LAPPEENRANTA-LAHTI UNIVERSITY OF TECHNOLOGY LUT
School of Business and Management
Knowledge Management and Leadership

Tiina Tawaststjerna

DIGITAL BUSINESS ECOSYSTEMS AS CONTEXTS FOR DIGITAL TRANSFORMATION – THE POINT OF VIEW OF AN INTERMEDIARY ORGANIZATION

Examiners: Adjunct professor, Heidi Olander
Associate Professor Mika Vanhala

ABSTRACT

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Digital business ecosystems contexts for digital transformation – the point of view of an intermediary organization

Master's thesis
2020
94 pages, 11 figures, 7 tables and 1 appendix
Examiners: Adjunct professor Heidi Olander, Associate Professor Mika Vanhala

Keywords: digital transformation, digital business ecosystem, digital innovation, digital business model, value creation

Changing customer needs, the rapid development of digital technologies and changes in business environments have challenged the existing business models of many established organizations. To respond to the change, organizations aim to create value by utilizing digital technologies to innovate new digital services and solutions, and enhance their strategies, culture, resources and leadership to support that change. This holistic change process is understood as digital transformation. Digital business ecosystems, understood as networks of organizations, provide organizations a context for collaborative value creation utilizing digital platforms.

This study examined digital business ecosystems as one option for organizations to create value through digital transformation. Further, the aim was to also to explore what kind of motivations organizations have for engaging in digital business ecosystems and identify success factors. The study was conducted as a qualitative case study in one case company with a vast experience of digital business ecosystems and digital transformation. Empirical data was collected through semi-structured thematic interviews and the data was analyzed with abductive approach.

The results mostly supported previous research. Digital transformation is a challenging change journey itself, and digital business ecosystem as a context increases the challenges, as different organizations have different incentives, strategies and expectations. The main reasons for organizations to participate in digital business ecosystems were to build such competitive assets for the future, that would be difficult or impossible to build alone. The findings suggest that ecosystem strategy, the clear roles of different actors, and the creation of a shared vision and mindset are important elements in value creation. Trust and shared vision, as well as collaborative governance were identified as key success factors. The collaborative governance model provides mechanisms for ecosystems to function, such as a common rulebook, steering and expert groups and unbundling the ownership and access rights regarding to the outcomes of the ecosystem.

TIIVISTELMÄ

Lappeenrannan-Lahden teknillinen yliopisto (LUT)
School of Business and Management
Tietojohtaminen ja johtajuus

Tiina Tawaststjerna

Digitaalinen transformaatio digitaalisissa liiketoimintaekosysteemeissä – yhden case-yrityksen näkökulma

Pro gradu -tutkielma
2020
94 sivua, 11 kuvaa, 7 taulukkoa ja 1 liite
Tarkastajat: Tutkijaopettaja Heidi Olander, Tutkijaopettaja Mika Vanhala

Hakusanat: digitaalinen transformaatio, digitaalinen liiketoimintaekosysteemi, digitaalinen innovaatio, digitaalinen liiketoimintamalli, arvon luominen

Teknologian kehitys, muuttuvat asiakastarpeet ja muutokset yritysten liiketoimintaympäristöissä haastavat yritysten liiketoimintamalleja. Menestyäkseen organisaatiot pyrkivät luomaan arvoa innovoimalla uusia digitaalisia tuotteita ja palveluita hyödyntäen digitaalisia teknologioita. Tätä kokonaisvaltaista muutosta, joka kohdistuu myös organisaatioiden strategiaan, kulttuuriin ja resursseihin, kutsutaan digitaaliseksi transformaatioksi. Digitaaliset liiketoimintaekosysteemit, joissa arvoa luodaan yhdessä muiden toimijoiden kanssa hyödyntäen jaettuja digitaalisia ympäristöjä, tarjoavat organisaatioille uusia mahdollisuuksia edistää digitaalista transformaatiota.

Tässä tutkimuksessa tutkittiin digitaalisia liiketoimintaekosysteemejä yhtenä tapana luoda arvoa digitaalisella transformaatiolla. Lisäksi tavoitteena oli selvittää motiiveja ekosysteemeihin liittymiselle ja ekosysteemin menestykseen vaikuttavia tekijöitä. Tutkimus toteutettiin laadullisena tapaustutkimuksena yhdessä case-yrityksessä, jolla on laaja kokemus digitaalisista transformaatiohankkeista ja ekosysteemeistä. Empiirinen aineisto kerättiin puolistrukturoiduilla teemahaastatteluilla ja aineisto analysoitiin abduktiivisesti eli teoriaohjaavasti.

Tulokset suurimmilta osin tukivat aiempaa tutkimusta. Digitaalinen transformaatio itsessään on haastava muutosmatka ja ekosysteemi kontekstina tuo lisähaasteita, koska organisaatioilla on erilaisia tavoitteita, strategioita ja odotuksia. Tärkein syy osallistua digitaalisiin ekosysteemeihin on sellaisten tulevaisuuden kilpailuetujen rakentaminen, joita olisi yksin vaikeaa tai mahdotonta saavuttaa. Tulokset viittaavat siihen, että arvonluonnin kannalta tärkeitä ovat ekosysteemin strategia, toimijoiden selkeät roolit, sekä yhteinen visio. Menestystekijöinä tunnistettiin luottamus ja yhteinen visio, sekä collaborative governance (hallintamalli), mikä tarjoaa mekanismeja tukea ekosysteemin toimintaa. Keskeisimmät hallintamallin mekanismit empiirisen tutkimuksen perusteella ovat yhteinen sääntökirja, erillinen johto-, ja asiantuntijaryhmä, sekä käyttöoikeuksien ja omistajuuden eriyttäminen ekosysteemin lopputuotosten osalta.

ACKNOWLEDGEMENTS

Writing this thesis has been quite a journey! A rollercoaster of inspiration, challenges, hard work, frustration and moments of despair, when struggling with the crossing deadlines of full-time work and studies. However, it was mostly fun. I am grateful for the opportunity to get an academic viewpoint towards the topics, that are relevant, interesting and closely related to my work with people, business and information technology.

Now, coming at the end of the journey, I want to express my gratitude to all of you, who have contributed along the way. First of all, I want to thank my supervisor, adjunct professor Heidi Olander for valuable comments, guidance and support. Special thanks to our Tijo 2018 group for the peer support and moments of laughter. You rock!

The biggest thank you belong to my family. My love, Ville, for support and patience in taking care of everything, so that I was able to focus on my studies during all those weekends and long nights. Thanks Anton and Maria for bringing joy and Padmé, my furry little personal trainer.

The lifelong learning continues!

Helsinki, 3.11.2020

Tiina Tawaststjerna

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1. INTRODUCTION

Organizations have faced both opportunities and challenges due to the ongoing digital disruption of their business environments. Changes in customer behavior and competition regarding new digital products and services have transformed the traditional industry boundaries. New digital products, services and business models have been born, as organizations have searched for ways to act upon the increased amounts of data and utilize the technological advances. An unexpected catalyst to speed up the change arrived in early 2020 when the COVID-19 pandemic stroke the world. Besides being a humanitarian crisis, the coronavirus has already had an enormous effect on speeding up the digital transformation. Many consumers have tried out digital products and services like food e-commerce for the first time. The increase in digital collaboration and communication technologies due to remote work has been significant in the business-to-business landscape. These changes have profoundly shaped the way of working in many organizations. Several commercial reports describe the consequences for businesses and debate how the digital transformation speed has increased. (Harward Business review, 2020; McKinsey, 2020; Deloitte, 2020; Gartner, 2020).

Technology has always been an enabler for change. Technologies related to data storage and processing, cloud computing and the ubiquitous development of artificial intelligence-based solutions have made it possible for organizations to leverage the development to their advantage (Brynjolfsson & McAfee, 2017). As the COVID-19 crisis emerged, it created such a disruption that organizations have been forced to speed up the digitalization and digital transformation efforts and increase digital technology usage. This has, in turn, created massive pressure for organizations to quickly acquire and develop valuable digital skills to enable digital transformation. (Harward Business Review, 2020; Gartner, 2020).

With rapidly changing business and technology environments, it has never been more paramount to understand that digital transformation is needed for survival. Improving the efficiency of existing processes and way of working is not enough. Both in the business-to-consumer and business-to-business space, the customers

are more digitally savvy and demanding. Building new digital services and business models requires different resources and capabilities than may exist in organizations. Digital transformation initiatives are more and more dependent on other organizations, and therefore it was relevant to understand why and how digital transformation unfolds in digital business ecosystems. This study examines value creation by digital transformation, understood as a continuous process of utilizing digital technologies to innovate new digital business models and transforming the structures, culture and leadership to support the change. More specifically, this study investigates digital transformation in a broader context of the digital business ecosystem. Digital business ecosystems are networks of organizations engaged in value creation in collaboration and utilize digital platforms and technologies in providing new ways for organizations to create and capture value.

1.1 Research background and motivation

This study aimed to explore the value creation elements of digital transformation and digital business ecosystems. Further, the ambition was to understand why organizations participate in digital business ecosystems and eventually identify what kind of factors should be considered when executing digital transformation within multiple partners in the context of digital business ecosystems. Digital transformation refers to processes where organizations utilize digital technologies, engage themselves in digital innovation to develop new products, services and business models, and transform their organizations to better respond to changing competitive landscapes. Digital transformation concerns change in technology, organizations, innovations and businesses has become an emerging topic for research both in the fields of business and information technology. From a business perspective, digital transformation attracted much attention during the last decade. (Vial, 2019; Hausberg, Liere-Nethwler, Packmohr, Pakura and Vogelsang, 2019).

As a relatively new research field, digital transformation is an emerging topic of interest across various disciplines and areas of study. Many scholars have focused on using and adopting specific digital technologies like artificial intelligence, blockchain, IoT, big data or virtual and augmented reality and related business

value. Other scholars have approached digital transformation as a holistic concept covering one or more multi-discipline streams e.g., in finance, marketing, innovation, or knowledge management (Hausberg et al., 2019). Many studies highlight digital transformation as a continual and holistic change process. The disruptions of existing business models cause organizations to drive digital innovations (Hinings, Gegenhuber & Greenwood, 2018) and change their strategies and leadership models (Matt, Hess & Benlian, 2015). Digital innovation is one of the main interest areas in previous digital transformation research. The analysis has focused on the business model innovation, the procedures of building and enhancing the organization's processes to support innovation, along with the changes in organizational culture and strategic aspects regarding innovation. (Hausberg et al., 2019).

Originally borrowed from ecology, the term "ecosystem" refers to a structure that consists of multiple partners working together to materialize a value proposition. Ecosystems have been extensively researched (Adner, 2017). The ecosystem research recognizes that the concept has been addressed from various viewpoints. The majority of previous studies have approached ecosystems through the purpose of the ecosystem. For example, an *innovation ecosystem* puts innovation in the center, emphasizing collaborative activities among actors with complementary components or capabilities (Adner, 2006; Oh, Phillips, Park & Lee, 2016; Jacobides, Cennamo & Gawer, 2018). Research of *knowledge ecosystems* has focused on knowledge creation and exploration activities (Clarysse, Wright, Bruneel & Mahajan, 2014; Van der Borgh, Cloodt & Romme, 2012). A *business ecosystem* underlines the creation of customer value propositions through the joined capabilities of the ecosystem members (Moore, 1993; Iansiti & Levien, 2004; Jacobides et al., 2018).

The definitions overlap as the boundaries between different types of ecosystems have evolved. Digital business ecosystems connect the elements from the business ecosystem and digital ecosystem. The emphasis is on customer value creation (Clarysse et al., 2014) and in highlighting the role of digital technologies and organizing parties to create value on a joined digital platform (Jacobides et al., 2018; Nambisan, Zahra & Luo, 2019; Senyo, Liu & Effah, 2018). *Digital business*

ecosystems are a form of business and technology-related collaboration for organizations. Specific research focusing on digital business ecosystems has concentrated on business or technical issues, conceptualization and artifacts. From the value creation viewpoint, the chosen perspective in previous research has primarily been on customer interactions (Senyo, et al., 2019).

The context of a digital business ecosystem for digital transformation to unfold provides an exciting research context for at least two reasons. *First*, having adequate knowledge of digital transformation and digital business ecosystems as separate concepts does not provide enough insight into understanding the drivers and success factors behind the collaborative value creation that emerges in digital business ecosystems. The majority of previous research on digital transformation has focused on a single organization's context or a specific aspect of digital transformation, e.g. implementing a particular technology or leading the digital transformation change in an organization. There was a gap in understanding how digital transformation unfolds in digital business ecosystems within multiple participants and what aspects should be considered when choosing to participate in such endeavors. As digital technologies create disruptions and open up new potential value creation paths, the impact exceeds a single organization's boundaries. Moore (1993) already recognized that a shift in competition affects traditional industry boundaries. Thus, value is created both by individual organizations and by the whole ecosystem as an entity.

The second reason behind selecting the scope and approach for this study was that more insight was needed of the meaningful elements in understanding how to create value by digital transformation in the digital business ecosystem context. As previous research of ecosystems is extensive and many specific research themes focusing on digital business ecosystems exist, there are still many gaps to be filled. According to, for instance, Senyo et al. (2019), there are unexplored aspects of value creation to be covered and a need for developing digital business ecosystem specific theories. They further urge researchers to test existing frameworks empirically and carry out case studies in different contexts. This study aimed to fill

some of this gap by identifying the elements and success factors related to collaborative value creation between the ecosystem members.

Based on the background briefly demonstrated here, ecosystems as socio-technical environments seem to provide natural contexts for organizations to explore new technologies, discover digital innovations and produce new digital business models. Both for theoretical and practical standpoints, there was a need to understand better the elements, motivations and factors related to the success or failure of digital transformation attempts in an ecosystem context. Also, one motivation was the researcher's interest and enthusiasm for the topic.

1.2 Research objective and questions

The objective of this qualitative case study was to explore how to create value by digital transformation in digital business ecosystem context. The objective was based on the pre-assumption that both the characteristics of digital transformation and digital business ecosystems affect the ways that value can be created and captured successfully. This study's viewpoint was limited to value creation and the phenomenon was examined from the perspective of one case company in the context of digital business ecosystems.

Thus, the main research question was:

> *What kind of factors should be considered when creating value by digital transformation in digital business ecosystems, in order to increase the likelihood of success?*

Supporting the main research question, the following sub-questions are established:

1. *What are the key elements of digital transformation and how do they contribute to value creation?*
2. *What are the key elements of digital business ecosystems and how do they contribute to value creation?*
3. *Why do organizations participate in digital business ecosystems?*

A literature review and an empirical study were conducted to find answers to the research questions. The theoretical part of the study, primarily addressed with research sub-questions 1 and 2, approached digital transformation and digital business ecosystem concepts from the definitions found in previous research literature and explore the fundamental elements of both concepts. With sub-question 3, the drivers and motivations for engaging in ecosystems are explored. In the empirical part of this study, the focus was in investigating how value creation by digital transformation takes occurs the case organization's viewpoint and what kind of motivations and success factors can be identified. The analysis of the results was an abductive reflection between theoretical concepts and empirical observations.

With the focus to understand digital business ecosystems as contexts for value creation by digital transformation, this study explores the motivations for joining ecosystems and investigates characteristics of successful ecosystem work. This, in turn, could increase the understanding of the phenomenon and promote further academic research by contributing to the limited amount of literature available. From a practical perspective, the aim was to provide insights for practitioners working with digital transformation projects in digital business ecosystems. This study may help managers and practitioners involved in digital business ecosystems by elaborating on the best practices and increasing the understanding of different elements and various aspects of value creation (and capture).

1.3 Key definitions

This section defines the key definitions to help understand the selected scope and viewpoints of the study. Also, some interrelated terms may be shortly defined for clarification. There were also many other definitions used in this study and the rest will be explained as they are first introduced in literature review chapters 2-4.

Digital transformation

Digital transformation means "a change in how a firm employs digital technologies, to develop a new digital business model that helps to create and appropriate more value for the firm" (Verhoef, Broekhuizen, Bart, Bhattacharya, Dong, Fabian,

Haenlein, 2019, p. 1). From a value creation viewpoint, digital transformation is a dynamic change process of strategies, business models, processes and people, that is not restricted to the organizational level but goes beyond that to partnerships and ecosystems. The utilization of digital technologies is a key enabler, emphasizing the interactions between digital business and technology environments.

In previous research, the terms *digitization*, *digital technologies* and *digitalization* have been used as overlapping and sometimes also as synonyms (Vial, 2019). To clarify, *Digitization* means a process of converting non-digital data into a digital format. *Digitalization* refers to altering and enhancing organization's internal business processes with digitized data, typically in order to gain cost savings or better customer experience. (Matt et al., 2015; Ritter & Pedersen, 2019; Verhoef, Broekhuizen, Bart, Bhattacharya, Dong, Fabian & Haenlein, 2019). Digitization and digitalization can thus be seen as the previous phases of digital transformation (Verhoef et al., 2019).

Digital business ecosystem

Digital business ecosystems are "socio-technical environments of individuals, organizations and digital technologies with collaborative and competitive relationship to co-create value through shared digital platforms" (Senyo et al., 2019, p. 53). This definition is used for two reasons. First, it includes the concept of a business ecosystem as a network of partners, who have a governance structure to guide the valued creation in collaboration (Altman & Tushman, 2017) and second, it emphasizes the role of digital technology infrastructure in value creation (Senyo et al., 2019). In digital business ecosystems, the basic assumption is, that value created in collaboration is more excellent than value created solely by an individual organization (Adner, 2006).

