these findings in relation to prior project management literature (Thomas & Fernández, 2008). This revealed discrepancies between blockchain projects and traditional software implementation projects, particularly in the generally lower rating of the *Efficiency* dimension, which contrasts with IT project literature, where budget and time adherence were typically seen as the most crucial criterion.

5.3 Essay 3: Forecasting the Emerging Machine Economy: Towards a Maturity Model

In Essay 3, we present the development of MEEMM and its distinct dimensions. In this essay, we followed the established procedure of Becker et al. (2009) in developing maturity models. We designed our research to explore the evolving machine economy driven by EDTs and AI, which are transforming value creation and enabling machines to act with human-like decision-making capabilities. By focusing on the capabilities and maturation of machine economy entities, we sought to establish a shared vision that guides both scholarly discourse and practical development, addressing the current fragmentation and enhancing strategic decision-making in this burgeoning field.

The MEEMM comprises six key dimensions: physical, connectivity, smartness, identity, interaction, and business. Each dimension comprises sub-dimensions representing diverse aspects and capabilities necessary for MEEs. In the physical dimension, we assess an entity's ability to influence its environment and self-perception. This incorporates both tangible infrastructure and intangible elements, like virtual data access via application programming interfaces. Connectivity evaluates an entity's network

communication integration, with maturity levels progressing from no integration to full autonomy in connecting with ecosystem entities. Smartness examines the AI and autonomous decision-making abilities of MEEs, ranging from basic task execution to full self-learning and decision-making autonomy. The identity dimension addresses the reliability of identification and authentication systems. Maturity here ranges from self-assured identity, which is quick but less trustworthy, to self-sovereign identity, combining trustworthiness with privacy. Interaction measures how MEEs interface with other entities, reflecting capabilities from unidirectional information broadcast to dynamic bidirectional communication. In the business dimension, we explore the autonomy levels of business models within the machine economy, from performing predefined tasks to executing self-developed strategies without human oversight.

The maturity model delineates five maturity levels, from Level 0 (no maturity) to Level 4 (full maturity). Entities with higher maturity possess increased capabilities and autonomy, but this complexity isn't always appropriate. Thus, we advocate assessing the optimal maturity level for specific use cases. Our MEEMM elucidates the vision of a machine economy, where machines autonomously create value and engage in transactions without human intervention. Early applications include autonomous payments and self-driving vehicles. This vision propels machines to be central economic agents, enhancing productivity, autonomy, and innovation. We further apply our MEEMM to Waymo's robotaxis, demonstrating a multi-dimensional actuation and sensing capability.

Thereby, our study bridges the gap in the literature on autonomous economic systems, providing a comprehensive model for assessing and advancing MEEs. Practically, the MEEMM serves as a strategic tool for organizations, helping design and mature machine-driven economic capabilities and aligning with market demands.

5.4 Essay 4: A Model to Assess the Impact of Digital Technologies on the Health-related Quality of Life

In Essay 4, we explored the impacts of digital technology on HRQoL, acknowledging its importance as a measure of individual well-being in diverse settings. Traditionally, models assessing HRQoL (Bakas et al., 2012) have not accounted for the influence of digital technology, an oversight we aimed to address. To do this, we extended a well-

established HRQoL model by integrating a component explicitly related to digital technology, the TA-HRQoL. Our method used a survey to evaluate the extended TA-HRQoL model. We chose to exemplify the application of digital technology through a device designed for the self-management of bladder dysfunction. This choice allowed us to scrutinize the validity of our model extension and the impact of various HRQoL determinants on patients suffering from bladder dysfunction. We focused on assessing whether incorporating digital technology could improve HRQoL and how this reflected in daily life.

Our findings suggest that the use of digital technology indeed has a positive effect on HRQoL. In the exemplary scenario we examined, using digital technology led to significant reductions in bladder-related functional impairments. This improvement, in turn, contributed directly to enhanced perceived well-being and increased life satisfaction among users. This outcome suggests that digital technology can be critical in managing health conditions, thereby improving the overall quality of life.

The implications of our study are threefold. First, by providing evidence of the influence of digital technologies on HRQoL, we offer support for our model extension, the TA-HRQoL. We regard this model not only as valid but also as a practical framework for understanding and assessing the impact of digital technologies on an individual's HRQoL. Second, our TA-HRQoL model enables healthcare providers and policymakers to evaluate the benefits of digital health interventions more comprehensively and consider their implementation in various healthcare contexts. Third, our research underscores the potential for digital technology to transform healthcare management and delivery by integrating seamlessly into patients' lives. This integration can offer individuals greater autonomy and control over their health, ultimately leading to a better quality of life. As digital technology continues to evolve, its role in healthcare is likely to expand, necessitating ongoing research and adaptation of models like the TA-HRQoL to ensure they remain relevant and effective in measuring the multi-faceted impacts of these technologies on health and well-being.

5.5 Essay 5: Breaking Banks – the Multi-faceted Influence of Distrust in Banks on the Adoption of Decentralized Finance

In Essay 5, we investigated whether distrust in traditional intermediaries in the financial sector positively influences the adoption of new blockchain-based services in this domain. We evaluated our proposed research model (Kim et al., 2009) using SmartPLS 3, examining the effects of various factors on the Behavioral Intention to Use DeFi. We found that Social Influence and Relative Benefits of DeFi significantly and positively influence users' intentions to adopt these technologies, with path coefficients showing these factors as strong motivators. We also observed that Structural Assurances of Banking negatively impact Distrust in Banks, while Disrepute of Banks exerts a positive effect. We analyzed the statistical significance of the path coefficients and confirmed the high relevance of Social Influence and Relative Benefits. Although Distrust in Banks and Perceived Risk of Banking showed lower path coefficients, they were less influential on the Behavioral Intention to Use DeFi. Furthermore, we considered the model's explanatory power above-average, as suggested by the R^2 values. Our hypothesis testing confirmed that Social Influence significantly impacts DeFi adoption, aligning with Venkatesh's earlier findings. We established that the perceived advantages of DeFi over traditional banking significantly drive adoption intentions. However, contrary to our expectations, we did not find that Perceived Risk and Distrust in Banks significantly influenced DeFi adoption, suggesting that users remain with familiar systems despite risk perceptions.

Hence, we propose a "trust paradox," where users' distrust in financial institutions does not lead to DeFi adoption, mirroring the privacy paradox (Kokolakis, 2017). From a managerial perspective, our results suggest that DeFi providers enhance perceived value and integrate into trusted settings to entice adoption. We believe we can attract more users in the early stages by emphasizing real benefits over traditional banking. Moreover, we recommend focusing on interoperability and user convenience to mitigate resistance and foster future adoption.