Value creation and capture

Value creation in a business context is a primary aim of any organization as successful value creation leads to competitive advantage and financial performance. Among multiple players, the "added value of a player is equal to the value created by all players minus the value created by all other players"

(Brandenburger & Stuart, 1996, p. 13). Value creation and value capture are interrelated terms. In ecosystem context, value creation refers to collaborative activities among ecosystem participants while value capture is connected with an individual organization's capability to gain profit (Ritala, Assimakopoulos & Agouridas, 2013). Similarly, value capture refers to how customers accept value created by an organization (Letaifa, 2014). Value creation is the selected viewpoint in this study, seen as the key driver for organizations to go through digital transformation or participate in digital business ecosystems.

1.4 Methodology

This study was conducted as a qualitative single case study, utilizing one actor's viewpoint in digital business ecosystems. The data collection approach was a single-case study arising from a need to explore complex issues within a specific context (Zainal, 2007). The empirical part was conducted in a case company. The case company is a Nordic company that operates globally in business to business environment and provides digital services and solutions for large enterprises and public sector organizations. The case company helps its customers in ongoing digital transformations and facilitates digital transformation initiatives in several digital business ecosystems. Many employees in the case organization had experience of digital transformation (digitalization and digitization) endeavors, but only a few employees had previous experience also from digital business ecosystems. Altogether six experts were interviewed in semi-structured theme interviews. All of the selected interviewees had an extensive digital transformation, digitalization and digitization project background. They have participated in several different digital business ecosystem initiatives by the case company. Four of these ecosystems are presented in chapter 6.1 to provide a background for interviews. All the interviews were one-to-one virtual meetings, using a communication and collaboration platform (Microsoft Teams) with voice and video connection.

The abductive approach was chosen, as it provided the opportunity to analyze both theoretical literature and empirical data simultaneously. In the abductive approach, theory sets the framework for collecting the data, but the data was also allowed to

challenge the theory. (Dubois & Gadde, 2002). The data analysis was based on qualitative content analysis and abductive reasoning, which relied on the theoretical framework's central themes. Themes rose both from the previous theory and empirical findings. To summarize, the research approach concerning the research questions is presented in table 1.

Table 1. Research approach to research questions

Research approach	Research sub-questions
Theoretical (empirical)	**1.** What are the main elements of digital transformation and how do they contribute to value creation?
Theoretical (empirical)	**2.** What are the main elements of digital business ecosystems and how do they contribute to value creation?
Empirical (theoretical)	**3.** Why do organizations participate in digital business ecosystems?
	Research question
Theoretical & empirical	What kind of aspects should be considered when creating value by digital transformation in digital business ecosystems, in order to increase the likelihood of success?

1.5 Theoretical background and literature overview

The theoretical background of this study is comprehensive. Both digital transformation and digital business ecosystem studies are built on organizational, computing and social network theories. Before conducting the empirical part of this study, there was a need to understand large and complex digital transformation and digital business ecosystem concepts. The aim was to form a substantial understanding of the characteristics of both digital transformation and digital business ecosystems and how these elements are related to value creation. An initial theoretical framework was built to connect two central concepts and further utilized in the empirical part of the study. To concentrate on the main objective of this research, more knowledge on the research topic needed to be developed. An overview of the literature, introducing and summarizing some studies utilized in forming the framework, are presented here.

The source material selected for the literature review is an interdisciplinary collection, including literature of organizational change and organization strategy to

social networks and computing and information technology. The literature search focused on two main concepts in this study: digital transformation and digital business ecosystems. The overview of the primary digital transformation literature used in this study and the main findings is presented in table 2.

Table 2. Overview of digital transformation literature

Author(s) and article	Main findings
Bharadwaj, El Sawy, Pavlou, Venkatram, (2013). *Digital business strategy: Toward a next generation of insights*	A digital business strategy framework: scope, scale, speed and sources of value creation and capture
Brown & Brown, (2019). *From Digital Business Strategy to Digital Transformation – How? A Systematic Literature Review.*	Digital transformation strategy as a link between digital transformation and digital business
Gimpel, Hosseini, Huber, Probst, Röglinger, Faisst, (2018). *Structuring Digital Transformation: A Framework of Action Fields and its Application at ZEISS*	A holistic framework of action fields for digital transformation.
Hausberg, Liere-Nethwler, Packmohr, Pakura, Vogelsang, (2019). *Research streams on digital transformation from a holistic business perspective: a systematic literature review and citation network analysis*	Overview of different disciplines of digital transformation research
Hinings, Gegenhuber, Greenwood, (2018). *Digital innovation and transformation: An institutional perspective*	Types of novel institutional arrangements critical for digital transformation.
Kane, (2019). *The Technology Fallacy*	People and leadership side of digital transformation: navigate digital disruption, rethink leadership and talent, become a digital organization.
Matt, Hess, Benlian, (2015). *Digital Transformation Strategies*	Digital transformation framework of balancing four transformational dimension.
Verhoef, Broekhuizen, Bart, Bhattacharya, Dong, Fabian, Haenlein, (2019). *Digital transformation: A multidisciplinary reflection and reseach agenda.*	Digital transformation and business model innovation. Three stages of DT; growth strategies and success factors.
Vial, (2019). *Understanding digital transformation: A review and a research agenda*	A framework across 8 building blogs of digital transformation.

Digital transformation is a relatively new research topic. Therefore, the focus of the literature search was on articles published during 2013-2019. Some review articles, summarizing more massive amounts of previous research, were used to get an overall understanding of previous studies, areas of interest, identified gaps and the elements of digital transformation. The selected approach in this study was on the business side of digital transformation. Hence many articles with a straightforward information technology viewpoint were scoped out. Next, the search focused on getting a better overview of the different characteristics and aspects of digital transformation.

Academic scholars have widely researched ecosystems. The focus in searching for previous literature was twofold. In the first phase, the review articles that summarize large amounts of previous research were reviewed to understand different ecosystem types and previous research streams. After conducting the empirical part of this study, the literature research focused on finding literature regarding digital business ecosystems. The overview of the primary ecosystem literature used in this study is presented in table 3.

Table 3. Overview of ecosystem literature

Author(s) and article	Main findings
Adner, (2017). *Ecosystem as Structure: An Actionable Construct for Strategy.*	Ecosystem constructs, innovation and aspects of ecosystem strategy.
Davidson, Harmer, Marshall, (2015). *Strategies for creating and capturing value in the emerging ecosystem economy.*	Value creation and capture in ecosystems, ecosystem archetypes and strategies for organizations.
Clarysse, Wright, Bruneel, Mahajan, (2014). *Creating value in ecosystems: Crossing the chasm between knowledge and business ecosystems.*	Ecosystem constructs, value creation processes in knowledge and business ecosystems-
Iansiti & Levien, (2004). *Strategy as Ecology*	Organization's strategy is not sufficient to understand ecosystem strategy.
Jacobides, Cennamo, Gawer, (2018). *Towards a Theory of ecosystems*	When and why ecosystems emerge and what makes them different compared to other business constellations.
Moore, (1993). *Predators and prey.*	Business ecosystem concept.
Nambisan, Zahra, Luo, (2019). *Global platforms and ecosystems: Implications for international business theories.*	Digital platforms and ecosystems as ways to build knowledge and relationships and create value to customers
Scaringella & Radziwon, (2018). *Innovative, entrepreneurial, knowledge, and business ecosystems: Old Wine in New Bottles?*	Systematic literature review to identify ecosystem archetypes and sub-types.
Senyo, Liu, Effah, (2019). *Digital business ecosystem: Literature review and a framework for future research*	Synthesis of DBE research: lack of clear understanding of the concept and theories. Need for empirical validation.
Zahra & Nambisan, (2012). *Entrepreneurship and strategic thinking in business ecosystems.*	Success factors in business ecosystems

The lists in Tables 2 and 3 are not exhaustive, but the aim was to summarize the essential sources. There was an attempt to find previous research literature of digital transformation conducted within an ecosystem context, but with little success. Several other articles were also used to increase the knowledge regarding the selected themes and investigate previous theories, frameworks, and identified gaps and suggestions for future studies.

1.6 Structure of the thesis

The outline of the study is presented in figure 1.

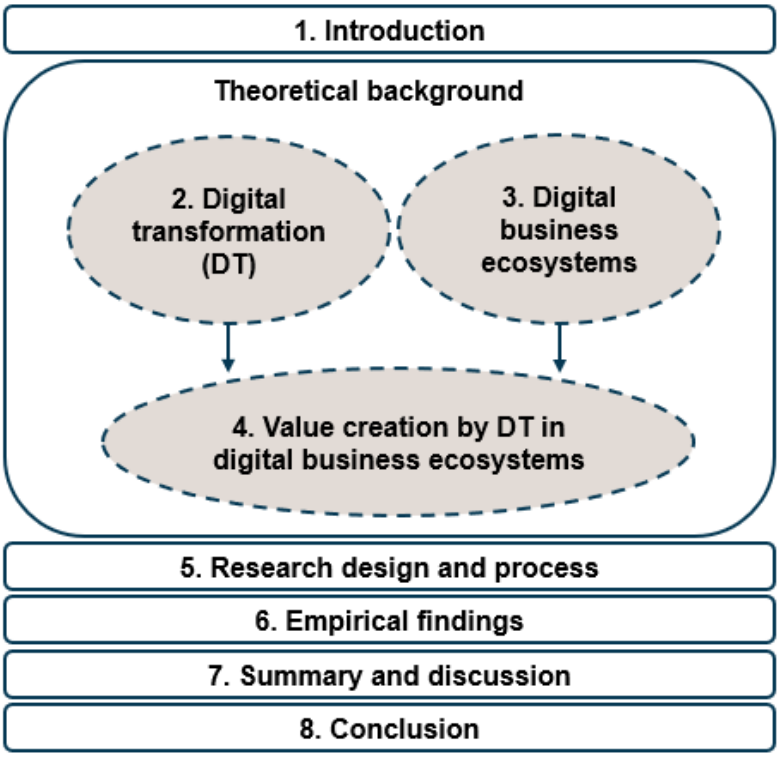

Figure 1. The outline of the study

Chapter 1 introduced this study and the themes. It explained the research background, motivations and presented the research objective and research questions. Key definitions were shortly set, and methodological selections were justified. A literature overview of both main concepts was given to clarify and structure the previous research literature selections.

Chapters 2 and 3 introduce the main concepts of this study: digital transformation and digital business ecosystem. In these chapters, the background and the elements of the concepts are explored. Chapter 4 summarizes the theoretical findings as a theoretical framework. The framework was further applied in in this study's empirical part.

Chapter 5 presents the research design and strategy, approach, methods and the reasoning behind the selections. The case organization is presented, and the data collection and analysis processes are explained. The whole research process is illustrated. The validity and reliability issues and limitations of the study are identified.

Chapter 6 presents the empirical findings, including a few examples of the case company's digital business ecosystems. Finally, the findings are summarized and discussed with previous research in chapter 7. Chapter 8 draws conclusions and answers the research questions. Also, implications for theory and practice are given. Finally, the limitations of this study are summarized, the generalizability of the findings considered, and proposals for future research are made.

2. DIGITAL TRANSFORMATION

In this chapter, the key elements regarding digital transformation are depicted. First, the concept of digital transformation is approached by presenting different frameworks from previous research literature. Next, the elements of digital transformation are explored and considered from a value creation perspective.

2.1 The concept of digital transformation

Digital transformation is a broad topic with many meanings and viewpoints (Vial, 2019; Hausberg et al., 2019; Nambisan et al., 2019). As digital business is complex, the ability to create value and innovate is more important than ever, and in the broad meaning, digital transformation impacts individuals, organizations and society (Reddy & Reinartz, 2017). It is not only about using technology or creating new products and services. The change impacts strategies, leadership, people and processes (Verhoef et al., 2019) resulting in whole new data-driven opportunities and business models (Nylén & Holmström, 2015). In the comprehensive review, Verhoef et al. (2019) describe digital transformation as a process, using a flow model to explain the drivers, phases and strategic imperatives of digital transformation. The flow model, modified from Verhoef et al. (2019, p. 2) is presented in figure 2.

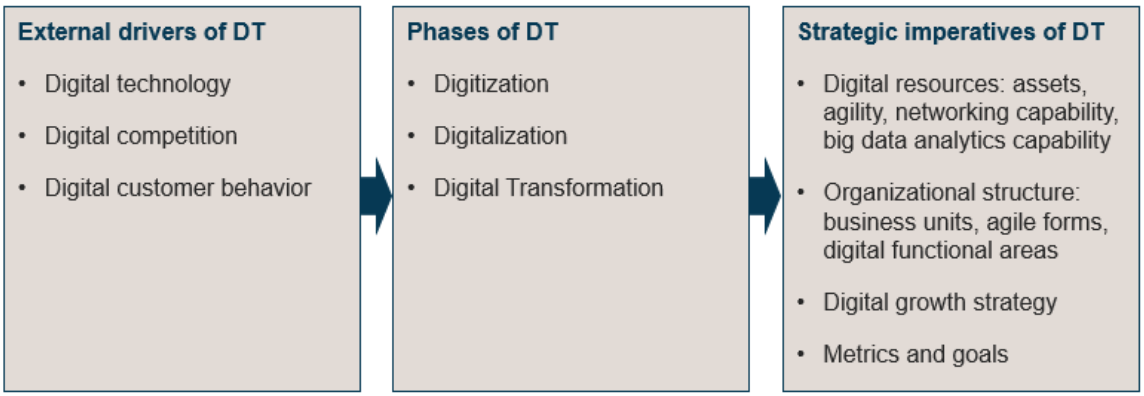

Figure 2. The flow model of digital transformation

The power of the external drivers and the impact on businesses can be understood in practice, for example, by looking at the Finnish retail sector a few years back. New digital technologies made it possible for global digital competition to enter the Finnish market in the form of e-commerce, and at the same time, customer behavior changed rapidly. New digital customer behavior like showrooming (examining products in physical stores and then purchasing online) and webrooming (searching for information online and then purchasing in physical stores) disrupted existing business models and the speed of needed change surpassed retailers' digitalization strategies and the pace of digital transformation. (Flavián, et al., 2020). As a result, many traditional retailers face severe challenges with shrinking figures, while at the same time, the e-commerce is globally growing.

Vial (2019) provides an extensive framework that summarizes the understanding of digital transformation in contemporary research. The framework, illustrated in figure 3, consists of eight building blocks of digital transformation and explains their relations to each other. Digital transformation is defined as "a process where digital technologies create disruptions triggering strategic responses from organizations that seek to alter their value creation paths while managing the structural changes and organizational barriers that affect the positive and negative outcomes of this process." (Vial, 2019, pp. 118, 122).

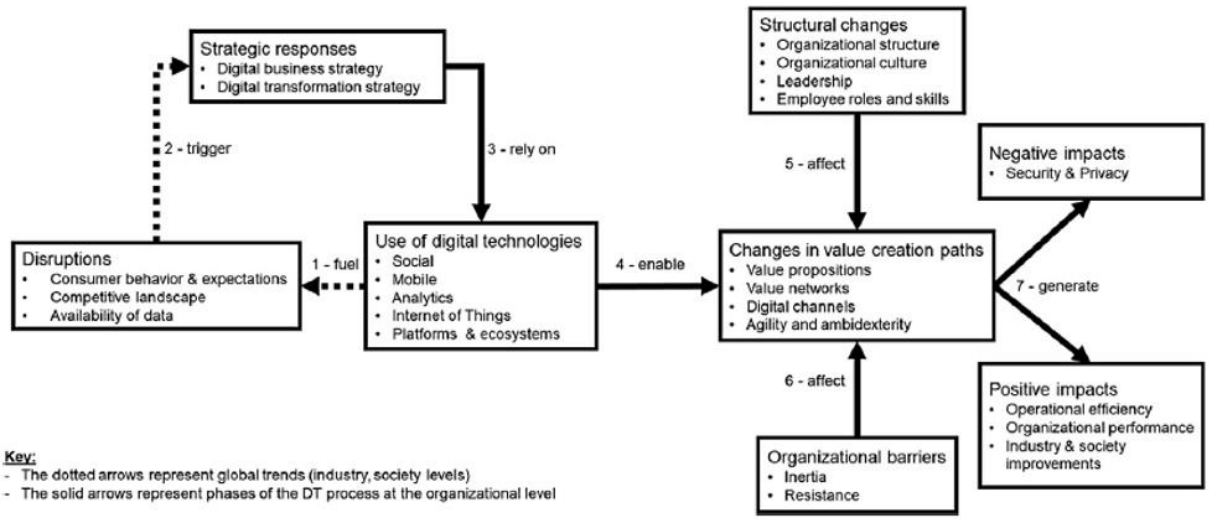

Figure 3. Building blocks of digital transformation

Another framework by Matt et al. (2015) presents the transformational elements in digital transformation. It describes how digital technologies, changes in an organization's structures, and value creation are different aspects that need to be considered in digital transformation. Additionally, it highlights the financial dimension as a critical factor in combining the other aspects. An organization's willingness to finance digital transformation is related to the perceived urgency to act. The ability to finance digital innovations can thus act either as a driver or a barrier to digital transformation. (Matt et al., 2015)

2.2 The elements of digital transformation

Considering the digital transformation elements, it is a complex combination of people, processes and technology engaged in constant change process. The essential elements of digital transformation are reviewed more closely in the next subsections. The aim is to combine the viewpoints presented in various theoretical frameworks to understand how those characteristics are related to value creation.