5.6 Essay 6: Designing the Future of Bond Markets: Reducing Transaction Costs Through Tokenization

In Essay 6, we developed a blockchain-based system to enhance transparency and trust in bond markets. Our motivation stemmed from the existing inefficiencies in current bond markets, such as long settlement times and high costs associated with the issuance of corporate bonds (T. Guggenberger et al., 2024). These inefficiencies lead to high TAC, which in turn have several drawbacks for market participants (Coase, 1937). Motivated by the widely recognized potential of blockchain-based IS to reduce TAC and the emergence of the first blockchain-based corporate bonds in practice, we aimed our research at designing a generic blockchain-based bond system that could decrease TAC compared to current bond markets.

To achieve this, we employed a DSR approach, informed by Peffers et al. (2007), consisting of six methodical steps. In the design and development phase, we built a blockchain-based digital ledger system. This artifact was specifically crafted to provide a decentralized and immutable record of transactions, thereby addressing the critical need for transparency and security. During the demonstration phase, we showcased the functional architecture of our blockchain system, emphasizing its ability to meet processual, legal, and regulatory requirements essential for its deployment. The evaluation phase was pivotal, focusing on the perceived benefits of our blockchain prototype. We assessed its efficacy in enhancing transactional transparency and reducing uncertainties by facilitating self-optimizing behaviors. The results confirmed that our artifact effectively met the predefined objectives, thus indicating its practical utility.

The theoretical and practical implications of our research are threefold. First, we provide novel design knowledge on blockchain-based bond markets by identifying five design principles. Second, we extend the existing research on IS-enabled TAC reduction in bond markets by highlighting the importance of using the automation potential inherent to smart contracts to successfully reduce TAC and ultimately achieve a positive business case (Williamson, 1985). Third, our research demonstrates the feasibility of blockchain-based bond markets.

Our results confirm that the issuance mechanism of the prototype notably reduces TAC. Nonetheless, it is crucial to recognize these costs as intrinsic obstacles that are resistant to circumvention due to the expenses associated with the current Ethereum-

based prototype design. Although these costs are substantial, they should be viewed within the larger context of the prototype's overall effectiveness and its impact on the field of information systems, with the understanding that future advances in technology and regulatory changes might mitigate these inherent constraints.

5.7 Essay 7: Digital Innovation in the Public Sector: A Resourcing Perspective on How the Public Sector Collaborates with the Private Sector

In Essay 7, we investigated the IdentNet network, funded by the German Federal Ministry of Economic Affairs and Climate Action, to understand how it develops digital identity frameworks as an example of digital innovation in PPPs. We therefore employed a single embedded case study design, inspired by Yin (2014) to investigate these mechanisms within the IdentNet network. The network operates as a cooperative consortium, comprising eleven public and 44 private sector organizations, working collaboratively to create secure and democratically sound digital identity solutions. We followed the ideas of Auschra and Sydow (2023) to conceptualize this PPP as a purpose-oriented network, drawing from the general idea of value networks.

By observing IdentNet's resourcing practices, we noted that public and private sector assets are utilized to create value, with public institutions providing unique relationships and data. In contrast, private organizations contribute competitive market expertise and agile development capabilities. Thereby, we highlight the importance of such value networks in making assets, previously exclusively usable for one organization, accessible to all network participants. Various practices, such as collaborative learning sessions and technical collaborations, facilitate knowledge exchange and innovation. Further, we highlight how IdentNet's innovation communities emerged to address specific goals, thereby extending the existing literature in this domain (Auschra & Sydow, 2023). Our results illustrate how these communities formed around specific sub-goals, applying strategic partnerships and tailored digital-specific resourcing practices to advance the network's overall goals.

We recognize IdentNet's success in aligning private innovation with public regulation, improving digital identity solutions across various sectors. Our findings indicate the value of fostering decentralized innovation communities to drive digital

transformation, suggesting that dissemination practices are crucial for integrating and leveraging new resources network-wide. Overall, we propose that IdentNet exemplifies the potential of PPPs, as a concrete example of value networks, to navigate complex technological landscapes while simultaneously developing digital innovation.

5.8 Essay 8: Emerging Digital Technologies to Combat Future Crises: Learnings From COVID-19 to be Prepared for the Future

In Essay 8, we explored the impact of emerging technologies—specifically IoT, AI, and DLT—and their convergence in tackling challenges posed by the COVID-19 pandemic. The global spread of COVID-19 has disrupted economies, leading to a significant recession and extensive job losses. In response, governments implemented restrictive measures to curb infection waves, which left companies facing unprecedented challenges. This forced many businesses to accelerate their digital transformation efforts, utilizing digital technologies to sustain operations. Consequently, in response to the pandemic, many companies explored EDTs, including IoT, AI, and DLT, for their potential to manage the crisis effectively.

Motivated by the convergence of these technologies, we aimed to investigate their role in combating current and future pandemics. Our analysis highlights the potential benefits that arise from the strategic use of these technologies. We examine the capabilities of each technology both independently and in combination, and we offer insights for researchers, practitioners, and policymakers.

We find that during the COVID-19 pandemic, all three EDTs have gained significant attention and use. The IoT has facilitated smart applications like the Robert Koch Institute's app for contact tracing and China’s health monitoring systems, enhancing efficiency and privacy. AI has been instrumental in predicting and diagnosing COVID-19, helping healthcare systems manage resources effectively. DLT has promoted digital collaboration for pandemic-related data sharing, enhancing global supply chain resilience, and fostering secure, decentralized systems for health credentials and combating misinformation. Further, our review suggests that complex challenges, such as the COVID-19 pandemic, require focusing not only on singular technologies but also on technology convergence to leverage the potential of combining multiple EDTs in use cases.

Therefore, we identify two key recommendations that are especially pertinent in the context of value networks. First, we highlight that the combination of DLT and Self-sovereign Identities can provide neutral collaboration platforms that, in turn, can be leveraged to address concerns in value networks, e.g., information-sharing. Second, we call for policymakers and practitioners alike to leverage the potential of innovation through value networks, also referred to as *Open Innovation*. Overall, our contribution enhances the theoretical understanding of how the convergence of EDTs can be harnessed to assist individuals, organizations, and society in navigating extraordinary situations.

6 Discussion and Conclusion

In the following, I first provide a summary of the introduction to my dissertation (6.1). Next, I will outline my work's theoretical and practical implications (6.2). Finally, I highlight the limitations of this dissertation (6.3) before introducing avenues for future research (6.4).

6.1 Summary

Following my motivation for this dissertation, the emergence and manifold potential and simultaneous challenges of managing decentralized value networks, I aim to contribute to the guidance of organizations and actors in such value capture configurations. I structured my dissertation around three research goals derived from the WST lens: Managing activities, participants, information, and technologies (RG1), customers and products or services (RG2), and environment, infrastructure, and strategies (RG3) of decentralized value networks.