2.2.1 Digital technologies

Digital technologies are the fundamental enablers or drivers of digital transformation (Matt et al., 2015; Verhoef et al., 2019). Digital technologies enable digital transformation by creating disruption. By definition: "a disruptive technology is a technology that changes the basis of competition by changing the performance metrics along which firms compete" (Danneels, 2004, p. 249). Digital technologies include, for example, computing, communication and interaction technologies that help in creating innovative products and services (Brown & Brown, 2019). Utilizing digital technologies, like social, mobile, analytics and IoT, along with platforms and ecosystems have a crucial role in creating disruptions. Consumer expectations are changing, as they use more social media and mobile services, and the availability and usage of data changes the competitive landscape of organizations (Vial, 2019).

An organization's ability to exploit new digital technologies is a strategic decision related to future value creation ambitions. As digital technologies can create new

possibilities outside the core business, it is crucial for an organization to balance existing business and potential new business. (Matt et al., 2015). The capability to acquire data and analyze data for decision-making purposes is crucial in digital transformation (Verhoef et al., 2019). However, many digital technologies used in digital transformation are not new (Bharadwaj, El Sawy, Pavlou & Venkatraman, 2013). Artificial intelligence (AI) is an example, as it includes the utilization of several new technologies. AI was first introduced by J.C.R. Licklider (1960) as a partner to humans to interact in a symbiotic partnership formed between computers and humans. During the next 60 years, the technologies related to AI have rapidly evolved as a vast amount of data, and cloud technologies have made it possible to utilize AI-based solutions. Recently Kaplan and Haenlein (2019) described AI as “a system’s ability to correctly interpret external data, to learn from such data, and to use those learnings to achieve specific goals and tasks through flexible adoption. According to them, we currently live in the age of Artificial Narrow Intelligence, where AI is applied only to specific, narrow areas. For example, as consumers, many of us use maps and navigation systems like Google Maps to find locations and route options. To do that, Google feeds its algorithms with data coming from multiple different sources and turns it into meaningful and value-adding services not only for consumers, but also for other organizations willing to utilize their digital platforms in their own business.

Organizations use AI-based solutions are widely in many different applications, e.g., in demand forecasting, predictive maintenance, personalized customer experience, fraud detection, or supply chain optimization (Kaplan & Haenlein, 2019). The aim is to create improvements in performance, revenue, profitability and customer satisfaction by enhanced business operations, automated and better decision making (Tarafdar, Beath & Ross, 2019). Whole business environments are becoming more disruptive when AI-based solutions emerge (Gimpel, Hosseini, Huber, Probst, Röglinger & Faisst, 2018). Many scholars estimate that while entering the age of artificial general intelligence (AGI), also referred as human-level artificial intelligence, the disruptive impact of AI will be more radical than what we have witnessed so far. (Kaplan & Haenlein, 2019)

One may argue whether some technology is new or disruptive in the first place. Verhoef et al. (2019) point out that new digital technologies may quickly become a new norm and have the power to alter consumer behavior. As new digital technologies and resultant solutions like search, social media and online commerce change customer behavior, this has been one of the main drivers for organizations to engage themselves in digital transformation.

2.2.2 Digital strategy

A straightforward utilization of digital technologies is not enough for a contemporary organization to innovate and remain competitive. Organizations need to respond to digital disruptions created by digital technologies. On a strategic level, the response is in the form of a digital business strategy or digital transformation strategy (Vial, 2019). Bharadwaj et al. (2013) in their studies called for rethinking separate business and IT strategies into a combined view of digital business strategy. As digital technologies enable new forms of value creation and ecosystems' conditions may change rapidly, an organization needs to change or reconsider its strategy, identity and culture. Digital business strategy can be approached with four strategic dimensions, that are *scope*, *scale*, *speed* and *sources of value creation*. As digital transformation creates new options and possibilities for organizations, the *scope* refers to value creation potential outside organizational boundaries, like in ecosystems. *Scale* is related to understanding the power of digital business enablers e.g. data and technologies. *Speed* is about increased efficiency in decision making and increased speed in making new value propositions and launching new services and products (Bharadwaj, et al., 2013).

One aspect of strategic decisions is related to the balance between agility ambidexterity. Ambidexterity refers to organizations' need to respond to both opportunities and threats caused by digital disruptions and ability to exploit existing business efficiently. Balancing between maintaining efficiency in current business and enabling organizational agility to leverage digital business opportunities (Gimpel, et al., 2018) causes the need for structural and operational changes in organizations (Matt, et al., 2015). As agility and ambidexterity are ways for

organizations to find new paths for value creation (Vial, 2019), Gimpel et al. (2018) point out that the most significant risk is to lose the connection to customers as business models change.

The digital transformation strategy helps organizations to rethink the new aspects of value creation. In highlighting the difference, digital business strategy describes the business value through the utilization of digital technologies. The digital transformation strategy clarifies the way toward digital transformation. (Brown & Brown, 2019). Strategies need to be implemented and there are risks of losing the scope and facing difficulties if this is not done correctly. As Matt et al. (2015) point out, there is high uncertainty embedded in new digital technologies; hence digital transformation strategies should be revisited and reassessed regularly. Forming and maintaining a digital transformation strategy requires leadership. Companies need to ensure that people responsible for digital transformation strategy implementation have experience and incentives to lead digital transformation.

One practical example of a successful digital strategy and implementation in practice can be found in Finland's financial services sector. Finnish banks were among the first ones to open digital banking services for their customers. Adding new channels (first, a net bank, then a mobile bank) to the customers are examples of successful digitalization and enhancements of existing business models from a strategic perspective. However, digital transformation requires an ambitious strategy that challenges the existing business models and leads the attempts to utilize data and technologies into better customer experience.

2.2.3 People, culture, leadership and structures

Digital transformation is a continual change to an organization, resulting from following a digital business strategy by exploiting digital innovations based on digital technologies. As a complicated process, it causes changes not only on the product or service levels, but also on the process and structural levels. Restructuring existing organizations may be needed to enable digital business model innovation while building and acquiring new skills and capabilities is essential. (Matt et al., 2015).

Organizational structures that support digital growth strategies are needed. For example, in practice, increasing agile ways of working, reorganizing work in organizations and utilizing data and different digital platforms to create value. (Verhoef, et al., 2019)

Technology is not the main element in value creation, but how technology is used and how digital transformation is lead and managed in organizations (Kane, 2014). Besides the pressure to rethink strategic decisions, organizations need to respond by redesigning structures and processes to achieve digital agility during the transformation from traditional to digital business. Organizational structures, culture and leadership and employee roles and skills affect how value is created by digital transformation. (Vial, 2019). Organizations need digital resources. They need to recognize the existing situation, needs for the future and acquire or develop the relevant digital capabilities of individuals, as well as digital assets like data, processes, and information technology systems and solutions (Verhoef, et al., 2019)

There are many aspects to consider when leading digital transformation. Organizational structures, employee roles and skills and organizational cultures influence the value creation paths of an organization. There are also barriers, like inertia and resistance towards the changes. (Vial, 2019). As digital transformation is a complex process that takes time, leading digital transformation is a strategic imperative. Digital leadership requires digital agility as in the ability to sense opportunities provided by digital technologies and combining digital resources and assets to change the existing business models, and the capability to network digitally by finding stakeholders with similar needs and partnering with them. (Verhoef, et al., 2019)

Strong leadership is needed to guide digital transformation development and implementation (Brown & Brown, 2019). Kane (2019) highlights that intellectual capital is more important than the technical side since it is much harder to change the way people work and do business than implement a piece of new technology. According to him, talented people, leadership capabilities, organizational culture and strategies are the main elements, and technology is only the enabler. If

organizational agility increases and leaders enable experimental and collaborative culture to grow, it will boost digital transformation.

2.2.4 Digital maturity

Taking a step deeper, digital transformation literature introduces the concept of digital maturity (Kane, 2019; Brown & Brown, 2019; Vial, 2019). Through continuous and successful digital innovations, organizations can retain digital maturity (Vial, 2019). According to Brown & Brown (2019), a digitally mature organization is one where digital transformation has already changed the business models, processes and competencies. Digital maturity includes eight elements: strategy, leadership, products, operations, culture, people, governance and technology. First, there needs to be a digital transformation strategy and digital leadership in place to enable new product and service innovation. Organizational culture needs to change to enable digital innovation, increase the agility and digitalization of organization's processes. An organization needs to acquire or train enough digital experts, as well as digitally qualified non-experts. As any competitor easily adopts the same digital technologies, the organization's choices become visible in business models.

It has been argued that the organizations capable of fostering agile culture and digital mindset will be more successful in digital transformation (Gimpel, et al., 2018). The importance of digital mindset is highlighted as inertia and resistance are known barriers to digital transformation (Vial, 2019). The inertia of organizations is built on bureaucracy, manager control and tight processes. To foster creativity and ambition to utilize digital technologies in exploring new digital innovations, both managers and employees need a digital mindset. (Gimpel, et al., 2018). Previous research shows that digitally mature companies invest much more in strengthening and nurturing agile, digital culture and developing the needed capabilities, than organizations that are not yet that far in the path of digital transformation (Kane, 2019).

3. DIGITAL BUSINESS ECOSYSTEMS

This chapter reviews the concept of the digital business ecosystem. As a key concept and also a context for the empirical part of this study, the aim was to understand the digital business ecosystems' nature concerning value creation. That said, ecosystems' conceptual background was first reviewed to understand different ecosystem archetypes and define the conceptual background. As ecosystems are widely researched, the focus in searching for previous literature was in review articles that summarized greater amounts of previous literature. In chapters 3.2 onwards, the focus is on the value creation elements and dynamics of digital business ecosystems.

3.1 Conceptual background of ecosystems

The ecosystem concept originated from natural ecosystems and was initially introduced in a business context by James F. Moore (1993). He characterized the business ecosystem as interconnected actors like companies, organizations, customers and other stakeholders in sharing the success or failure. Since that, several conceptualizations of different ecosystem types, such as business ecosystems, knowledge ecosystems, innovation or platform ecosystems have been made in academic literature (Adner, 2017) (Scaringella & Radziwon, 2018). Different definitions exist to serve different purposes and streams, but in general, ecosystems are used as tools for orchestrating joint value creation and innovation in organizations. Different ecosystem concepts have been researched to a great extent and in many research the emphasis has been on collaborative aspects. The primary ecosystem concepts and their roots are presented in figure 4 by Scaringella & Radziwon (2018, p. 666). The model is based on their comprehensive study to summarize previous research on ecosystems.

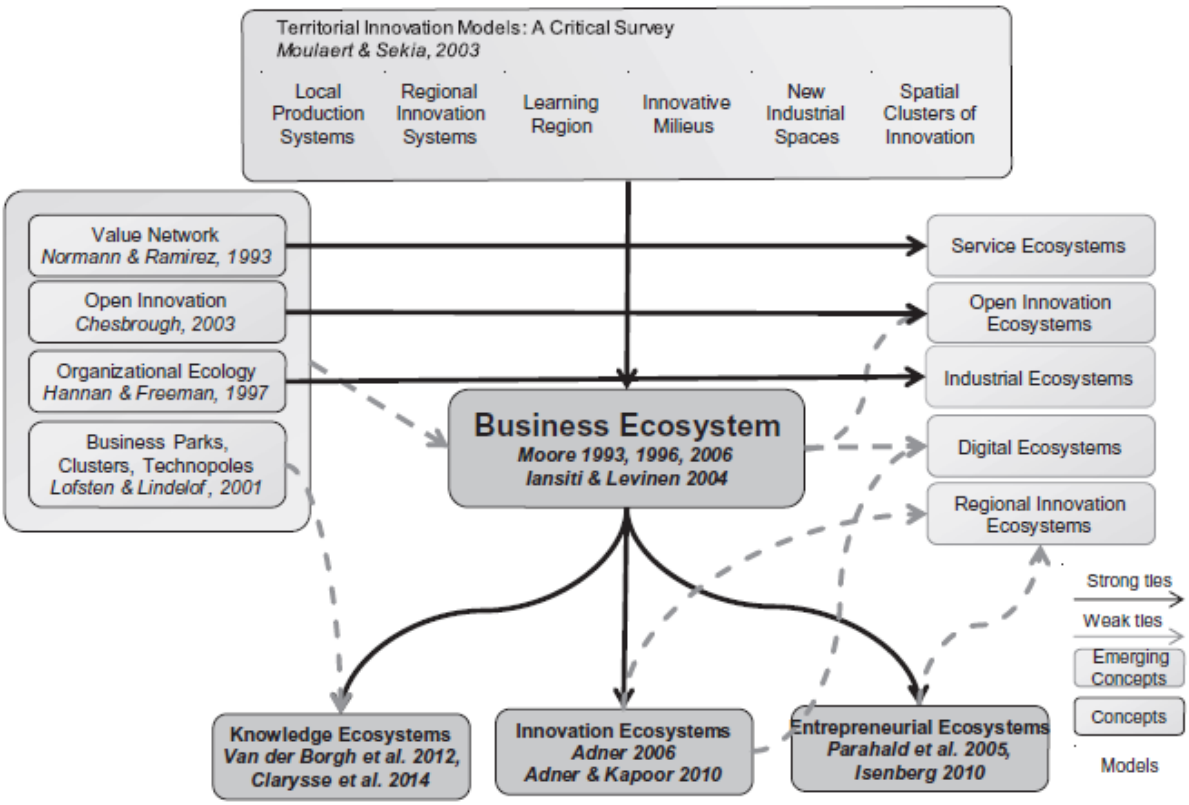

Figure 4. The key ecosystem concepts and their roots

Generally, ecosystems appear in many shapes and forms. A digital ecosystem is a subtype of a business ecosystem, combining features also from innovation ecosystems (Scaringella & Radziwon, 2018). In digital ecosystems, the role of digital technologies in organizing parties to create value on a joined platform is highlighted (Jacobides, et al., 2018) (Nambisan, et al., 2019) (Senyo, et al., 2019). More specifically, the concept of a digital business ecosystem has been used to describe the digital and business layers' coupling together. Thus, a digital business ecosystem extends the concept of a business ecosystem. (Nachira, Nicolai, Dini, Le Louarn, Leon, 2007). In this study, the definition of the digital business ecosystem is used. According to Senyo et al. (2019, p. 53): *"Digital ecosystems are socio-technical environments of individuals, organizations and digital technologies with collaborative and competitive relationship to co-create value through shared digital platforms".* As such, it combines both the people related elements and technical elements. In the next subsections, the elements of ecosystems are introduced more detailed.

3.2 Elements of digital business ecosystems

Being part of ecosystems and creating value efficiently has become a source for competitive advantage building for many organizations. In ecosystems, value creation in collaboration is possible due to advances in technology. (Adner & Kapoor, 2010). In digital business, value creation is not controlled by a single firm, but it is always relative and shifting in expanding choice space. The strategic challenge for an organization is to be able to quickly identify and respond to new opportunities for value creation (Keen & Williams, 2013). Van der Borgh et al. (2012) in their study identified three characteristics of value creation in an ecosystem. Value creation is a dynamic process that is distinctive to the context. Value creation is related to the ecosystem's *business model* and the knowledge exchange between participants and the ecosystem needs to be *managed*. Ecosystems are value-creating networks that create value through the interaction of ecosystem members that have a shared logic and governance system (Thomas & Autio, 2014).

With the emergence of digital ecosystems, digital platforms can help in sharing resources among the members of the ecosystem, promote knowledge sharing and relationship building that in turn can enable value creation, resulting in innovations, products and services (Nambisan et al., 2019). In ecosystems, firms share ideas and resources (Moore 1993). Ecosystem participants collaborate to create and capture value, but not only that. Organizations *"commercialize new ideas and technologies through their business models".* (Chesbrough, 2010). This means that that technology itself does not provide much value unless brought to life via a business model. He continues, especially with new technology, a business model might not exist, or it can be challenging to define. This thinking fits very well with the concept of digital transformation. Creating value and revenue with new business by utilizing disruptive technologies might be very challenging or even impossible for a single organization. However, complementary capabilities of partners might help to unlock the value.

There are several advantages to being part of an ecosystem. With the complementary capabilities of other ecosystem members, organizations can fill in

gaps in their skills and knowledge, gain access to critical resources and build financial or social capital that can be used to commercialize new technologies. (Zahra & Nambisan, 2012). In digital platforms and ecosystems, organizations can enhance the value propositions by utilizing the knowledge and expertise of partners (Nambisan, et al., 2019). A global trend toward individualization means that customers demand innovative and individual value propositions and request products and services that fit their needs. This is a driving force for organizations towards collaboration in digital ecosystems hence they help organizations to speed up the innovation cycle. (Gimpel, et al., 2018).

In summary, previous research does not exclusively list the elements of ecosystems. Based on the literature review, the fundamental elements include at least members, roles, structures, collaboration and competition, ecosystem management and governance, as well as shared logic and mindset. Thus, to understand value creation and success factors in ecosystem work, each element will be reviewed more closely.

3.2.1 Members, roles and structures

According to Adner (2017, p. 40) ecosystem can be understood as “the alignment structure of the multilateral set of partners that need to interact for a focal value proposition to materialize.” A typical business ecosystem consists of both established companies and new enterprises or entrepreneurs (Zahra & Nambisan, 2012). Value is created in interaction between the members of the ecosystem, where all the participants directly affect the potential for value creation (Thomas & Autio, 2014). Business ecosystems consist of organizations with collaborating and combining capabilities. These complementary capabilities and ecosystem structures are the characteristics that make ecosystems unique compared with other forms of collaboration. (Jacobides et al., 2018).