First, we analyzed the activities, participants, information, and technologies of decentralized value networks (RG1) through Essays 1 to 3. Essay 1 explores how intermediation is transformed by blockchain technology. We demonstrate that, although blockchain promises to eliminate previously centralized intermediaries entirely, some activities cannot be removed from such intermediaries in practice (Feulner et al., 2022). As a result, new business models emerge, enabling these intermediaries to readjust their activities and sustain their roles in the market. Thereby, we contribute to the literature by proposing two pathways through which re-intermediation emerges. Essay 2 expands upon this discussion by investigating how companies successfully manage blockchain projects. It adds to research on project management (Shenhar & Dvir, 2007) and blockchain (Zavolokina et al., 2020) by integrating these two fields, which have often been studied separately. In particular, the essay offers success criteria for evaluating the outcomes of blockchain projects, presenting these in the form of a framework. Essay 3 advances the concept that single technologies can transform firms, shifting the focus to converging multiple digital technologies (T. Guggenberger, Lockl, et al., 2021). The convergence of these technologies enables the emergence of a machine economy. Our study proposes a maturity model that provides a capability-based

perspective on this novel phenomenon. This shows how entities in the evolving machine economy can coordinate their activities and interact with one another. We thereby contribute to the literature by proposing a shared vision of the emerging machine economy and identifying capability-based development paths towards it.

Second, we examined customers and products or services of decentralized value networks. Essay 4 takes a closer look at an IoT network equipped with AI functionalities, illustrating how decentralization can improve HRQoL for patients with bladder impairments as a possible customer. Our findings indicate that these innovations can profoundly affect the key indicators of personal well-being. Essay 5 continues this customer-centric approach by investigating decentralized value networks in the financial sector to determine whether distrust in traditional financial intermediaries encourages users to adopt DeFi applications. Although no statistical evidence is found for this relationship, the essay introduces a "trust paradox," highlighting the complexity of trust when decentralized networks challenge established institutions. Essay 6 deepens our understanding of decentralized value networks in finance by outlining a prototype for issuing and trading corporate bonds. Using a TAC theory foundation, it empirically demonstrates that decentralized networks can reduce TAC (Williamson, 1985). Accordingly, these networks provide a practical alternative to forms of financial intermediation that have traditionally been centralized.

Third, we investigated the environment, infrastructure, and strategies of decentralized value networks. Essay 7 examines how digital innovation can be coordinated among diverse stakeholders, including public and private actors. By taking a resourcing perspective (Auschra & Sydow, 2023), we study a large German consortium that collaboratively developed a decentralized value network. This approach clarifies how resourcing unfolds in such a setting and how it contributes to fostering digital innovations. Finally, Essay 8 offers a conceptual overview of how convergent digital technologies, like AI, IoT, and blockchain, can be applied to tackle grand challenges like the COVID-19 pandemic. We conclude by offering recommendations for policymakers and managers on strategies that can effectively address such large-scale issues. These strategies underscore how multiple digital technologies, converging into a decentralized framework, can be leveraged to tackle grand challenges.

6.2 Contributions to theory and implications for practice

The essays' results contribute to both theory and practice of the management of decentralized value networks. This section summarizes the individual contributions for theory and practice, structured along my three research goals.

In pursuit of RG1, Essays 1 and 2 concentrate on managing blockchain in particular, while Essay 3 addresses the broader phenomenon of the machine economy. First, Essay 1 discusses how blockchain solutions affect organizational activities and contributes to theoretical debates regarding intermediation in digital markets. Second, Essay 2 adds insights to the literature in project management and blockchain research by introducing a framework of success criteria for evaluating blockchain projects. Third, Essay 3 contributes to our descriptive design knowledge of emerging machine economy entities, offering a capability-based perspective that refines previously high-level conceptual understandings of this phenomenon.

Addressing RG2, Essays 4 through 6 explore how decentralized value networks influence customers and products. Essay 4 provides empirical evidence for the potential of such networks to improve HRQoL by validating our proposed TA-HRQoL model, which accounts for the influence of digital technologies on the HRQoL. Essay 5 enhances the current knowledge on technology acceptance in decentralized contexts by proposing a trust paradox in the adoption of DeFi applications. Building upon this, Essay 6 provides design knowledge for building TAC-efficient blockchain-based applications, demonstrated through a prototype for blockchain-based corporate bonds.

Finally, Essays 7 and 8 contribute to RG3. Essay 7 expands literature by applying a resourcing perspective to PPPs, enabling the identification of digital-specific resourcing practices pertinent to such collaborations. Essay 8 then discusses how the convergence of EDTs can empower decentralized value networks to address future grand challenges on a larger scale by conceptualizing their interplay on a theoretical level.

Next to the theoretical contributions, this dissertation offers multiple theoretical contributions to the management of decentralized value networks, as well as a range of practical implications for industry and policymakers. For example, Essay 1 outlines strategies for managers to establish competitive market positions using blockchain technologies, while Essay 2 recommends project management practices to ensure

successful implementation. Essay 3 highlights the importance of leveraging technology convergence to develop capabilities for autonomous machine economy entities. Essays 4 and 5 present empirical data and managerial guidance for fostering acceptance and adoption of decentralized value networks, and Essay 6 demonstrates how firms might effectively embed these networks into their products. Further, Essay 7 suggests how managers can coordinate decentralized value networks in PPPs through specific resourcing and dissemination strategies. Lastly, Essay 8 provides policymakers and organizational leaders with insights into harnessing EDTs to navigate and mitigate grand challenges such as the COVID-19 pandemic.

6.3 Limitations

Even though my dissertation offers insights and contributions for academic research and practical application, it has certain limitations. Decentralized value networks stand as a relatively new phenomenon, and the capabilities of the underlying technologies are advancing rapidly. Consequently, it is imperative to remember that the work presented in this dissertation reflects only the current state of knowledge and is likely to be affected by technological advancements in the future. In the following, I will outline the most important limitations that should be taken into account when interpreting the findings.

First, the inherent complexity of decentralized value networks makes it challenging to study their impacts on customers and products and services using real-world data alone. As a result, some of the analyses in Essays 4 through 6 (related to research goal 2) rely on conceptual or hypothetical scenarios. While these scenarios provide valuable insights into potential outcomes and user behaviors, they do not capture all the nuances that might emerge in real-world implementations. Future research may need to supplement or refine these initial findings with in-depth case studies or additional empirical data for a more comprehensive understanding.