Adner (2017, p. 40) draws a clear distinction between two perspectives: affiliation and structure approaches. *Ecosystem-as-affiliation* emphasizes the role of the actors. Building from the needs of the ecosystem members, it considers the

interdependence between members, and as a result, possible value propositions emerge. On the other hand, *ecosystem-as-structure* starts from the value proposition and the members of the ecosystem contribute to that. The affiliation approach is similar to Moore's (1993) business ecosystem definition, where a principal actor has a leading role among other actors, like other organizations, intermediaries and customers. Iansiti and Levien (2004, pp. 68, 70-71) further contributed by adding suppliers, distributors, technology providers and other stakeholders and defining ecosystem members' potential roles. Ecosystem-as-structure starts from the value creation viewpoint, where the actors of an ecosystem are identified based on their capability to interact with each other to make the value proposition happen (Adner, 2017)

To successfully utilize ecosystems, an organization needs to understand which role to play in an ecosystem. Established companies typically play different roles than new ventures (Zahra & Nambisan, 2012). Iansiti and Levien (2004) introduced three possible roles for an organization: *keystone*, *dominator* and *niche player*. *Keystones* (also known as hubs, orchestrators or ecosystem leaders) are organizations that enable the ecosystem's health and productivity by contributing to the critical success factors, robustness to survive from external disruption and increased diversity and create opportunities for niche organizations. Keystones have a great impact on the whole ecosystem. *Dominators* aim to control the resources that are the most useful to them. When most of the resources and therefore most of the value creation potential get piled up to one ecosystem member, this may be a risk for the ecosystem. Dominators can appear as physical dominators, who take over the ecosystem by eliminating competition and limiting innovation. On the other hand, value dominators aim to capture value as much as possible, leaving no room for value creation. *Niche players* (challengers, smaller organizations) contribute to the ecosystem by providing specialized parts to the whole. (Iansiti & Levien, 2004).

3.2.2 Collaboration and competition

Organizations participating in ecosystems need to actively shape relationships with other members to create and capture value (Selander, et al., 2010). Ecosystem

participants are bound by mutual interdependence (Thomas & Autio, 2014). The collaborative efforts of ecosystem members are needed to create such value that would otherwise be difficult or impossible for a single organization to create alone. (Iansiti & Levien, 2004) (Adner, 2006). Efficient and successful work on an ecosystem is dependent on each ecosystem member's contribution to value creation (Iansiti & Levien 2004). Thus, having a weak member who is not committed and does not share the shared vision and logic, may result in poor performance or ecosystem failure. Also, Davidson, Harmer & Marshall (2015) suggest that organizations need to change their mindsets to be able to contribute to value creation in an ecosystem context. According to them, to be able to identify and utilize value creation potential in an ecosystem requires that capabilities like openness, agility and connectedness are recognized and built.

The ecosystem relationships change and evolve. Moore (1993) introduced the stages of ecosystem lifecycle development from the start to the end. *Birth* is the initial stage of an ecosystem with the focus is on collaboration to ensure value creation. In the *expansion* stage, the ecosystem increases its scale and scope geographically or as market coverage. *Leadership* puts the focus on leading the co-evolution of the ecosystem in stable mode. In the *self-renewal* or *death* phase, the ecosystem can either renew itself or be destroyed. (Moore, 1993). Creating a strong vision in the birth phase is important, but also collaborating and strengthening the common vision along the ecosystem lifecycle (Moore, 2006). Utilizing different phases in ecosystem development, Letaifa (2014) illustrated value creation and capture focus within the scale of collaboration and competition. The ecosystem development steps highlight the idea of ecosystemic mindset. When ecosystem members have an ecosystemic mindset, they have moved away from competitive mindsets and are building collaboration. The quadrant by Letaifa (2014, p. 288), presented in figure 6, describes the value creation and capture focus and different ecosystem development phases.

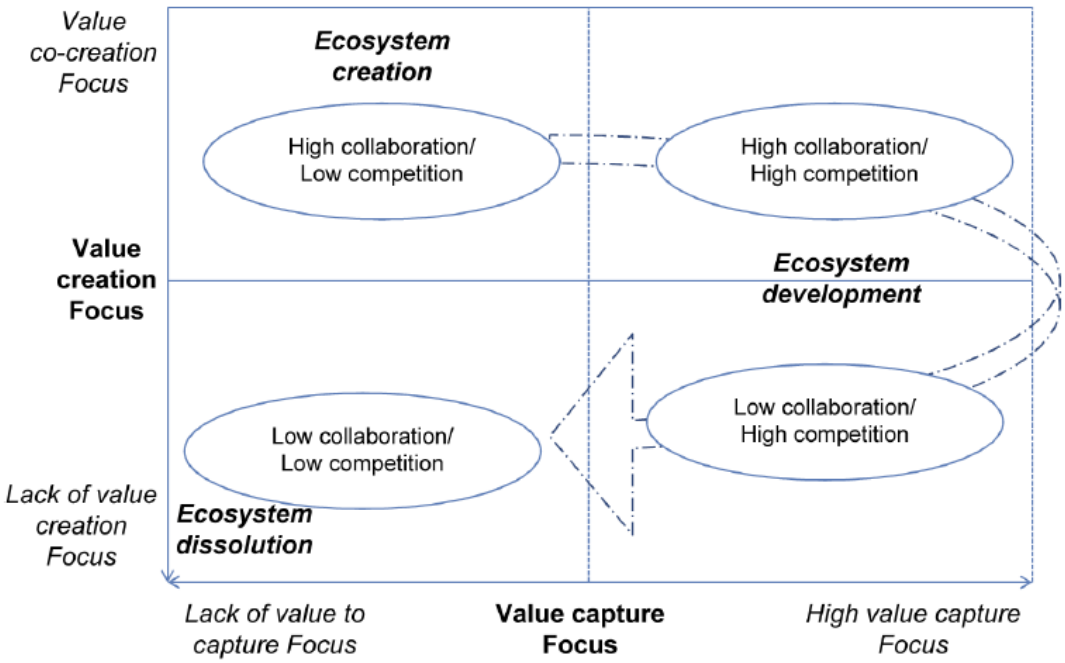

Figure 5. Value creation and the ecosystem development

The quadrant's top-left corner represents the ecosystem creation phase when participants are focusing on joint value creation in collaboration. In the top-right quadrant, the members of the ecosystem work towards commonly agreed goals and targets. The ecosystem is developing and expanding, and value creation focus is high if the participants have successfully shared their resources. If the collaboration is low and competition high, the participants focus on maximal value capturing for individual organization's perspective, as represented in the bottom-right quadrant highlighting the "race for leadership" inside the ecosystem. The last phase, illustrated in the bottom-left corner, represents an ecosystem's termination or dissolution phase. At that phase, both the collaboration and competition are low and the ecosystem is no longer functional. The value creation focus has vanished, and it is difficult to capture value. The ecosystem either dies or can renew itself by creating innovations. (Letaifa, 2014).

The strategic choices are based on current state or future targets (Iansiti & Levien, 2004). Davidson et al. (2015) suggest the defining characteristics of an ecosystem are orchestration and mutuality. According to them, orchestration may occur as formal management or in a more informal way, applied through the culture of sharing ideas and operating on mutual self-interest. Illustrated in figure 5 is a modified figure

form Davidson et al. (2015). With ecosystem's degree of orchestration (horizontal axis) and ecosystem complexity (vertical axis), a suggestion of ecosystem archetypes is described.

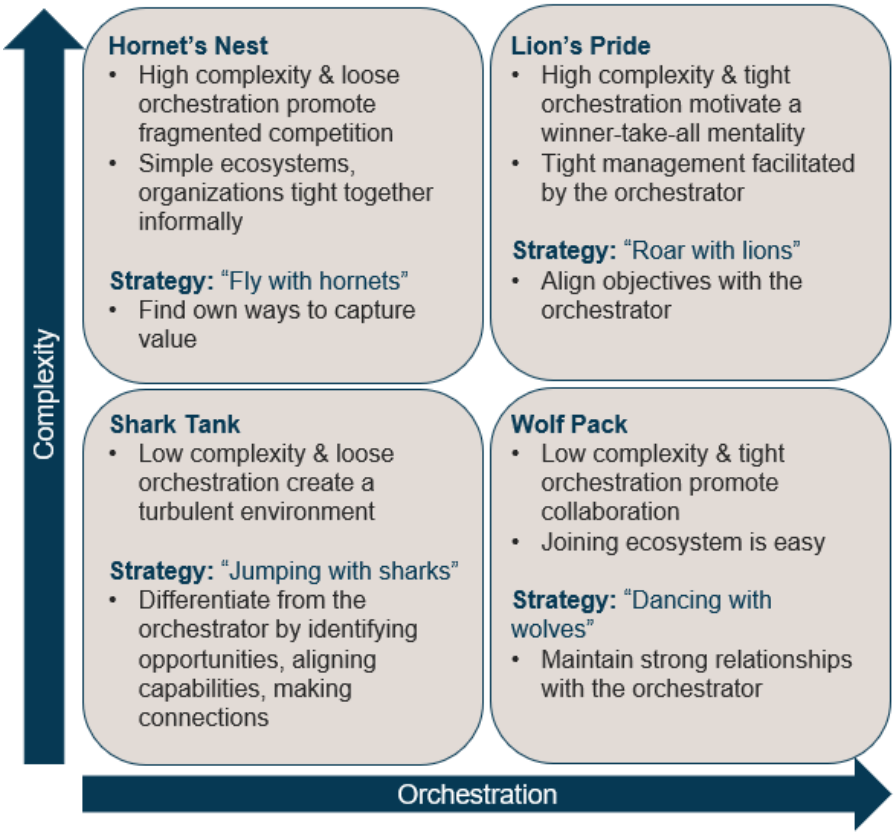

Figure 6. Ecosystem archetypes and strategies

The level of complexity (illustrated in the vertical axis in figure 5) is higher by the number of participants, but also the diversity of participants, the nature of the relationships among members and the complexity of activities that influence the level of complexity. Orchestration (horizontal axis in figure 5) represents the strength and extent of influence, formality level in interactions between ecosystem members, and the amount of compliance. The key message in the figure is that ecosystems differ in fundamental ways, affecting the estimated value creation and capturing. The organizations should apply different strategies and optimize the success by recognizing different ecosystem archetypes and select strategies based on this. (Davidson, et al., 2015)

3.2.3 Management and governance

Ecosystems have governance systems to coordinate value creation, operations and effects of the joint efforts. A governance system consists of authority structure as relations between ecosystems' participants, membership control as how open the ecosystem is for new participants and task coordination. (Iansiti & Levien, 2004) (Thomas & Autio, 2014). The way ecosystems are managed to influence ecosystems on both individual organizations and ecosystem levels. Management should create capabilities to nurture productive ways to create value through experimentation and effective decision-making. (Van der Borgh, et al., 2012). Letaifa (2014) describes how ecosystems should be managed to create sustainable social communities that focus on value creation and effective decision-making and set aside the unproductive habits of competition and representing individual organization's interest over the shared vision inside the ecosystem.

Senyo et al. (2019) point out that it might be challenging to define a governance structure for a digital business ecosystem, given the self-organizing nature. There is inadequate research in this area. Six dimensions of digital business ecosystem governance have been already addressed by Nachira et al. (2007): balance of interests based on shared values and vision, communication culture, credibility and trust, lightweight organization and synchronization, licensing and regulation, as well as technologies. The principles include that there should be no single point of control or dependency upon any single actor, an ecosystem should provide equal opportunities for access to all, as well as scalability and robustness.

Collaborative governance has been defined as: "A governing arrangement where one or more public agencies directly engage non-state stakeholders in a collective decision-making process that is formal, consensus-oriented, and deliberative and that aims to make or implement public policy or manage public programs or assets." (Ansell & Gash, 2008, p. 544). From this standpoint, the collaboration is driven by a public institution and it is too narrow to be used in the extent of digital business ecosystems. A systematic literature review by Batony & Svensson (2019) however reveals that the concept of the collaborative ecosystem has been used more loosely

in the previous research literature to define both governmental and non-governmental members, initiatives and drivers, scope and assumptions regarding intention and outcome. This study approaches collaborative governance from a trust perspective, discarding legal and contractual issues. A model of collaborative governance by Ansell & Gash (2008, p. 550) has a collaborative process at the heart of the model. This includes the cycles of dialogue among members, building trust, having a commitment to the process, as well as shared understanding.

3.3 Success factors in ecosystems

Success in ecosystems requires strategic thinking to understand the collaboration and competition aspects, especially in business ecosystems that consist of established companies, smaller independent ventures, entrepreneurs or customers. Established companies should have a different strategic approach, depending on the sort of governance and the nature of innovation. Zahra and Nambisan (2012) named the possible approaches with four models: *The Orchestra*, *The Creative Bazaar, The Jam Central*, and *The MOD Station*.

In *The Orchestra* model, the ecosystem is shaped around one keystone player, providing strong network leadership for other actors in the ecosystem. The main challenges for an established company that typically has the keystone role in an ecosystem, are related to managing the relevance of innovation space in the eyes of other ecosystem members and involving all in decision making. In *The Creative Bazaar* model, the keystone or leading company provides the infrastructure for others to develop and commercialize innovative ideas. For an established company, there is a risk of disruption to existing business models. However, by allowing partners to use the infra, the established company can benefit from the faster development of innovations and possibilities to find radically new opportunities. In *The Jam Central* model, the governance responsibility is scattered as there is no centralized management. For established companies, this type of ecosystem might be difficult, as the innovation emerges organically from the collaboration and any member can play a primary role. In *The MOD Station* model, the focus is set to explore new technologies or entering new markets. Established companies provide

a platform for other members, allowing others to exploit existing products and services. If an established company manages this model with an open mindset and tolerates possible short-term losses, gains may include enhanced value in existing customers and new products or markets. (Zahra & Nambisan, 2012)

In their research of value creation and capture in innovation ecosystems, Ritala et al. (2013) observed the mechanisms of ecosystem management while building and managing an ecosystem. Their findings were that tangible mechanisms, like contractual conditions and intellectual property rights, are important in setting the joined standard rules for the ecosystem. The role of the leading member of the ecosystem is an intangible or relational mechanism, and essential in setting the vision for the ecosystem work. These findings suggest that the trust and maturity of relationships should be considered as fundamental success factors when creating value in an ecosystem.

Success in ecosystems is related to the governance structures of an ecosystem. The rules define e.g. who can join an ecosystem and how their work is managed. This is related to the ecosystem type, targets and members. Where some ecosystems may have strict rules, some have fewer principles of behavior and these are formed by the roles of ecosystem members. The multilateral dependencies between the members of the ecosystem and the modular structures are the unique factors that enable individual organizations to collaborate without strict hierarchies. (Jacobides, et al., 2018). Clarysse et al. (2014), point out that it is uncertain if the success factors are similar in all the types of ecosystems or what kind of differences occur. According to Iansiti and Levien (2004), success in ecosystems comes from ecosystem members collective efforts to create value by complementing each other in collaboration and competition. Another critical element is the need for a keystone that ensures that the ecosystem can blossom.

In the study of value creation during ecosystem lifecycles, Letaifa (2014) found three success factors or primary capabilities that an ecosystem should apply to enable value co-creation. The first one is the need for an *ecosystemic mindset*. When competitors join an ecosystem, they need to shift away from a competitive mindset

to enable a cooperative mindset. The second one is *ecosystem management* and the third one is building a *social community*. To be able to create value in an ecosystem successfully, organizations need to *change mindsets* to new kind of value creation, build *right connections,* and make their own organizations more *agile*. To understand how value is created in an ecosystem context is important and organizations should continuously evaluate new possibilities for value creation. To be able to build the right connections, organizations need to recognize their own capabilities what complementary capabilities are needed. There is also a need to increase agility, to be able to respond to changing roles and identify opportunities. (Davidson, et al., 2015).

4. VALUE CREATION THROUGH DT IN ECOSYSTEMS

This chapter aims to combine the findings from previous chapters 2 and 3, where the elements of digital transformation and digital business ecosystems were reviewed. Two main assumptions can be distilled from the previous theory: (1) digital transformation is a result of continuous digital innovations, and (2) business models helps in understanding the value creation and capture potential from both individual organization's perspective and the ecosystem as a whole. It is relevant to realize that the value creation and capture efforts become visible in digital innovations and digital business models. Therefore, organizations aim to pursue digital transformation also in an ecosystem context, not only in internal change programs.

In the next sub-chapters, digital innovations and digital business models are presented. In the final sub-chapter, the theoretical findings are synthesized into an initial framework to be further utilized in conducting the empirical part of this study.

4.1 Digital innovations

Changes in value creation become visible in value propositions, in the ways how organizations combine digital products and solutions to customers. One of the benefits of digital transformation is the expectation for new value creation opportunities (Reddy & Reinartz, 2017). Digital business opens up new possibilities to value creation and capturing by utilizing data and information, value propositions, value networks and digital channels (Bharadwaj, et al., 2013). Value creation becomes visible in digital innovations, the creation of new products, solutions, or business models resulting from the use of digital technologies (Nylén & Holmström, 2015). The digital transformation process starts with disruption, when digital technologies and disruptive business models change the business and innovation landscape (Hinings, et al., 2018).

Digital innovations enable digital transformation. Digital transformation can be seen as a continuous process, where several digital innovations cause disruption. (Skog, et al., 2018) Also, Hinings et al. (2018) see cumulative digital innovations as the

core enablers of the digital transformation process. However, the output of digital transformation is not always positive. Issues with privacy and security might be undesirable outcomes that organizations need to consider. (Vial, 2019).