Second, although many essays feature empirical evidence, validating the results from more recent examples of decentralized value networks remains an important step for future research. While some of the case studies examined in the dissertation draw from large-scale projects, the nature of decentralized technologies means that variations in

context, industry, and scale can substantially influence the outcomes. Therefore, empirical evidence is limited to the particular settings explored, raising the need for further analyses to reduce possible biases. Such biases may stem from sample characteristics, specific environmental factors, or technology maturity levels at the time of study. Conducting longitudinal studies, incorporating different technological platforms, or investigating a wider set of industry sectors could help generate stronger, more generalizable conclusions.

6.4 Future research

Even though this dissertation serves as a starting point for the discussion on decentralized value networks, the limitations and implications identified here open up numerous directions for continued investigation. Researchers could benefit from further examining how these networks are instantiated and evolve over time, as decentralized value networks are still in their early stages of development. This dissertation highlights two particularly promising areas for future research.

First, the identity domain currently shows significant potential, as recent regulatory actions by the European Union are shaping how decentralized value networks for digital identities may operate. Notably, the upcoming regulation on Electronic Identification, Authentication, and Trust Services (i.e. *eIDAS 2.0*) calls for member states to implement decentralized frameworks for identity management. However, at the point of writing this dissertation, large parts of the concrete details of this implementation remain unclear. In this context, Essay 6 offers a range of recommendations that can serve as a basis for future empirical validation in this emerging context.

Second, several industries, such as the automotive sector, are exploring the creation of data spaces, which leverage decentralized networks to share data and enable innovative applications. While the long-term viability of these initiatives remains unknown, the ideas and models described in this dissertation provide a foundation for investigating the management and governance of such networks.

Moreover, although a critical portion of this dissertation concentrates on DLT and blockchain technologies, developments in decentralization, such as federated learning, zero-knowledge proofs, or IoT, promise to enable different decentralized value

networks. Future research should adapt current frameworks to account for these novel technologies, thus ensuring that theoretical and practical insights remain applicable in an evolving environment. It is also imperative to account for the differences in decentralized and distributed IS (Baran, 1964).

Ultimately, my dissertation indicates that decentralized value networks based on “are increasingly creating, shaping, and controlling our world“ (Baskerville et al., 2020, p. 518). Such disruptive forms of organizing for value creation (Ellinger et al., 2024) challenge the existing perspectives of IS theory as they are rooted in the digital world, which shape the analog world into a new digital-based reality. Subsequently, IS scholars call for critical perspectives on existing theories (Baskerville et al., 2020; Ellinger et al., 2024), suggesting that future research could also question conventional notions of work systems as proposed by Alter (2013). Throughout all essays, my findings consistently suggest the critical importance of interorganizational collaboration for these networks' effective functioning and success. However, while WST recognizes the environment as one of several elements influencing a work system, my research indicates that future studies should further investigate how work systems operate within interorganizational contexts, where processes and activities must be coordinated within a single organization and across multiple participating entities.

Although managing decentralized value networks poses many challenges, it holds remarkable promise for organizations, individuals, and society at large. I hope that the theoretical and managerial implications presented in this dissertation will play a meaningful role in further developing the potential of decentralized value networks and making their benefits more accessible.

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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.[1]

Essay 1: Beyond Disintermediation: A Multiple Case Study of Emerging Intermediary Roles in Blockchain Applications

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

Simon Feulner (co-author)
Simon Feulner co-developed the research project. He participated in regular discussion rounds and contributed to developing the paper's theoretical foundations, content, and structure. Further, he engaged in textual elaboration, particularly in the introduction, theoretical background, methodology, results, discussion, and conclusion sections. Thus, Simon's co-authorship is reflected in the entire research project.

Jens-Christian Stoetzer (co-author)
Jens-Christian Stoetzer co-developed the research project. He participated in regular discussion rounds and helped develop the paper's theoretical foundations, content, and structure. He engaged in textual elaboration, particularly in the introduction, theoretical background, methodology, results, discussion, and conclusion sections. Thus, Jens-Christian's co-authorship is reflected in the entire research project.

Tobias Guggenberger (co-author)
Tobias Guggenberger supervised the research project and provided mentorship. Further, he participated in research discussions, provided feedback on the paper's content and structure, and engaged in textual elaboration. Thus, Tobias's co-authorship is reflected in the entire research project.

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

Nils Urbach (co-author)

Nils Urbach supervised the research project and provided mentorship. He also participated in research discussions, provided feedback on the paper's content and structure, and engaged in textual elaboration. Thus, Nils's co-authorship is reflected in the entire research project.

Essay 2: You Can't Manage What You Can't Define: The Success of Blockchain Projects Beyond the Iron Triangle

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

Tobias Guggenberger (co-author)

Tobias Guggenberger initiated and co-developed the research project. He contributed by developing the paper's research design and the theoretical foundations. Further, he engaged in textual elaboration, especially in the introduction, theoretical background, methodology, discussion, and conclusion sections. He also participated in research discussions and provided feedback on the paper's content and structure. Thus, Tobias Guggenberger's co-authorship is reflected in the entire research project.

Jens-Christian Stoetzer (co-author)

Jens-Christian Stoetzer co-developed the research project. He contributed by conducting and analyzing the expert interviews. Further, he engaged in textual elaboration, particularly in the introduction, theoretical background, methodology, results, discussion, and conclusion sections. He also participated in research discussions and provided feedback on the paper's content and structure. Thus, Jens-Christian Stoetzer's co-authorship is reflected in the entire research project.

Lukas Theisinger (co-author)

Lukas Theisinger initiated and co-developed the research project. He contributed by conducting and analyzing the expert interviews. Further, he engaged in textual elaboration, particularly in the introduction, theoretical background, methodology, results, discussion, and conclusion sections. He also participated in research discussions and provided feedback on the paper's content and structure. Thus, Lukas Theisinger's co-authorship is reflected in the entire research project.

Julia Amend (subordinate co-author)

Julia Amend supervised the research project and provided mentorship. Further, she participated in research discussions, provided feedback on the paper's content and structure, and engaged in textual elaboration. Thus, Julia Amend's co-authorship is reflected in the entire research project.

Nils Urbach (subordinate co-author)

Nils Urbach supervised the research project and provided mentorship. Further, he participated in research discussions, provided feedback on the paper's content and structure, and engaged in textual elaboration. Thus, Nils Urbach's co-authorship is reflected in the entire research project.

Essay 3: Forecasting the Emerging Machine Economy: Toward a Maturity Model

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

Jens-Christian Stoetzer (lead author)

Jens-Christian Stoetzer initiated and co-developed the research project. He contributed by developing the paper's theoretical foundation and curating the methodological approach. Further, he was responsible for data collection. Jointly with the other authors, he developed and evaluated the artifact. He was responsible for writing parts of the original draft and was involved in reviewing and editing the entire paper. He contributed as the lead author of the research paper.