Digital innovations can be either sustaining or disruptive. Initially, the difference between disruptive and sustaining innovations was drawn by Christensen (1997). According to him, most new technologies are sustaining, with the capability to improve the performance of existing capabilities and e.g. enhance existing products and services. The use of disruptive technologies will, in turn, lead to disruptive innovations. The core in understanding the nature of disruptive technology is that upon their initial release, disruptive technologies are first applied by early adopters. Over time, the new disruptive technologies exceed the capabilities of dominant technologies, disruptive innovations challenge current solutions, finally replace them and disruptive technologies become new mainstream technologies. However, Christensen's theories have been criticized for lacking the criteria for defining disruptive technologies. One way to define disruptive technology is in its power to destroy competence and value built on top of incumbent technologies. (Danneels, 2004).

4.2 Digital business models

Previous literature indicates that a digital business model is a common element in both digital transformation and digital business ecosystems. Both digital transformation and digital business ecosystems are complex and dynamic and include continual change. Digital transformation follows from continuous digital innovations. With digital technologies creating disruption and transforming the organizational structures, having organization structures, skills and leadership to support that, it is possible to innovate constantly and by combining several digital innovations, digital transformation happens. The outcomes become visible when commercialized in the form of a business model. A digital business model explains and helps in understanding how to create and capture value and thus explain the business logic of organizations.

Each ecosystem member's digital business model influences the ecosystem. When organizations join digital business ecosystems, they build relationships and dependencies with other members, share resources and capabilities and commit to a shared vision. An individual organization's business strategy does not have to be aligned with the digital business ecosystem's strategy, but it must be evaluated against it. In the same way, the business models of a digital business ecosystem influence the business models of a single organization. To extract value from continuous digital innovations becomes reality via business models – either with the existing models or new business models that may disrupt existing business models. In that way, ecosystems challenge and pressure organizations to enhance, change or re-invent existing business models. (Verhoef, et al., 2019; Zott, Amit & Massa, 2011).

It has been argued that existing technologies can only support value creation and capture with the existing business model of an organization. With new business models, there are more challenges. Limitations of the existing business models drive organizations to change their business models. Digital business models rely on accurate data and information. In the digital world, organizations operate in different networks and ecosystems to e.g. exploit external digital resources, co-create value with customers or join ecosystems. New business models, like multi-sided platforms, have emerged as organizations thrive to create and capture value through dynamic collaboration between multiple organizations. (Bharadwaj, et al., 2013).

As a business model performs value creation and value capture, the same technology commercialized with two different business models will deliver different outcomes. (Chesbrough, 2010). This notion underlines that the technology has the disruptive potential only when put to use via a business model. With AI-related technologies, this is especially relevant. While the value creation and capture potential may be easy to understand, to make it happen for real requires much time, effort and investments. Matt et al. (2015) in their study highlighted the financial aspects as a dimension of digital transformation. This means that the ways that an

organization can utilize new digital technologies and make needed changes, is dependent on the organization's willingness to finance the needed transformation.

A business model is crucial as it links strategy and structures, helps to explain value creation, and has a vital role in unlocking the potential value of new technologies and in commercializing them. Organizations must develop new business models, where value is created and captured among partners in value networks. Four potential sources for value creation have been identified when investigating e-business: novelty, lock-in, complementarities and efficiency. Novelty refers to adopting new structures, content or participants. Lock-in includes elements like trust that are important for maintaining the relationships. A new business model can be created with complementary elements by other organizations and organizing activities efficiently (Zott, et al., 2011).

4.3 Framework combining digital transformation and ecosystems

To form an understanding of previous research and aiming to capture the nature of broad and complex concepts of the digital transformation and digital business ecosystems, it has been relevant to describe the elements and aspects of value creation. Previous research literature includes several examples of different frameworks utilized in studies regarding digital transformation and ecosystems. However, none of the existing frameworks seemed to provide a comprehensive ground for conducting the empirical part of this study. The reason for creating an initial framework was simply to help visualizing and conceptualizing the components related to this study. The summary of the literature review is illustrated in a theoretical framework in figure 7.

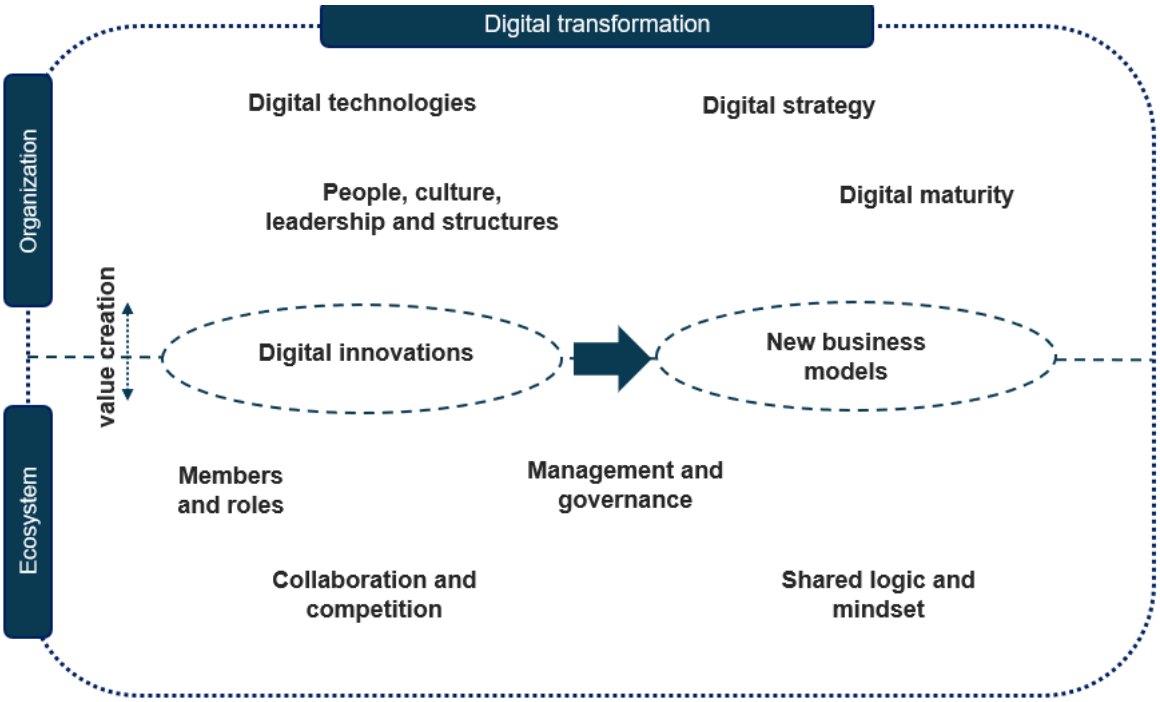

Figure 7. Framework combining digital transformation and ecosystems

Although far from exhaustive, the framework provides a ground for conducting the empirical part of this study. Both the concepts of digital transformation and digital business ecosystem share common features. They are highly interdisciplinary by nature, complex and evolving.

5. RESEARCH DESIGN AND PROCESS

This chapter describes the empirical part of this thesis. First, the research strategy, approach and methodology are introduced, following by the design and execution of the research process. The first chapter presents the research strategy, approach and methods and reasoning behind the selections made. The next chapter describes the data collection phase and presents the case organization. Further, the way that data was analyzed is explained. The whole research process is outlined. At the end, the validity and reliability of the research are concerned. The aim was to explain the research strategy and method selections as transparently as possible to clarify and justify the choices made.

5.1 Research strategy, approach and methods

This study was carried out as a qualitative study. The selection of research methodology is a decisive part of the study. The methodology selection affects how a researcher can make meaningful interpretations of the topic (Fisher, 2004). The starting point of method selection was pragmatic: the research questions and objectives defined the methodological selections. Qualitative methodology is useful in studies concerning human affairs (Gomm et al., 2000), and it provides tools for exploring and understanding complex phenomena in its real-life context (Edwards, 1998; Baxter & Jack, 2008). Typical for qualitative research is to compile research data in real-life situations and people are the preferred ways of data collection. In qualitative research, the focus is on context, interpretation, and understanding of different informant's viewpoints. The researcher also interacts with informants. The research approach is subjective and diverse, as it is based on the experiences of the informants. (Hirsjärvi & Hurme, 2015).

The empirical part of this qualitative study was conducted as a single case study. A case study is a typical way to approach qualitative research. According to Yin (2003), a case study should be considered when the study aims to answer questions "how" and "why". It is also relevant when there are unclarities in the boundaries between the context and the phenomena. A single case study concentrates on one

case and when there are several cases, a multiple case study applies. If the context is different for each case, then a multiple case study approach should be chosen, as the aim is to explore the differences between different cases. (Baxter & Jack, 2008). If the case contains more than one sub-unit for analysis, it is called an embedded case study (Yin, 2003). A single case study can be either explanatory, exploratory, descriptive, intrinsic or instrumental (Baxter & Jack, 2008). When the problem has not been well researched in-depth before and the aim is to understand the problem more thoroughly, the case study design is explanatory (Yin, 2003).

The main reasons for selecting qualitative research are that digital transformation is a relatively new research topic and weakly studied in the context of digital business ecosystem. Thus, this study is explanatory by nature. A selection between a single case study, multiple case study and embedded case study was made based on the circumstances. A single case study approach was chosen since the phenomenon was explored from one organization's perspective. The case organization for conducting the empirical part of the study is a private Nordic information technology, software and digital consulting company. The company operates in a business-to-business environment, advising and helping its customers renew their businesses by capturing the opportunities in technologies, innovation and digital transformation. The company has been fostering co-innovation and exploration around new digital technologies in several ecosystems. Depending on the ecosystem, the role of the case company could have had a slightly different role. Overall, it can be stated that the ecosystems discussed in this study can be characterized as digital business ecosystems and the most common roles of the case company in those ecosystems has been leader, facilitator and digital platform builder/provider. Thus, the selected case organization was able to give insights regarding the research topic of this thesis.

The research strategy chosen was influenced by Dubois's & Gadde's (2002) viewpoints on the abductive approach. According to them, the abductive approach covers the elements of a deductive approach, where propositions are developed from existing theory and an inductive approach, where theory is built from empirical data. In the systematic combining process, combining the existing theory with the

empirical world and the processes of direction and redirection are affected by theory, empirical world, framework and case analysis. The method supports the researcher in studying both theory and practice and allowing the empirical findings to expand the theoretical side (Dubois & Gadde, 2002). The systematic combining process (according to Dubois & Gadde, 2002, p. 555) utilized in this study is illustrated in figure 8.

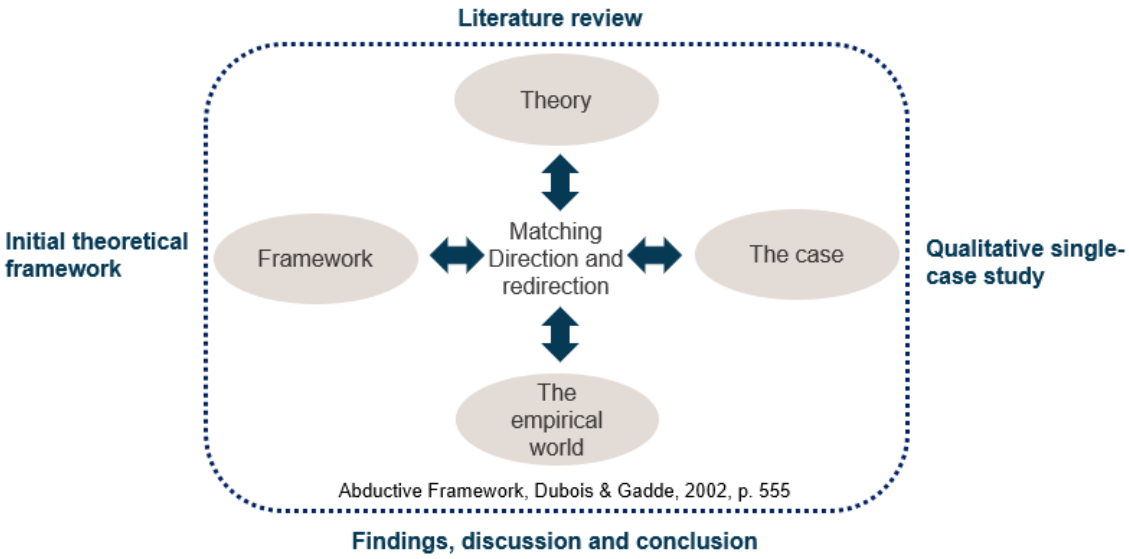

Figure 8. Systematic combining

An abductive research approach seemed the most suitable for this study. First, the literature review is familiarized with previous research literature. Literature review findings were summarized in an initial theoretical framework that was used with the case. Findings from the empirical case study challenged the theoretical findings and additional literature searches were done to fully understand the empirical findings and fill the gaps in the theory.

5.2 Data collection

Data was collected with semi-structured interviews. Data should be at the level where it is rich and detailed enough to make it possible for the researcher to explore the phenomenon and identify themes, analyze possible patterns and even find surprising facts (Saunders, Lewis, Thornhill & Bristow, 2019). Understanding

research philosophy and approaches to theory development. The data for this qualitative study was collected through semi-structured interviews carried out in the case company. An interview is semi-structured when the interviewer has pre-defined topics to be covered and questions are formed beforehand. However, the interviewer is left with the freedom to engage the interviewee in informal conversation around the topic of interest (Hirsjärvi & Hurme, 2015). Semi-structured interviews are appropriate, especially for exploratory and explanatory research, as they allow the interviewees to speak freely and express their thoughts and opinions (Fisher, 2004).

According to Miles & Huberman (1994), samples in qualitative research are often purposive. Sampling involves decisions about which people to interview and which sampling strategy should be chosen for the following. From various types of sampling, information-oriented selection was utilized. It is suitable for a single case aiming to obtain information from a relatively small sample (Flyvbjerg, 2011). When choosing the interviewees, the informants must have as much experience and information as possible about the subject under study (Eskola & Suoranta, 1998). In this study, the researcher worked in the case organization and therefore had previous information and insight into both the case organization and the ecosystems discussed. This previous knowledge was also utilized in the selection of the informants. The selection was made based on the following pre-requisitions:

a) the informants had experience of digital transformation,
b) the informants had experience of (digital business) ecosystems
c) the informants were (based on the previous experience) expected to be able to elaborate on key learnings and success factors

The number of potential informants to meet all the criteria (a-c) was scarce. Digital business ecosystems as a form to carry out digital transformation is a relatively small initiative in the case company, measured by revenue or the number of employees engaged in ecosystems. Therefore, the number of potential interviewees with solid experience and background was limited and all the interviewees had essential roles as informants. Altogether six (6) informants were interviewed. All the interviewees were long-time employees of the case company with business or technical

backgrounds, participated in several digital transformation projects, and had experience with digital business ecosystems and co-innovation or co-creation among many different stakeholders. Therefore, they had excellent experience and understanding of the key concepts of this study. All of them have been or still are part of different digital business ecosystem initiatives carried out by the case company and, thus could give valuable insight. Concerning the four ecosystem examples described in chapter 6.1, five interviewees had experience in two or more ecosystems and one interviewee only with one ecosystem. All the interviews were conducted individually in virtual meetings since COVID-19 pandemic situation restricted face-to-face meetings. The length of the interviews varied from 50 to 65 minutes and both Finnish and English languages were used. All the interviews were recorded and later transcribed to written format.

The semi-structured interview questions were loosely organized under two main themes: digital transformation and digital business ecosystems. The first theme focused on digital business ecosystems, the interviewees' experiences concerning successful and unsuccessful cases, ecosystem characteristics and motivations from the case company point of view. The second theme focused on digital transformation and the features related to value creation in collaboration with other ecosystem members. Interview questions are presented in Appendix 1.

5.3 Data analysis

The data analysis was based on abductive reasoning and the main themes according to the theoretical framework of the study: digital transformation and digital business ecosystems. Four different ecosystems are briefly presented in chapter 6.1 to give an overall understanding of the case company's role in digital business ecosystems. These presentations are not part of actual data analysis, but the idea was to give more insight into the ecosystems, their purpose, vision and targets, and describe the case company's role and the roles of other ecosystem members. All the ecosystems discussed in the interviews occured in Finland, the participants being Finnish companies and public sector organizations or Nordic companies.

It was a deliberate decision not to take different ecosystems explored in this study as sub-units for analysis. During the analysis process, the guiding effect of previous theories and research literature was combined with the empirical finding from the interviews. In abductive analysis the data analysis is not directly based on theory, but the connections to it are observable. The researcher may also make observations about the empirical non-response to previous research. (Baxter & Jack, 2008). The previous research and theoretical framework influenced the analysis, but the primary goal was to find new perspectives or viewpoints, rather than reinforce the theory. In this case, the interpretations of the findings were supported by the theory. However, as a result of combining data and theory, new observations related to the research topic were made.

The analysis was carried out by producing themes and coding the empirical data. There were four phases in the data analysis. First, all tape recordings were transcribed into the written format. Second, the transcribed data was carefully read through several times while taking notes and writing down observations. Coding interviews means splitting large amounts of data into smaller pieces of themes, codes or analyzable units. It involves identifying themes, dividing the material further into units, excluding non-valuable material and organizing themes (Fisher, 2004). Initial codes were made before interviews based on the initial theoretical framework and research questions. During coding, previously defined and new arising themes were explored. In the third phase, these were summarized and divided as themes and sub-themes.

It is expected in qualitative analysis that codes can evolve and change as the empirical study continues (Miles & Huberman, 1994). The initial main themes in the theoretical framework were all not found in the empirical data, and the empirical data challenged the framework by emphasizing certain aspects. The findings and analysis in phase four were summarized under the main themes and sub-themes, as presented in figure 9.