Sebastian Duda (subordinate author)

Sebastian Duda (subordinate author) initiated and co-developed the research project. He contributed to the paper's theoretical foundation. He contributed to the data collection. He participated in developing and evaluating the artifact. He was responsible for writing parts of the original draft and was involved in reviewing and editing the entire paper. He contributed as subordinate author of the research paper.

Florian Hawlitschek (subordinate author)

Florian Hawlitschek provided mentorship and feedback on the paper's content and structure. He participated in developing and evaluating the artifact. He also engaged in the textual elaboration with respect to reviewing and editing of the entire manuscript over the course of the initial submission. He contributed as subordinate author of the research paper.

Tobias Guggenberger (subordinate author)

Tobias Guggenberger provided mentorship and feedback on the paper's content and structure. He also engaged in the textual elaboration with respect to reviewing and editing of the entire manuscript over the course of the initial submission. He contributed as subordinate author of the research paper.

Nils Urbach (subordinate author)

Nils Urbach provided mentorship and feedback on the paper's content and structure. He also engaged in the textual elaboration with respect to reviewing and editing of the entire manuscript over the course of the initial submission. He contributed as subordinate author of the research paper.

Essay 4: A Model to Assess the Impact of Digital Technologies on the Health-related Quality of Life

This research paper was co-authored by Jannik Lockl, Doreen Schick, Jens-Christian Stoetzer, and Katrin Huff. The co-authors contributed as follows:

Jannik Lockl (co-author)

Jannik Lockl contributed by providing the initial idea and inspiration for the research paper. He offered continuous supervision and academic mentorship throughout the project. Additionally, he contributed valuable experience and constructive feedback. He was involved in revising the manuscript during the peer review process. He contributed as a subordinate author with equal authorship rights.

Doreen Schick (co-author)

Doreen Schick contributed by revising the manuscript during the peer review process. She conducted literature research, was involved in textual elaboration, and provided experience and feedback throughout the writing process. She contributed as a subordinate author with equal authorship rights.

Jens-Christian Stoetzer (co-author)

Jens-Christian Stoetzer contributed by revising the manuscript during the peer review process. He carried out literature research, participated in textual elaboration, and brought in experience and feedback. He contributed as a subordinate author with equal authorship rights.

Katrin Huff (co-author)

Katrin Huff was responsible for conducting the data collection. She contributed to the development of the model and the methodology. She contributed as a subordinate author with equal authorship rights.

Essay 5: Breaking Banks – the Multi-faceted Influence of Distrust in Banks on the Adoption of Decentralized Finance

This research paper was co-authored by Jannik Lockl and Jens-Christian Stoetzer. The co-authors contributed as follows:

Jannik Lockl (co-author)

Jannik Lockl initiated and co-developed the research project. He contributed by developing the paper's methodological approach. Jointly with the other author, he conducted the data collection and analysis. He was responsible for writing parts of the original draft and was involved in reviewing and editing the entire paper. Thus, Jannik Lockl's co-authorship is reflected in the entire research project.

Jens-Christian Stoetzer (co-author)

Jens-Christian Stoetzer initiated and co-developed the research project. He contributed by developing the paper's theoretical foundation and curating the findings of the paper. Jointly with the other author, he conducted the data collection and analysis. He was responsible for writing the original draft and was involved in reviewing and editing the entire paper. Thus, Jens-Christian Stoetzer's co-authorship is reflected in the entire research project.

Essay 6: Designing the Future of Bond Markets: Reducing Transaction Costs Through Tokenization

This research paper was co-authored by David Cisar, Benjamin Schellinger, Jens-Christian Stoetzer, Nils Urbach, Florian Lennart Weiß, Vincent Gramlich, and Tobias Guggenberger. The co-authors contributed as follows:

David Cisar (co-author)

David Cisar initiated and co-developed the research project and key artifact. He contributed by developing the paper's methodological approach. Jointly with the other authors, he developed and evaluated the artifact. He was responsible for writing parts of the original draft and was involved in reviewing and editing the entire paper. Thus, David Cisar's co-authorship is reflected in the entire research project.

Benjamin Schellinger (co-author)

Benjamin Schellinger initiated and co-developed the research project. He contributed by developing the paper's theoretical foundation and curating the methodological approach. Jointly with the other authors, he developed and evaluated the artifact. He was involved in reviewing and editing the entire paper. Thus, Benjamin Schellinger's co-authorship is reflected in the entire research project.

Jens-Christian Stoetzer (co-author)

Jens-Christian Stoetzer co-developed the research project. He contributed by developing the paper's theoretical foundation and curating the findings of the paper. Further, he was responsible for data collection. Jointly with the other authors, he developed and evaluated the artifact. He was responsible for writing parts of the original draft and was involved in reviewing and editing the entire paper. Thus, Jens-Christian Stoetzer's co-authorship is reflected in the entire research project.

Nils Urbach (co-author)

Nils Urbach provided mentorship and feedback on the paper's content and structure. Jointly with the other authors, he developed and evaluated the artifact. He also engaged in the textual elaboration with respect to reviewing and editing of the entire manuscript over the course of multiple rounds of revisions. Thus, Nils Urbach's co-authorship is reflected in the entire research project.

Florian Lennart Weiß (co-author)

Florian Lennart Weiß co-developed the research project. He contributed to the paper's theoretical foundation and contributed to the data collection. He participated in developing and evaluating the artifact. He was responsible for writing parts of the original draft and was involved in reviewing and editing the entire paper. Thus, Florian Lennart Weiß co-authorship is reflected in the entire research project.

Vincent Gramlich (subordinate author)

Vincent Gramlich provided mentorship and feedback on the paper's content and structure. He also engaged in the textual elaboration with respect to reviewing and editing of the entire manuscript over the course of the initial submission. He contributed as subordinate author of the research paper. Thus, Vincent Gramlich's co-authorship is reflected in the entire research project.

Tobias Guggenberger (subordinate author)

Tobias Guggenberger provided mentorship and feedback on the paper's content and structure. He also engaged in the textual elaboration with respect to reviewing and editing of the entire manuscript over the course of the initial submission. He contributed as subordinate author of the research paper. Thus, Tobias Guggenberger's co-authorship is reflected in the entire research project.

Essay 7: 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, 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.

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 also provided oversight and mentorship throughout the research process. Therefore, his authorship is reflected throughout the entire research project.

Essay 8: Emerging Digital Technologies to Combat Future Crises: Learnings From COVID-19 to be Prepared for the Future

This research paper was co-authored by Tobias Guggenberger, Jannik Lockl, Maximilian Röglinger, Vincent Schlatt, Johannes Sedlmeir, Jens-Christian Stoetzer, Nils Urbach, and Fabiane Völter.

Tobias Guggenberger (co-author)

Tobias Guggenberger co-developed the research project. He contributed by developing the paper's conceptual foundation and analysis. Further, he engaged in textual elaboration, especially in the introduction, background, conceptual analysis, findings, implications, and conclusion sections. He also participated in research discussions and provided feedback on the paper's content and structure. Thus, Tobias Guggenberger's co-authorship is reflected in the entire research project

Jannik Lockl (co-author)

Jannik Lockl co-developed the research project. He contributed by developing the paper's conceptual foundation and analysis. Further, he engaged in textual elaboration, especially in the introduction, background, conceptual analysis, findings, implications, and conclusion sections. He also participated in research discussions and provided feedback on the paper's content and structure. Thus, Jannik Lockl's co-authorship is reflected in the entire research project.

Maximilian Röglinger (co-author)

Maximilian Röglinger supervised the research project and provided mentorship. Further, he participated in research discussions, provided feedback on the paper's content and structure, and engaged in textual elaboration. Thus, Maximilian Röglinger's co-authorship is reflected in the entire research project.

Vincent Schlatt (co-author)

Vincent Schlatt co-developed the research project. He contributed by developing the paper's conceptual foundation and analysis. Further, he engaged in textual elaboration, especially in the introduction, background, conceptual analysis, findings, implications, and conclusion sections. He also participated in research discussions and

provided feedback on the paper's content and structure. Thus, Vincent Schlatt's co-authorship is reflected in the entire research project.

Johannes Sedlmeir (co-author)

Johannes Sedlmeir co-developed the research project. He contributed by developing the paper's conceptual foundation and analysis. Further, he engaged in textual elaboration, especially in the introduction, background, conceptual analysis, findings, implications, and conclusion sections. He also participated in research discussions and provided feedback on the paper's content and structure. Thus, Johannes Sedlmeir's co-authorship is reflected in the entire research project.

Jens-Christian Stoetzer (co-author)

Jens-Christian Stoetzer co-developed the research project. He contributed by developing the paper's conceptual foundation and analysis. Further, he engaged in textual elaboration, especially in the introduction, background, conceptual analysis, findings, implications, and conclusion sections. He also participated in research discussions and provided feedback on the paper's content and structure. Thus, Jens-Christian Stoetzer's co-authorship is reflected in the entire research project.

Nils Urbach (co-author)

Nils Urbach supervised the research project and provided mentorship. Further, he participated in research discussions, provided feedback on the paper's content and structure, and engaged in textual elaboration. Thus, Nils Urbach's co-authorship is reflected in the entire research project.

Fabiane Völter (co-author)

Fabiane Völter co-developed the research project. She contributed by developing the paper's conceptual foundation and analysis. Further, she engaged in textual elaboration, especially in the introduction, background, conceptual analysis, findings, implications, and conclusion sections. She also participated in research discussions and provided feedback on the paper's content and structure. Thus, Fabiane Völter's co-authorship is reflected in the entire research project.

Appendix B: Other Publications

Table 4: Overview of Other Publications

Reference	VHB JQ3 ranking	Outlet
Feulner, S.; Schlatt, V.; Guggenberger, T.; Völter, F.; Stoetzer, J.-C. (2024). Self-Sovereign Identity for Digital KYC. In Fridgen, G., Guggenberger, T., Sedlmeir, J., Urbach, N. (eds) *Decentralization Technologies. Financial Innovation and Technology*. Springer, Cham. https://doi.org/10.1007/978-3-031-66047-4_7	n/a	Collection
Gramlich, V.; Guggenberger, T.; Principato, M.; Schellinger, B.; Duda, S.; Stoetzer, J.-C. (2024). In Decentralized Finance Nobody Knows You Are a Dog. In *Proceedings of the 57th Hawaii International Conference on System Sciences (HICSS)*. https://scholarspace.manoa.hawaii.edu/server/api/core/bitstreams/2776a9fa-be21-4eceb8f2-2df62930810a/content	C	Conference Proceedings
Duda, S.; Stoetzer, J.-C.; Guggenberger, T.; Urbach, N. (2024). Understanding the Machine Economy: Combining Findings from Science and Practice. In *International Journal of Innovation and Technology Management 21(4)*. https://doi.org/10.1142/S0219877024500342	C	Journal
Urbach, N.; Guggenberger, T.; Pfaff, H.; Stoetzer, J.-C.; Feulner, S.; Babel, M.; Principato, M.; Lautenschlager, J. (2024). EU Digital Identity Wallet : Anwendungsfälle, Nutzungspotenziale und Herausforderungen für Unternehmen. *White Paper*. *Fraunhofer FIT*. https://eref.uni-bayreuth.de/id/eprint/90425/	n/a	White-paper
Grüneke, T.; Guggenberger, T.; Hofmeister, S.; Stoetzer, J.-C. (2024). AI-Enabled Self-Regulated Learning: A Multi-Layer Taxonomy Development. In *Proceedings of the 32nd European Conference on Information Systems (ECIS)*. https://aisel.aisnet.org/ecis2024/track13_learning_teach/track13_learning_teach/4/	B	Conference Proceedings

Reference	VHB JQ3 ranking	Outlet
Duda, S.; Fischer-Brandies, L.; Guggenberger, T.; Häckel, B.; Oberländer, A. M.; Rex, A.; Stoetzer, J.-C.; Teuchert, A.; Urbach, N. (2023). Lebensmittelindustrie 4.0: Auswirkungen der Machine Economy auf die Lebensmittelindustrie der Zukunft. *White Paper*. *Fraunhofer FIT*. https://eref.uni-bayreuth.de/id/eprint/75886/	n/a	White-paper
Urbach, N., Stoetzer, J.-C. (2022). Das Problem mit der Nutzerakzeptanz. *Neue Juristische Wochenschrift – aktuell* (45). https://eref.uni-bayreuth.de/id/eprint/72873/	n/a	Journal
Strüker, J., Urbach, N., Guggenberger, T., Lautenschlager, J., Ruhland, N., Schlatt, V., Sedlmeir, J., Stoetzer, J.-C., & Völter, F. (2021). Self-Sovereign Identity: Grundlagen, Anwendungen und Potenziale portabler digitaler Identitäten. *White Paper*. *Fraunhofer FIT*. https://eref.uni-bayreuth.de/66090/	n/a	White-paper

Unraveling the Disintermediation Mystery: Reevaluating Intermediation Theory in the Age of Blockchain[2]