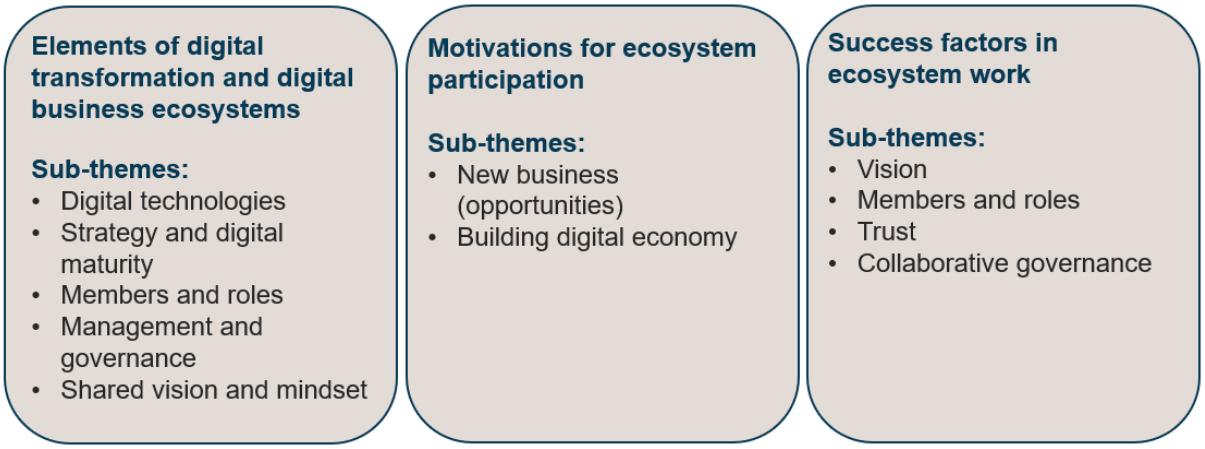

Figure 9. The main themes and sub-themes in data analysis

The findings were summarized under three main themes that were identified during the analysis. First, the findings related to both key concepts, digital transformation and digital business ecosystems, were summarized. The findings were interrelated and linked in the empirical data, and thus collected under five sub-themes: digital technologies, strategy and digital maturity, members and roles in an ecosystem management and governance in an ecosystem, and shared vision and mindset. The second main theme compiles organizations' motivational factors for participating in digital business ecosystems under two sub-themes: new business opportunities and building digital economy. Both case company's own motivations and assumed motivations of other ecosystem participants were discussed. The third main theme focused on success factors regarding ecosystems work, summarizing the most important aspects of the empirical data.

The findings were grouped under four sub-themes as vision, members and roles, trust and collaborative governance. Thematic divisions guided the writing process and illustrative quotations were selected to support and clarify the findings' presentation. Chapter 6 introduces the empirical findings in more detail and chapter 7 discusses the findings concerning the theoretical findings. Finally, the conclusions are made in chapter 8.

5.4 Research process

The research process is illustrated in figure 10.

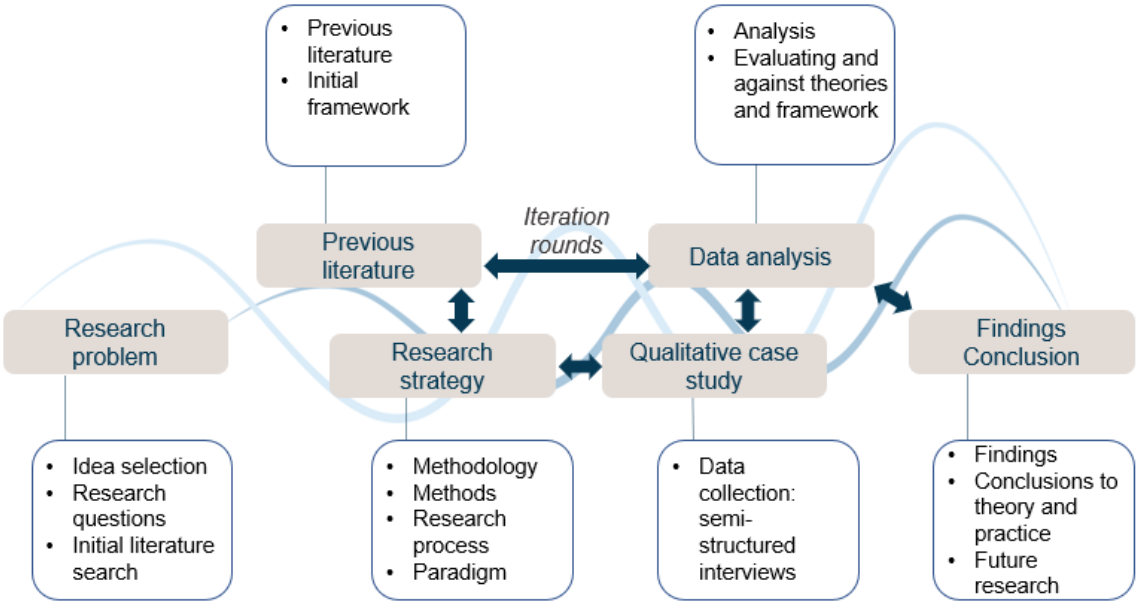

Figure 10. Research process

The work started in November 2019 by ideation and drafting of potential research problems. An initial search of research literature was done, guided by the researcher's initial ideas. With the first draft of the research problem and questions and by studying the previous research literature on the topic, a *research plan* was formed by the end of January 2020. By that time, the understanding of previous research was that it is scarce, focusing either on digital transformation or on ecosystems. There seemed to be a lack of understanding how value creation by digital transformation unfolds in ecosystems.

The work continued to a more thorough study of the previous research literature. An initial theoretical framework began to take form by narrowing down the scope and defining the keywords and main concepts. The theoretical framework visually combines the central concepts and ideas of the study in the selected context (Eriksson & Kovalainen, 2016). While having complex and broad concepts like digital transformation and digital business ecosystems, a theoretical framework helped to conceptualize and define empirical study's scope. In the abductive

approach, known premises are used in generating conclusions that can be tested empirically (Saunders et al., 2019). Guided by the initial theoretical framework, interview themes and questions, as well as selection of informants began to take shape in parallel. The work in progress, a literature review, was delivered and presented in March 2020. Based on supervisor's feedback and guidance, the constructs were reviewed.

First interviews were arranged to April 2020 and the initial schedule was to finalize data collection by the end of the month. Due to the unexpected Covid19 pandemic situation and increased assignments in both work and private life, the interview schedule was delayed. The data collection in the form of interviews was carried out during April-May 2020. Processing, analyzing and interpreting the data took place somewhat parallel, but a large amount of work took place in June. As foreseen with the chosen abductive approach, the initial theoretical framework was challenged with the empirical data collected from interviews. With observable connections to previous theory, there was also a need to clarify the theoretical part. Especially the concept of the digital business ecosystem was deepened from theoretical position after the interviews. The dialogue between the data and research literature continued during the summer 2020. The findings, discussion and conclusions were written. As soon as both the empirical and theoretical parts were completed and the conclusions written, the thesis was sent to the supervisor at the beginning of August 2020. After the final comment round in August, the thesis was completed in its final form during October 2020.

5.5 Reliability and validity

It is important to evaluate the trustworthiness of the study in all steps of the research process to ensure the quality of the study (Eriksson & Kovalainen, 2008). When evaluating qualitative research, reliability and validity may not be the best criteria, but they are commonly used. There are several potential approaches to evaluate the reliability and validity of qualitative research (Tuomi & Sarajärvi, 2018). One commonly used criterion for judging the quality of case studies is based on testing *construct validity*, *internal validity*, *external validity* and *reliability*. Construct validity

measures the objectiveness of the study and can be increased by utilizing multiple data sources (Yin, 2009). In this study, the construct validity was addressed by selecting the methods for this study. According to Yin (2009), a multi-case approach would be preferred over a single-case approach since it provides multiple sources of evidence. In this study, the multi-case approach was not possible due to limited resources and with the unclarities of the relatively new research phenomenon. Therefore, the focus was on a single case. This decision was supported by the systematic combining approach that suggests going deeper in single cases (Dubois & Gadde, 2002).

Validity refers to the ability of the research to measure what is supposed to be measured. Internal validity is testing the trustworthiness of the analysis (Yin, 2009) and it is addressed by the theoretical and conceptual definitions made in the research (Eskola & Suoranta, 1998). In this study, the aim was to increase the internal validity by comprehensive familiarization with previous research literature regarding the themes of this study. Different theoretical viewpoints were carefully analyzed, before the drafting of the theoretical framework used in the empirical part of the study. To increase both internal and external validity, the different phases of the research process, the choices made in research design, the reasoning behind methodological selections, as well as the data collection and analysis process were described as detailed and transparently as possible. Also, several tables and figures have been used to clarify and summarize the written text.

The external validity is related to the generalizability of the research. (Yin 2009). To ensure the external validity, the actions focused on matching the theory and empirical findings. The most significant limitation relating to external validity is the small sample of interviews (6). The findings are less generalizable, than they would be in a multiple case study, or with more immense amount of data sources in a single-case study. As already stated in data collection chapter (5.2), the number of potential interviewees was limited due to the fact that digital business ecosystems as contexts to create value through digital transformation are not the most common form of activity in the case organization. The way to increase external validity was to match the empirical findings towards the previous theory. This is made visible in

Conclusions chapter 8, where the research questions are answered by combining previous theory and empirical findings. In chapter 8.2, the theoretical and managerial contributions of this study are considered, striving to generalize the results of this single case study.

Reliability evaluates the replicability of the study (Yin, 2009, pp. 40-41). The background of the researcher has influence on the research and specifically data analysis phase and thus need to be considered (Eskola & Suoranta, 1998). In this study, the researcher works in the case organization, which affects the objectivity and thus reliability. The researcher was familiar with the topics and knew most of the interviewees beforehand, which helped in exploring the theoretical background and in finding the informants. However, the researcher does not directly work with the interviewees and has not participated in ecosystem work described in this study. Another consideration was, that the background and the position of the researcher in the case organization helped in setting up confidential and relaxed interview sessions, where the interviewees were able to express themselves freely. Also, as Saunders et al. (2019) point out, choosing the theoretical framework for the study forms the conclusions by affecting the interview questions and data analysis. In this study, the aim was to increase the objectivity by carrying out the research in a systematic way from theory to the theoretical framework and into analyzing the results and making conclusions.

6. EMPIRICAL FINDINGS

In this chapter, the research findings are reviewed. The first section presents a few digital business ecosystems, where the case company has participated as a facilitator or intermediator. This presentation aims to provide an overview of the case organization's background and experience in digital transformation initiatives carried out in digital business ecosystems.

Next, the findings are presented. Chapter 6.2 introduces the elements of digital transformation and digital business ecosystems identified in the research data. The identified sub-themes and main findings from the case company's perspective are summarized. Chapter 6.3 suggests the case company's motivational factors to participate in digital business ecosystems and evaluates other ecosystem participants' motivations. Chapter 6.4 summarizes the factors that, based on the empirical data, might lead to successful endeavors in digital business ecosystems.

All the chapters include direct quotes from the interviews, translated from Finnish, if needed. Since the number of the interviews was only six, the quotes have been selected to represent all the informants. The quotations are not tagged to protect respondents' anonymity. In the quotes, the square brackets indicate clarifications added by the interviewer, and three dots inside the quote present a word or paragraph that has been deleted as insignificant.

6.1 Examples of digital business ecosystems in the case company

The case company participates in several ecosystems that can be described as digital business ecosystems. During the interviews, as the informants reflected on their previous experience, they were asked about the ecosystems they have participated as representatives of the case company. The ecosystems discussed during the interviews are shortly presented here. The aim was to give an overview of typical ecosystems facilitated by the case company, and the list is not exhaustive. The four examples help clarify the case company's role, other ecosystem members' roles, different ecosystem visions, objectives, purpose and lifecycle. From the

outlook of this study, the ecosystems do not form a theme for analysis but simply provide context and background for different themes to appear. Next, four ecosystems are briefly presented. All the cases were in Finland. The participants were Finnish companies or public sector organizations, or Nordic companies operating in Finland. Five interviewees out of six had experience in more than two ecosystems described.

Ecosystem 1 – fully digital founding of companies.

The purpose of the ecosystem was to enable a fully digital founding of companies. The existing process of forming a limited company was time-consuming, involving many manual steps and many stakeholders, like banks and public authorities. A company founder needed to contact several stakeholders and deliver required documentation and signatures, often in manual format. The current systems did not support verifiable identity information of individuals, foreign citizens or organizations.

Together with several Finnish authorities and companies, the case company had a mission to reduce the manual and administrative procedures. Another objective was to encourage entrepreneurship and attract foreign talents by making it easier to found start-ups in Finland. Distributed Ledger Technology (DLT) was utilized to orchestrate end-to-end process across different actors. This enables information of the founded company and its stakeholders to be updateable and available for every party in the network.

By the time of this study, a proof-of-concept that fulfilled the requirements of ecosystem participants, has been made and further development activities and collaboration have been planned. With the digital identity, the founding of a new limited liability company could be done entirely on a digital basis. A company can be reliably identified and can share verifiable information about itself online. The initial scope in the ecosystem work has been in Finland, but the technology solution is not geographically limited. There are models for other highly scalable global business networks that can serve various use cases and industries.

Ecosystem 2 – digital process for non-listed company share trading.

The purpose of the ecosystem was to design a fully digital process for non-listed companies' share trading and validate the entire process's legal and business feasibility. The trading process in the asset class of non-listed company shares relied heavily on manual processes and information was non-digitized. Therefore, different parties like investors, public authorities and financial services providers, found it challenging to verify the validity of the shareholder information.

The case company and several Finnish public authorities, organizations and companies had a mission to improve the accessibility and visibility of non-listed company shares and reduce manual and administrative work. Distributed ledger technologies Corda and Hyperledger Indy were used to form a concept for non-listed companies shares trading and create an ecosystem platform. With the outcomes, distributed business networks, public authorities and companies can trust that verifiable information flows between stakeholders and the process of non-listed company share trading is fully digital.

By the time of this study, a proof-of-concept has been made and further plans to develop an ecosystem platform are planned. The network platform will be developed as a collaboration between Finnish companies and authorities, but there are no geographical limitations from the technological point of view. The platform will enable the creation of new financial products and services by improving accessibility and visibility to the asset class and by completely changing the ways that investors and start-ups can transact.

Ecosystem 3 – digital company network.

The purpose of the ecosystem was to create a foundational network for new business models and utilize the work done in ecosystems 1 and 2. By the time of this study, this ecosystem was in a starting phase by the case company and other ecosystem members.

The foundational network is a distributed business network that enables creating the multi-party business transaction flows without any intermediaries or data replication.

The network will include some core functionalities like the digital signature, digital company identity and verifiable credentials. A distributed ledger that enable different network services, like payment processes, digital representation rights, business-to-business contracts, company share issuance, share accounts and trading and company founding process. Each service has a specific business functionality (like a payment process) and a business role (like the service provider) for organizations participating in the ecosystem to hold.

Ecosystem 4 – entrepreneur services

The purpose of this ecosystem was to set up services for entrepreneurs. The main idea was to provide services for people who want to be entrepreneurs or have already started a business. An ecosystem was formed from the business need to collect services, scattered in different places, under the same roof. The case company and different parties providing services to entrepreneurs were ecosystem members.

By the time of this study, the ecosystem work by the case company and different parties providing services to entrepreneurs has ended. As a result of the ecosystem's work, a new business entity was formed. The first launch was made, including a service in people establishing a company. For further development and collaboration, a proof-of-concept and activities were planned. The service's scope has been in Finland, but from the technological solution point of view, the service is not geographically limited.

6.2 Elements of digital transformation and digital business ecosystems

This chapter introduces the elements of digital transformation and digital business ecosystems identified in the research data. The sub-themes and main findings from the case company's perspective are summarized in table 4.

Table 4. Value creation elements based on interview data

Sub-theme	Main findings under the sub-theme
Digital technologies	Technical capabilities
	Exploration around new technologies
Strategy and digital maturity	Digital maturity level of each ecosystem participant
	Ecosystem strategy (lifecycle view)
Members and roles	Clear roles for members
	Changing members and/or roles through the ecosystem lifecycle
Management and governance	Complexity increases the need for governance
Shared vision and mindset	Clear and shared vision guiding the value creation
	Shared vision evolves through the ecosystem lifecycle

The interviewees were not directly asked to list their view of the key elements of digital transformation or digital business ecosystems, but the questions were open and indirect. As the case company has participated in many digital ecosystems, all the interviewees were familiar with digital transformation and ecosystem concepts. The definition of digital transformation was not discussed, nor the importance questioned. A quote from one of the interviewee's summarizes it well:

> *"Everything we do is digital transformation."*

Digital business ecosystems were seen as one potential option for carrying out digital transformation. The majority of the digital transformation cases, where the case company is present, occur in traditional partnerships between the vendor (the case company) and the client. These partnerships are based on contractual agreements between two parties. A couple of examples will further clarify the most typical services the case company provides. The case company develops new digital services for *customer A*, helps *customer B* in transforming the existing technology landscape according to business and ICT strategy, and explores new potential business initiatives with *technology partner X*. Overall, collaboration in digital business ecosystems type of setups was seen as more complicated than

working in traditional business-to-business settings and co-innovation between the case company (service provider) and customer (service recipient).