Authors

Simon Feulner, Jens-Christian Stoetzer, Tobias Guggenberger, Nils Urbach

Abstract

Blockchain technology has garnered significant attention from both academia and industry due to its potential to profoundly transform markets, organizational structures, and societal interactions. Initially praised for its capability to remove traditional intermediaries through decentralization blockchain promised direct, trustless transactions and a fundamental shift in existing business models, also referred to as disintermediation (Chalmers et al., 2021). However, as blockchain applications matured, researchers and practitioners observed the emergence of a more complex reality: instead of entirely eliminating intermediaries, blockchain often leads to a reconfiguration or introduction of new intermediary roles, a process termed re-intermediation (Feulner et al., 2022; Zeiß et al., 2024). Despite recognizing the dual dynamics of disintermediation and re-intermediation, prior studies have provided limited clarity regarding the specific conditions under which blockchain-driven re-intermediation occurs, as well as the characteristics distinguishing new intermediaries from traditional gatekeepers. Furthermore, the literature lacks comprehensive insights into how different blockchain architectures, regulatory environments, and stakeholder interactions shape the transition from disintermediation towards re-intermediation (Chalmers et al., 2021). Thus, there remains a significant research gap concerning the interplay of these factors in determining the fate and function of intermediaries in blockchain ecosystems. To investigate this phenomenon, we adopted a multiple case study methodology (Dubé & Paré, 2003; Yin, 2009), analyzing two distinct blockchain applications in depth. Specifically, we compared TradeLens, a permissioned blockchain solution in the shipping

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

industry, with MakerDAO, a decentralized finance protocol characterized by permissionless governance. Our methodological choice allowed us to closely examine real-world implementations, capturing the dynamics of intermediary transformation in differing organizational and technological contexts. We contribute an integrative theoretical framework emphasizing that blockchain's im- pact on intermediation is conditional, shaped significantly by governance structures, regulatory requirements, and technological complexity. This framework extends existing literature by moving beyond a binary interpretation of disintermediation, providing practitioners and academics with a more comprehensive understanding of blockchain's nuanced influence on market intermediation. Ultimately, our study underlines the necessity of considering broader organizational and regulatory contexts when evaluating blockchain's disruptive potential, offering critical guidance for organizations navigating the evolving landscape of intermediation.

Keywords: Intermediation; Disintermediation; Electronic Markets; Blockchain; Multiple Case Study

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Dubé, L., & Paré, G. (2003). Rigor in Information Systems Positivist Case Research: Current Practices, Trends, and Recommendations. MIS Quarterly, 27(4), 597. https://doi.org/10.2307/30036550

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Yin, R. K. (2009). Case study research: Design and methods (4. ed.). Applied social research methods series: Vol. 5. Sage.

Zeiß, C., Schaschek, M., Straub, L., Tomitza, C., & Winkelmann, A. (2024). Re-intermediation of the crypto asset ecosystem by banks: An empirical study on acceptance drivers among the populace. Electronic Markets, 34(1). https://doi.org/10.1007/s12525-024-00720-4

You Can't Manage What You Can't Define: The Success of Blockchain Projects Beyond the Iron Triangle[3]

Authors

Tobias Guggenberger, Jens-Christian Stoetzer, Lukas Theisinger, Julia Amend, Nils Urbach.

Abstract

Companies across industries aim to disseminate blockchain through respective projects that evaluate, design, or implement use cases. However, due to its novelty and complexity, blockchain poses novel challenges in carrying out such projects. Companies use success criteria to constantly evaluate projects. Even though literature provides frameworks for the general evaluation of projects, no research yet investigated if success criteria fundamentally differ for blockchain projects due to the characteristics of the technology. Therefore, we assess success dimensions and criteria, deduced and evaluated from an in-depth interview study with blockchain experts from 12 different projects. We contribute to the theory on blockchain project management by introducing a new success dimension and specific success criteria for blockchain projects. Our findings help to elaborate the value of blockchain in companies and novel possibilities to evaluate respective projects. We provide additional insights by assessing their relative importance and discussing implications for theory and practice.

Keywords: Blockchain, Project Management, Project Success, Success Criteria.

[3] This essay has been published in: Guggenberger, T., Stoetzer, J.-C., Theisinger, L., Amend, J., & Urbach, N. (2021). You Can't Manage What You Can't Define: The Success of Blockchain Projects Beyond the Iron Triangle. In Proceedings of the 42nd International Conference on Information Systems (ICIS). https://eref.uni-bayreuth.de/67317/

Forecasting the Machine Economy: Towards a Maturity Model[4]

Authors

Jens-Christian Stoetzer, Sebastian Duda, Florian Hawlitschek, Tobias Guggenberger, Nils Urbach.

Abstract

Recent advances in emerging digital technologies ultimately enable economically autonomous acting machines (Ågerfalk, 2020). Such machines are leading to an emerging machine economy, which practitioners and academics alike expect to have profound market potential. However, to date, the interaction of autonomous machines is limited by a common understanding of how such a machine economy manifests in the future. To address this issue, we followed the established maturity model development method of Becker et al. (2009) to develop the Machine Economy Entities Maturity Model (MEEMM). We started to build the maturity model based on the existing literature, which we captured using Webster and Watson's (2002) literature review methodology. Further, we extended and evaluated our knowledge using 22 expert interviews. Our proposed maturity model has six dimensions and eleven sub-dimensions outlining the machine's capabilities required to participate in the machine economy. We thereby bridge the gap in literature between conceptual work and research focusing on technical aspects of the machine economy vision. Our MEEMM provides a common understanding of the emerging machine economy and identifies development paths towards it. Companies might use the MEEMM to make their organization's product portfolio ready for the machine economy and derive future visions for their products. We thereby provide a starting point for a more detailed discussion about the potential and corresponding challenges of a future machine economy in both academia and practice. Finally, the MEEMM positions itself as a strategic tool for companies to translate

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

vision into concrete technical and business implementations. This is crucial as individual organizations are required to collaborate in ecosystems to generate new value from such machine economy applications (Hodapp and Hanelt, 2022).

Keywords: Machine Economy, Maturity Model, Autonomous Agents, Machine Customers.

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A Model to Assess the Impact of Digital Technologies on the Health-Related Quality of Life[5]

Authors

Jannik Lockl, Doreen Schick, Jens-Christian Stoetzer, Katrin Huff.

Abstract

Objectives: Health-related quality of life (HRQoL) is a vital instrument to account for individuals' well-being in various settings. However, no model of HRQoL allows for examining the effect of digital technology on HRQoL. Therefore, we extend an established HRQoL model by adding a digital technology-related construct. We refer to this extension as the technology-affected health-related quality of life (TA-HRQoL). Methods: We investigate the extended TA-HRQoL model through a survey. In the survey, we exemplify the use of digital technology through a device for self-managing bladder dysfunction. Hence, we explore whether the model extension proposed is valid and how determinants of the HRQoL affect patients with bladder dysfunction. Results: The results indicate that the use of digital technology improves the HRQoL. In our exemplary use scenario, the digital technology decreases bladder-related functional impairments and increases well-being and life satisfaction directly. Conclusions: Our study may provide evidence for the influence of digital technologies on the HRQoL, thus supporting our model extension. We consider our proposed TA-HRQoL model as valid and as useful to account for the influence of digital technology on an individual's HRQoL. With the TA-HRQoL model, the impact of a digital technology on an individual's HRQoL can be assessed.