> *"Digital transformation in organizations is ongoing. Getting started in an ecosystem is always much harder than doing things more traditionally."*

> *"Ecosystem never makes things easier; it only makes everything many times more difficult."*

> *"To get an ecosystem to function and work well is a hell of an effort."*

6.2.1 Digital technologies

Exploring new digital technologies that can create disruptions to businesses was seen as a critical element and a source for digital innovations. When discussing digital transformation, most interviewees reflected on many levels: individual organization, ecosystem, Nordics or Europe. The drivers for digital transformation were recognized as data, data processing capacity, cloud and changes in customer behavior. As these drivers are global, it was seen that also the consequences exceed the boundaries of a single organization.

Digital technology was recognized as a critical element in both digital transformation and digital business ecosystems. All ecosystems discussed in the context of this study included digital technologies and digital platforms. Some ecosystems were more strongly driven by the exploration around digital technologies than others, but all the interviewees shared the opinion that digital technologies are the enablers behind digital innovations. Competence with new technologies and the ability to lead exploration and value creation were seen as case organization's core capabilities.

> *"Of course, we need to have the technical capability."*

> *"We do pretty disruptive stuff and very early stage stuff. This combines leading-edge business models with leading-edge technology."*

"To identify the unknown unknows with the help of new technologies".

However, a "pioneer" attitude and exploration around new technologies were also seen as risks in an ecosystem context. To succeed, all the ecosystem members need to be committed to the ecosystem's vision and fully understand what it requires to work in an ecosystem.

"A very fundamental thing with new technology, (…,) in particular it is easily associated with a desire to experiment. Let's just get involved and try. A basic mistake that can be easily made is to start from the technology side without really thinking about everyone's business interests and incentives."

6.2.2 Strategy and digital maturity

Based on the case company's experiences, the other members of the ecosystem may have many various strategies related to digital transformation and digital business ecosystems. Also, some organizations did not have strategies regarding ecosystem work, and that this was a potential risk. According to the case organization, many organizations have set up specific innovation units inside their organizations to, for example, explore around new emerging technologies. The interconnectedness of these units with the overall strategy of the organization may cause problems for the ecosystem.

"Lack of strategy, …., this is not just about ecosystems, but everything that is done in companies. There is a group that would like to promote stuff, but management is not behind them. That is when things [in ecosystems] progress to a certain point, but when the decisions need to be escalated to a higher level, there's no strategy and no courage."

"There are often innovation units or emerging technologies units and that causes a danger [for the ecosystem], that the innovation unit is not sufficiently in sync with the rest of the organization."

A couple of interviewees also brought up the concept of digital maturity. When the issues related to strategy and digital maturity were discussed, the opinion was that there was much variation in the maturity levels of other ecosystem participants. Some ecosystem members may have much digital transformation experience and previous experience in participating in different ecosystems while others do not have any experience. The elements of strategy and digital maturity were seen as necessary. According to the case company, an ecosystem as a context was perceived as more challenging.

> *"Organization's own maturity to operate is often overlooked. There are actors at so many different stages. Some are already advanced and have built their own digital ecosystems and then there are others that are just beginning the journey"*

> *"Determining the right level of maturity is really essential when getting involved [in ecosystems]. Companies may not recognize their maturity levels themselves. How to form a strategy and kind of a functional basis for doing digital business. So that there would be a realistic picture of your own capabilities."*

6.2.3 Members and roles

The interviewees were asked to elaborate on the case company's role in digital ecosystems and how they perceived the other members and their roles. Depending on the ecosystem, the role of the case company could have been slightly different. The role was defined as coordinator, facilitator, orchestrator, leader or leading member. The case company had a role as a digital platform or data platform provider. The case company, as well as the other ecosystem members, can have several roles.

There was a consensus among the interviewees, that the case company's role has always been based on some existing capability. For example, existing platforms could be utilized in the ecosystem or have technical capabilities to explore and build

something new and thus act as a provider and infrastructure enabler for other ecosystem members. The case company has never had a role in providing the services for consumer end-users.

> *"We have never gone outside B2B. A legal entity has always been found that has provided the service to the market"*

Overall, the ecosystem as a structure for collaborative value creation was not seen as a fixed setup. In all ecosystems discussed in this study, three key findings related to members and roles in the ecosystem can be found. First, there can be variation in the roles needed in ecosystems, but they have to be adequately specified so that every member can understand other members' roles.

> *"The overall path in an ecosystem can be described through the roles. The roles need to be described so openly, that it is not unclear to anyone."*

The second finding was that one ecosystem member could simultaneously have many roles, which was a typical situation.

> *"..there may be actors in two different roles. One can be a service provider and then an end-user for these solutions [that ecosystem provides]"*

Third, the members are more likely to change during the ecosystem lifecycle than to remain the same throughout the whole ecosystem. Also, it was not seen as necessary to clearly define the ecosystem boundaries.

> *"What is an ecosystem really? When we set up an ecosystem, it is natural that tomorrow it may have different actors than today. As the ecosystem evolves, it is natural that members may change along the way."*

> *"Who is the main locomotive, (…), can change. The one, who is most affected by the issues at the moment takes the lead. In the next step, some actor might drop out saying "I will no longer get what I was looking for". Or you find*

out that this [whatever the target of the ecosystem] is against my business model and will be my competitor and I need to jump out now."

6.2.4 Management and governance

Governance issues were of specific interest among the interviewees. Specifically, the respondents described *collaborative governance*. They defined collaborative governance to include formal arrangements in terms of agreements, but more emphasis was on the non-formal side. The process of building trust and ecosystem members making a commitment to shared ecosystem vision were seen very important. One fundamental discovery was that the amount of ecosystem members increases the complexity. The complexity level of an ecosystem influences the management and governance models needed. On the other hand, the technologies' disruptive capabilities were not seen as an element that would increase complexity.

Other elements affecting the ecosystems' governance were that sometimes the ecosystem members do not have any role with each other. Occasionally there might be restrictions set by the competition authorities that restrict or deny direct collaboration between individual members. This increases the role of the case company acting as a facilitator of the processes taking place in the ecosystem. One case example clarifies very well how the governance model was built along the way.

"The core team was extensive, and the model changed as the ecosystem evolved. (…) one stage involved particular actors, and in the other stage they were left behind, and new members joined. The ecosystem advisory board was formed to provide guidelines and mandate for the work. Specific cross-industry workshops were used to make specifications. Everyone involved in ecosystems must have the same access to the specifications and then solution shaping happens in [smaller] sub-groups. With open specs, individual actors or groups of actors can set up subsystems and develop new service ideas or competing applications to the market."

Collaborative governance, trust and shared vision were essential aspects, as the members are highly dependent on each other in ecosystems and with initiatives including new digital technologies, it might be, that no one can precisely define the outcomes of the ecosystem work in a planning phase.

6.2.5 Shared vision and mindset

Having a shared vision that the ecosystem members can commit to was recognized as an important element. However, building a shared vision and mindset around digital strategy could be jeopardized if the trust does not exist among ecosystem participants. As the members and roles may change during the stages of the ecosystem lifecycle, also the shared vision and trust evolve along the way. Based on the case organization's experience, it is easier to start small and let the ecosystem grow as the shared vision expands.

> *"Let's prove the point in terms of the parties' vision and make it more difficult only after that. A bit of a lean-type start. Let's first try if it makes any sense."*

> *"It may be that an ecosystem starts as an open ecosystem. Then, when a certain point is reached, it is no longer open, but continues as a business service of selected actors."*

> *"The entire business model evolves along the way. Yesterday it was different than today and tomorrow different than today."*

6.3 Motivations for ecosystem participation

The second main theme focuses on the motivational factors. The theme aimed to understand why the case company has engaged itself in digital business ecosystems. The motivations of other ecosystem members were also discussed, as the respondents understood them. Both case company's own motivations and understanding of other ecosystem members' motivations were quite similar, as shown in the illustration presented in table 5.

Table 5. Key motivations identified in interview data

Sub-theme	Main findings under the sub-theme	
New business	Innovating new business models	● ○
	Building competitive assets for the future	● ○
	Potential to grow / find new revenue streams	● ○
Building digital economy	Spreading Nordic values	●
	More democratic and inclusive digital economy	●
	The importance of the topic	○

● Case company's own motivations
○ Case company's understanding of other ecosystem members' motivations

6.3.1 New business opportunities

The most common reasons to participate in digital business ecosystems were related to potential new business initiatives. Digital business ecosystems were seen as practices in building such competitive assets for the future that a single organization could not build by itself. As stated earlier, digital transformation carried out in digital business ecosystems was seen as much more challenging than performing digital transformation in an individual company. Value creation was not seen possible without other participants' inputs and complementary capabilities. The interviewees highlighted that the ecosystem participants need complementary knowledge and assets to realize the new business innovations.

> *"Value creation is no longer a matter for one organization. Your own business logic is always there, but there will be also a shared business logic."*

Building competitive assets for the future was perceived as a relatively central part of the case company's new business opportunities. The respondents saw that key incentives for the case company to participate in digital business ecosystems in the future were finding new revenue streams and having the potential to grow. However,

the collaboration in ecosystems was perceived as more challenging than collaboration in a more traditional business-to-business model. Also, the potential to get revenue in the future was riskier, as the respondents realized. Here are a couple of examples of how the interviewees communicated the future expectations.

> *"We want to be the number one in Europe that produces collaborative platforms to the world. That is our vision, that is our business."*

> *"I see brutally that we are building something where we can act as some kind of platform operator or other that creates some enabling service for multi-actor cooperation. In there, we have a role to play and business to do. Whether it is called an ecosystem or whatever."*

> *"We have an interest in building digital ecosystem platforms. […] to build a common solution for all, the entire volume will be sold at once. After all, we have the potential to grow."*

The case company realized that the potential of new business and revenue includes uncertainties. In digital business ecosystem initiatives, any precise predictions of future business are arduous.

> *"To calculate a business case is very difficult. It is easier to calculate for business applications utilizing a common platform. But with us, the goal is to be able to function a bit like in two levels. When infrastructures are built, then of course we are happy to build them as billable work. (…), we do not have the idea of owning the infrastructure, but to build such models that there is joint control and potentially non-profit model. On top of these, of course, we aim to bring our own business applications and make projects and continuous service. That is our longer-term business case."*

The case company expected the other ecosystem members to share the same primary reasons for ecosystem participation: building such new businesses that would be difficult or impossible to build alone. The competitive environment of

companies creates pressure to change. As the existing business models are threatened, the companies want to both defend existing and innovate new business models. Digital business ecosystems enable organizations to interact with other organizations, but the benefits of participation need to be exact. A couple of quotes clarify this thinking.

> *"After all, a company thinks about the business and ROI [return on investment] and the risks, of course, both the brand risks and the loss of money. The good thing about it is that if five companies join together, everyone invests only own share. It's clearly a lot cheaper than doing some new thing alone. Then again, this should be the starting point."*

> *"There is no point in doing something with others, that you can do on your own. The target needs to be more than the sum of its parts. That's pretty clear."*

6.3.2 Building digital economy

As high-level goals, many interviewees embraced social responsibility and Nordic values. The interviewees characterized Nordic values to include collaboration, openness, trust and democracy. As the case company is a Nordic organization that operates globally, the comparisons to countries outside Nordics were made. All the ecosystem cases discussed in this study occurred in Finland. However, participation in digital business ecosystems was recognized as a way for the case company to participate in building and enabling a more democratic and inclusive digital economy in Finland, but also in Europe.

> *"A higher-level goal for us is to start from a social perspective… to be able to build a more democratic digital economy. The immediate benefit is that when it is possible to democratize competition, it is easier for different types of player to operate in the market. Instead of just being errand boys for big USA companies."*

> *"The way of working… We have a long tradition of collaboration. Reference guests from different [European] countries have asked that how the hell are you doing this. If this is packaged and exported outside, we are really selling Nordic values. The Nordic way of working together, trust in each other, openness. That's wat we are doing, but the world may not be ready."*

> *"Globalizing our Nordic values through innovation."*

The case company estimated that the reasons for joining ecosystems might be different for private and public sector organizations. A public sector organization needs to be careful in selecting the ecosystems they participate in since they need to be careful not to favor certain actors or some businesses over the others. The case company's respondents estimated that the topic's importance might be the the main driver for a public sector organization to get involved in digital business ecosystems.

> *"The thing itself promotes something they [public organizations] consider important. …they may want to speed up the process in a credible way, be an enabling factor and at the same time, of course, be open and fair. They cannot favor or be exclusive."*

6.4 Success factors in ecosystem work

The third central theme touches on the success factors related to digital business ecosystems. The theme grasps the elements that may explain how to succeed in digital transformation initiatives in digital business ecosystems. The research questions related were open by nature and interviewees were asked freely to express their thinking. Due to the theme's broad scope, the findings are summarized and collected under a few sub-themes. On the other side of the coin are the factors that may lead to failure in digital ecosystems, based on the case company's experiences. However, this is not handled as an independent sub-theme but as part of the themes. The success factors are summarized under four sub-themes, as illustrated in table 6.

Table 6. Success factors based on interview data

Sub-theme	Success factors for digital transformation in digital business ecosystems
Vision	Shared vision and strategy, creating a vision
	Maintaining and clarifying the vision along the ecosystem lifecycle
	Finding the business cases that bring value for the customers
Members and roles	Right organizations, balancing the interest and incentives of heterogenous members
	Selecting members that can commit to shared vision
	Right individuals representing the organizations
Trust and other soft elements	Trust, creating trust
	Honesty, openness, flexibility, transparency
Collaborative governance	Leadership, facilitation capabilities, leading the balance between parties own interest and ecosystem target
	Advisory board
	Common rulebook

6.4.1 Vision

Typically, digital transformation initiatives among many members in an ecosystem started as relatively small experiments with new digital technologies. Before contacting potential ecosystem members, the case organization had already prepared to demonstrate the capabilities to deliver results with the selected technologies. A very typical approach was that the ecosystem started with an initiation phase, where proof-of-technology and proof-of-concept were formulated with a limited number of partners. After these initiation phases, a shared vision for the ecosystem began to take shape. By combining the previous experiments that different organizations may already have done, the expectations, budgets, and ideas regarding members, roles and outcomes, the case company has facilitated the birth of a shared vision for the ecosystem.

Jointly created vision was seen crucial for success in ecosystems. The metrics for success were not in the scope of this study, so success is quite straightforwardly

understood as the fulfillment of the targets and objectives set for the ecosystem. It all assimilates in the format of a vision.

> *"If there is no vision of […] what is being done, if there is no service or roles or how other actors connect to it and if there are no common rules of the game, […], if these are not found, then the ecosystem is unlikely to succeed."*

> *"You need to have vision, faith and someone who leads."*

The end-users for the services designed and produced in the ecosystems were typically consumers or other companies. Even though the case company is not directly providing any services to consumers, the potential end-users' role in creating the vision for the ecosystem work was considered very important. This was because modeling the customer journey from the end-user perspective would help set aside each ecosystem member's targets, needs and expectations. Typically, in digital transformation taking place on an individual organization's level, the organization is used to evaluating things only from their perspective. Taking the end-user's would help to understand who the other relevant actors in the ecosystem are, and clarify the vision.

> *"When it is not possible to have only one actor's perspective in ecosystem, it forces to have end user's point of view."*

End-users were seen as necessary, also from a value capture point of view. Keeping in mind that most of the motivational reasons for engaging in ecosystem work included financial targets in terms of new revenue, and the potential to grow and build competitive assets for the future. If the results from the collaborative innovations done in an ecosystem lead to such products, services or solutions, that have value for the end-user, the work accomplished in ecosystems has not been successful.

> *"If the value is not big enough, regardless of the goodness of the ecosystem, it will not fly."*

Creating a vision and committing to it was not enough. The interviewees pointed out the importance of clarifying the vision throughout the ecosystem lifecycle. The capability to smooth and simplify the ecosystem journey, leading the balance between the ecosystem vision and parties' interests, was highlighted in the interviewees' responses. Hence, knowledge sharing and collaboration were relevant in committing to the ecosystem's vision, learning form each other and sharing experiences.

> *"The vision must be maintained. In the worst case, we start arguing. During the journey, you come across things where you have to agree on new rules, create new roles, take new responsibilities, take new responsibilities temporarily."*

> *"The travel [ecosystem lifecycle] can be planned in advance, but it really happens during the trip. There may be a strong vision in the beginning, but when you head towards it, you need to take one step at a time."*

> *"Bringing your own perspective too hard too early needs to be avoided."*

> *"If you go too selfishly pushing your own agenda, then that ecosystem will collapse. For an ecosystem to succeed we know that we need all of and you need to have healthy business interests to be involved and we need to reach some kind of agreement on targets. It has to be something none of us can do alone."*

6.4.2 Members and roles

The ecosystem member selection or qualification processes were not in the scope of this study and thus not discussed in detail. However, the topic was approached when discussing the importance of ecosystem members and their roles. It can be summarized that the members of the ecosystem were selected with the aim of having sufficiently comprehensive expertise to fulfill the needs of the ecosystem. Every member of the ecosystem has its own business strategy and only brings to the ecosystem the necessary elements for collaboration. It was seen as crucially important for the ecosystem success that the members find natural roles and feel committed to those roles.

> *"There has to be the right companies with the right interests and the right drivers. The right people need to be involved. Then it can succeed."*

> *"You need to ask and find out any allergies. If you can't work with someone for business or any other reasons, that is something that needs to be said out loud."*

As the new business models invented in the digital business ecosystem may pose a threat to individual organizations' existing business models, the companies may want to defend their existing business models while innovating new ones. When facilitating an ecosystem, the case company realized that some organizations might have dual roles that affect their participation in an ecosystem. It is crucial to understand the competitive aspects. A couple of examples of the role of a bank portrays this.