Keywords: Digital technologies, HRQoL, Model development, Impact assessment.

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[5] This essay has been published in: Lockl, J., Schick, D., Stoetzer, J.-C., & Huff, K. (2022). A model to assess the impact of digital technologies on the health-related quality of life. International Journal of Technology Assessment in Health Care, 38(1), e81. doi:10.1017/S0266462322003245

Breaking Banks – The Multi-faceted Influence of Distrust in Banks on the Adoption of Decentralized Finance[6]

Authors

Jannik Lockl, Jens-Christian Stoetzer.

Abstract

During the global financial crisis in 2008, trust in established financial intermediaries declined sharply. In reaction, blockchain technology was developed as an alternative system to facilitate financial transactions devoid of intermediaries. The application of blockchain in the financial sector brought a new paradigm called Decentralized Finance. Employing a modified technology acceptance model, our study aims at examining the relationship of distrust in financial intermediaries and consumer's behavioral intention to use Decentralized Finance. To answer the research question, we follow a deductive approach to contribute to the theory on the behavioral reasons for inventing DLT and the adoption of distributed ledgers on information systems in the financial sector. We build on existing theory to be applied in a new context by identifying key constructs from prior literature, adopting constructs from existing relationships, and proposing new relationships (Alvesson & Kärreman, 2007). We modified and extended the research model of G. Kim et al. (2009) to employ a structural equation modeling with partial least squares (Hair et al., 2017). Even though the relationship of distrust in financial intermediaries and consumer's behavioral intention to use Decentralized Finance is well-documented regarding the motivation of the development of blockchain technology, as well as in cases of unstable financial systems, empirical data from our survey research does not support this relationship in the context of consumer adoption. Our study is the first to explore such a relationship and to provide a further understanding of how distrust in established financial institutions affects the adoption of DeFi. We thereby contribute to the theory on the foundations of DeFi and the impact

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

of blockchain technology, which must be revised by future research. Further, we propose a trust paradox in the financial sector.

Keywords: Decentralized finance, Technology acceptance research, Trust, Blockchain.

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Designing the Future of Bond Markets: Reducing Transaction Costs Through Tokenization[7]

Authors

David Cisar, Benjamin Schellinger, Jens-Christian Stoetzer, Nils Urbach, Florian Lennart Weiß, Vincent Gramlich, Tobias Guggenberger.

Abstract

Corporate bonds are an attractive option for corporate financing. However, current bond markets face many challenges and inefficiencies, resulting in high transaction costs (TAC). In recent years, technological advancements like blockchain technology have enabled the possibility of reducing TAC in bond markets. Even though practice experiments with such solutions, academic literature lacks generic design knowledge under the TAC lens to design blockchain-based bonds. Thus, our research follows the design science research (DSR) paradigm to design and develop a bond prototype using the Ethereum blockchain protocol. Our results highlight the capability of blockchain-based bond markets to reduce TAC in the three dimensions of asset specificity, uncertainty, and transaction frequency. Further, our research provides design principles to contribute to both practice and the academic discourse on developing blockchain-based bond markets with reduced TAC.

Keywords: Bonds, Design science research, Transaction cost theory, Blockchain.

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Digital Innovation in the Public Sector: A Resourcing Perspective on How the Public Sector Collaborates with the Private Sector[8]

Authors

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

Abstract

The public sector faces increasing pressure to drive digital transformation to meet modern societies' demands. Existing literature calls for systemic approaches to digital innovation in the public sector and a better understanding thereof, as digital innovation has been recognized to stimulate digital transformation (Magnusson et al., 2020). However, the public sector still struggles to foster digital innovation and often fails to promote explorative initiatives as a basis for innovation. In this paper, using a case study of a German consortium project (Yin, 2014), we investigate how public-private partnerships can promote digital innovation in the public sector. For our case study, we employ a resourcing perspective to study the PPP (Auschra & Sydow, 2023; Feldman, 2004). This allows us to study the collaboration of participating organizations and understand how digital innovation is created in our case of PPP. Our study empirically validates that PPPs do use resourcing practices as described in existing theoretical literature to facilitate digital innovation. We further find that subsets of organizations in the PPP engage in closer collaboration in what we call innovation clusters. These innovation clusters serve as a means of decentralized innovation agency and play a central role in fostering digital innovation. Our findings reflect existing knowledge on organizing digital innovation and transfer it to the context of PPPs (Ciriello et al., 2018). Further, we find that as a result of digital innovation being driven by innovation clusters, PPPs draw on dissemination practices as critical practices to reconsolidate assets and resources created in these clusters. This observation of dissemination practices extends existing network resourcing theory. Our work also has practical

[8] At the time of publication of this thesis, this essay is under revision for submission in a scientific journal. Thus, I provide an extended abstract that covers the essay's content.

implications by demonstrating the potential of PPPs to drive digital innovation, particularly in areas like identity management, where multiple stakeholders are involved who contribute different assets and resources (Guggenberger et al., 2023). Further, our findings imply that PPPs seeking to develop digital innovations should consider fostering the emergence of decentralized innovation clusters and dissemination practices. Also, governments and policymakers should consider supporting and enforcing PPPs that focus on digital innovation, as they have the potential to improve public services and foster the digital transformation of the public sector and its services.

Keywords: Digital innovation, Public sector, Public-private partnerships, Resourcing, Case study

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Emerging Digital Technologies to Combat Future Crises: Learnings From COVID-19 to Be Prepared for the Future[9]

Authors

Guggenberger, Tobias; Lockl, Jannik; Röglinger, Maximilian; Schlatt, Vincent; Sedlmeir, Johannes; Stoetzer, Jens-Christian; Urbach, Nils; Völter, Fabiane

Abstract

In 2020, the world has witnessed an unprecedented global pandemic with COVID-19. It has led nations to take measures that have an enormous impact on individuals, society, and the economy. Researchers and practitioners responded rapidly, evaluating opportunities to capitalize on technology for tackling associated challenges. We investigate the innovative potentials of three emerging digital technologies – namely, the Internet of Things, artificial intelligence, and distributed ledgers – to tackle pandemic-related challenges. We present our findings on the most effective means of leveraging each technology's potential, the implications for use in crises, and the convergence of the three technologies.

Keywords: Artificial intelligence; blockchain; COVID-19; distributed ledger technology; open innovation; emerging digital technology; internet of things.

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