> *"The bank, for example, usually has a dual-role. On the one hand they see that through this, they can provide better services to their customer in their role as a service provider. But then, when new types of digital services become available, they can also digitize and automate their own practices as if they were end-users."*

> *"The role of a bank does not need to be in the customer interface. It is enough that it has a system interface and someone else can build the services. The bank may then be present again in the service provided by some other provider."*

The viewpoint in this study was on the organizational level, but collaboration happens between individuals. Having the right people involved by the right organizations was seen as an essential success factor. Each participating organization nominated individuals to engage in the ecosystem work. According to the findings, the right person to represent an organization and attend the ecosystem work might not be the decision-maker. However, there was a consensus among the

respondents the right people to participate in ecosystem work should possess a sufficient level of decision-making authority (mandate) and the right mindset. As summarized by one interviewee:

> *"One rotten apple spoils the whole barrel"*

6.4.3 Trust

To summarize, having enough technical capabilities and credibility, having an initial idea and form it into a joint vision, finding a bunch of organizations with their business interests yet ready to commit to ecosystem vision and ready to nominate individuals to participate was specified only as a starting point. The more parties involved, the higher became the meaning of soft values along the ecosystem journey. All the interviewees ranked trust as the most significant success element, but transparency, openness, balance and flexibility were also recognized.

> *"Building trust is important. It takes a long time for trust to emerge. In the beginning it's like yeah, yeah everything is good (…), but really not. Trust and confidence are building along the way and things deepen along the way."*

> *"Trust is such an onion that needs to be peeled before the hard core is found. One cannot be too impatient and think that this goes on in stages like in the waterfall [model]. We always have to go back to the rules and the vision, those core elements, over and over again."*

> *"Trust, trust, trust".*

The perceived trust was seen as a core element in enabling the successful collaboration. This study did not try to elaborate on trust-building mechanisms in an ecosystem context. However, one finding was that existing (formal) relationships between organizations were perceived as less important than relationships between individuals. The case company typically had previous co-operation with the ecosystem members before the ecosystem initiatives started on a company level,

but not necessarily between individuals. As the interviewees indicated, success relies more on people's right mindsets that represent the ecosystem member organizations than with previous relationships between organizations.

6.4.4 Collaborative governance

Collaborative governance was brought up as a key element of success. In general, governance helped to prepare for things and mitigate risks. Having a collaborative governance model in place gives structure to ecosystem work and helps collaboration. Shared rules to guide the ecosystems work was perceived as a way to increase successful outcomes.

> *"The most important thing is to get the governance model in order and thereby start thinking about common rules of the game."*

The digital business ecosystem as a context for collaborative digital transformation efforts puts specific requirements for collaborative governance. It consists of two layers: the digital platform enabling technical infrastructure and a base for the collaborative part of a multi-stakeholder activity. The collaborative governance model used in the case company consisted of three elements: (1) *service entity*, with clear segregation of the parties and owners (2) *rulebook* that sets common rules for all ecosystem members, and (3) *steering board*. Regarding the service entity, decisions need to be made of the ownership. Very typically, a new business entity is set up by the ecosystem members or part of them. Rulebook defines the terms and conditions for providing the service to all ecosystem members, but the rulebook owner might be different from the owner of the service entity. The steering board or an advisory board drives the direction for joint effort.

> *"When there are many players, there must be a common rule book. How to join the common service, how to start, under what rules and conditions the data and services produced by the common service can be used."*

In this type of model, the leadership is distributed. The case company described its role as a facilitator, promoting collaboration in ecosystems. The case company's role was typically to lead the balance between parties' independent interests and jointly agreed ecosystem target.

> *"All parties need to feel that they are heard and treated equally. The conversation between them need to be facilitated and somehow there's a need to constantly sustain the vision and facilitate the debate around it."*

> *"The journey is more about facilitating, we have the ability to lead the ecosystem journey with these actors, where we start experimenting data and technical feasibility in parallel with dialogue with the parties about what kind of business models, (…), the visions and thoughts of different actors, like, what to build on the platform so that it can work in the real world."*

7. SUMMARY AND DISCUSSION

In this chapter, the empirical findings were summarized and discussed with the extant research literature. This study aimed to identify value creation by digital transformation in digital business ecosystems from a case company's perspective, by exploring the value creation elements of both digital transformation and digital business ecosystems. The initial theoretical framework based on the findings was further utilized to gain empirical evidence from a single-case study in a case company that facilitates digital transformation in several digital business ecosystems. The empirical findings both supported but also supplemented the previous research findings. As a result, digital business ecosystems were understood as one potential context for digital transformation to unfold. Also, the motivational factors for participating in digital business ecosystems were explored, as well as relevant factors for successful ecosystem work. The empirical findings are summarized in figure 11.

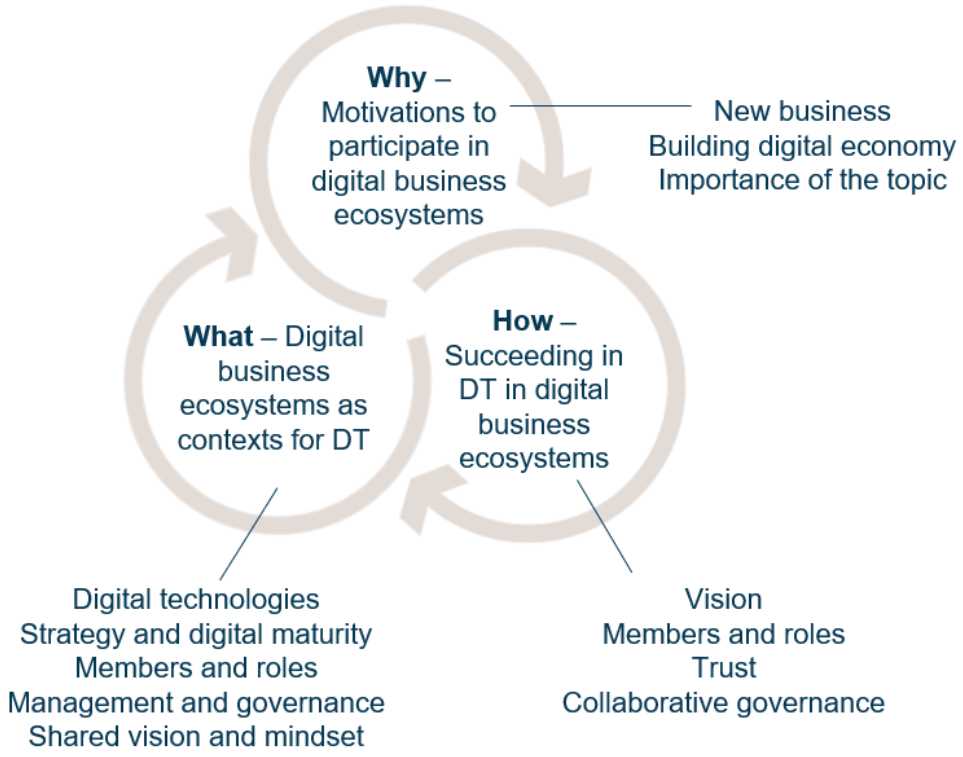

Figure 11. Findings summary

7.1 What – Digital business ecosystems as contexts for DT

In the research results, the value creation elements of digital transformation and digital business ecosystems were identified. Based on the interviews, digital transformation, in terms of the ability to utilize digital technologies to change the value creation, was widely recognized as part of the case company's core competence: None of the interviewees questioned the relevance of digital transformation. The discoveries were very well in line with the digital transformation frameworks presented by Matt et al. (2015), Verhoef et al. (2019) and Vial (2019) and Not only recognizing and naming similar vital elements but also highlighting that digital transformation is a continuous process, rather than a single activity.

In the literature, digital technology was identified as the critical enabler of digital transformation. An organization's ability to utilize digital technologies was important from a value creation perspective (e.g. Danneels, 2004; Gimpel et al., 2018; Hausberg et al., 2019; Hinings et al., 2018; Skog et al., 2018; Verhoef et al., 2019; Vial, 2019). Digital technology was also the fundamental element recognized in the interviews. However, the focus was heavily on what can be done with the technology, not with the technology itself. Thus, the findings were aligned with the expression of technology as an *enabler* used in the previous research literature. The exploration around digital technologies that can create disruptions to businesses, was seen as an endless source of potential innovations.

In the empirical findings, digital strategy, leadership and organizational structures were discussed together with the concept of digital maturity. As interpreted in theory by Gimpel et al. (2018), the balance between agility and ambidexterity, was an empirical finding. Based on the case company's understanding, the solution was to maintain efficiency in current business models while setting up specific units aiming to explore new digital technologies, leverage digital business opportunities or "fail fast" on such new initiatives. Digital maturity was highlighted, as it affects the organization's capabilities to do digital transformation in digital ecosystems. Very similar to discoveries by Vial (2019) and Brown & Brown (2019), a digitally matured

organization has already digitalized its core operations, fosters innovation culture and openness.

The case company has been facilitating many different ecosystems, some of them described in chapter 6.1. All of the ecosystems discussed included organizations participating in ecosystems and individuals representing their organizations, as well as digital technologies and platforms. The findings are aligned with the digital business ecosystem definition, where value is created through shared digital platforms in collaboration among ecosystem members (Senyo et al., 2019). The empirical findings regarding the ecosystem members and their roles support Adner's (2017) ecosystems-as-structure view, in which the starting point of an ecosystem is the value proposition and ecosystem members are selected based on the needs of the value proposition realization.

The case company is an established company, which typically plays a *keystone* or a *dominator* role in an ecosystem, according to definition by Zahra & Nambisan (2012). According to the definition by Iansiti and Levien (2004), keystones enable a healthy ecosystem by nurturing the success factors, diversity and targets of the ecosystem while dominators aim to take full advantage of the ecosystems, even at the expense of other members. In line with these, the case organization's role in digital business ecosystems can be best labeled as a keystone.

7.2 Why – Digital transformation in digital business ecosystems

In this study, the drivers and motivations for undergoing digital transformation or participating in a digital business ecosystem were perceived concerning value creation attempts. Based on the interviews, it can be stated that neither digital transformation nor digital business ecosystems were seen as objectives, but mainly as tools for enabling or enhancing value creation and new business. According to Adner (2006), no single organization alone can create such value that multiple partners can create together in an ecosystem. Being part of an ecosystem and create value together with other members has become a source for competitive

advantage (Adner & Kapoor, 2010). The empirical findings in this study fully supported these theoretical perspectives.

Further, the empirical findings support Adner's (2017) view on ecosystems represented as partner structures that need to interact to create value propositions. As ecosystems were perceived to add complexity to an already complex digital transformation phenomena, the question of why organizations engage in digital business ecosystems becomes even more relevant. According to Davidson et al. (2015), an individual organization's incentives to participate in ecosystems are simple: the whole is greater than the sum of individual parts. The empirical findings fully support previous theories that digital business ecosystems provide opportunities for new business model innovations, building new competitive assets, finding growth potential and making revenue. According to Vial (2019), the outcomes of digital transformation can be either positive or negative. While the positive expectations towards digital transformation and its outcomes were recognized in the empirical study, the undesirable outputs, like privacy and security issues, were not noticed in the interviews.

The flow model by Verhoef et al. (2019) represented the factors or drivers behind the need for digital transformation as digital technology, digital competition and digital customer behavior. In general, these elements were only partially recognized in the empirical study. The explorations around new digital technologies and resultant changes in the competitive landscape were detected influence the motivational factors behind the ecosystem participation. However, changes in customer behavior was not explicitly pointed out in the discussion. The reason could be that none of the respondents questioned the need or purpose of digital transformation, but it was perceived as something that is happening.

There was a sub-theme of motivational factors that spanned outside individual organization's boundaries and also the ecosystem's boundaries. The objectives related to the digital economy, social responsibility and embracing Nordic values were not directly found in the previous research literature. However, this does not mean that there is not any previous research on the subject. The reason for

empirical data and theory mismatch is most likely related to the literature search scope in this study. There was a precise decision in this study not to expand the scope outside the organization and ecosystem levels to include e.g,. societal or digital economy levels.

7.3 How – Success factors of DT in digital business ecosystem

Out of four ecosystem archetypes by Davidson et al. (2015), the successful ecosystem portrayed in the empirical study resembles most of the Wolf Pack archetype. In the Wolf Pack, the low complexity and tight orchestration promote collaboration and joining the ecosystem is easy. The Wolf Pack archetype was recognizable in model in all the ecosystems described by the case company. The low complexity of a Wolf Pack implicates simple activities by a single member and that no single ecosystem participant has an extreme power over others (Davidson et al., 2015). This principle was very well present in the distribution of power and leadership in the case company's example ecosystems. The case company has also been learning from the experiences. These conclusions were also related to the digital maturity level of the participating organizations.

According to an analysis of collaborative governance including 40 articles (Batony & Svensson, 2019) collaborative governance conceptualization is still unclear and might differ depending on the country context. In the study, leadership and management aspects were also connected with collaborative governance. The most important finding that emerged in the interviews was the need for collaborative governance. It was depicted and understood as the starting point and a crucial factor for successful ecosystem work. Collaborative governance included governance structure, common rulebook, clear roles for ecosystem participants and services. According to the study, a successful ecosystem has a clear and tight collaborative governance model, that sets the rules and models for collaboration. This type of governance provides common rulebooks, advisory boards and ways to balance between parties' interests and ecosystem targets. There needs to be a clear division of responsibilities between parties and owners.

Previous theory on ecosystem governance discusses the different dimensions of governance, but based on the literature review, they were not stated as broadly and clearly as in empirical findings of this study. According to Nachira et al. (2007) the dimensions of ecosystem governance include shared values and vision, communication culture, credibility and trust, lightweight organization and synchronization, licensing and regulation, and technologies. The principles include that there should be no single point of control or dependency upon any single actor, an ecosystem should provide equal opportunities for access to all, as well as scalability and robustness. A shared vision creates a foundation for value creation in an ecosystem. Having a vision for the future and transforming vision into action were recognized as success factors in both theory and empirical data.

According to the theory by Zahra and Nambisan (2012), success in ecosystems requires strategic thinking, which should be different depending on the nature of innovation and the nature of governance. The empirical findings of the success factors did not fit any of the models presented by Zahra & Nambisan (2012) but seem to combine a few elements of all four models. In *The Creative Bazaar Model,* there is a robust dominant company. In the empirical findings, there were many strong organizations in all of the ecosystems. Neither was the governance responsibility completely scattered, like in *The Jam Central Model.* The case company ecosystems mostly represented a combination of *The MOD Station* and *The Orchestra* models. The focus was on utilizing new technologies, but the exception to The Orchestra model was that the ecosystem's keystone player might change during the ecosystem lifecycle.

Letaifa (2014), while studying value creation in ecosystem lifecycle phases, found three success factors that an ecosystem should apply to enable value co-creation. These were ecosystemic mindset, ecosystem management and building a social community. The empirical findings fully support the creation of an ecosystemic mindset. The empirical findings in the vision sub-theme highlighted that in order to create value successfully, there needs to be a jointly created vision that needs to be nurtured and maintained along the ecosystem lifecycle.

8. CONCLUSION

This chapter concludes the findings. First, the research questions are answered. Then, theoretical and practical implications are presented. Finally, limitations regarding this study and suggestions for future research are made.

8.1 Research summary

This qualitative case study's objective was to understand how value is created by digital transformation in a digital business ecosystem context. Further, and examine organizations' motivational factors for joining digital business ecosystems and identify factors contributing to ecosystem work's successful outcomes within multiple partners. This was stated to fill a research gap in understanding how digital transformation unfolds in digital business ecosystems within multiple participants and what aspects should be considered when choosing to participate in such endeavors. Hence, this study would research unexplored aspects of value creation in developing digital business ecosystem specific theories (Senyo et al., 2019).

To fill the research gap, the study explored the main concepts of digital transformation and digital business ecosystem. The objectives were based on the pre-assumption that both the characteristics of digital transformation and digital business ecosystems affect how value is created. The theoretical findings were used to develop an initial theoretical framework. The framework was investigated empirically as a single-case study. The phenomenon was examined from the viewpoint of one case company in the context of digital business ecosystems. The analysis of the empirical data was based on qualitative content analysis and abductive reasoning. Next, the sub-questions and the main research question, presented in table 7, are answered.

Table 7. Research questions

Research sub-questions
1. What are the main elements of digital transformation and how do they contribute to value creation?
2. What are the main elements of digital business ecosystems and how do they contribute to value creation?
3. Why do organizations participate in digital business ecosystems?

Research question
What kind of aspects should be considered when creating value by digital transformation in digital business ecosystems, in order to increase the likelihood of success?

The first sub-question was: *What are the main elements of digital transformation and how do they contribute to value creation?*

Based on previous research literature, digital transformation is a holistic change for an organization and a complex combination of people, processes and technology. As new digital technologies emerge, digital competition grows and customer expectations change, organizations need to respond to pressure to their business and competitive landscapes. Digital innovations fueled by the utilization of digital technologies enable disruption to existing business models and innovation of new digital business models. (Vial, 2019; Hausberg et al., 2019; Nambisan et al., 2019; Verhoef et al., 2019).

Based on the literature review, digital technologies are the key enablers of digital transformation. An organization's ability to exploit digital disruption created by digital technologies is a strategic decision (Matt et a.l, 2015; Verhoef et al., 2019). To enable new value creation paths in terms of digital innovations and new business models, organizations need to rethink strategies, as well as structures, people and capabilities, culture and leadership (Brown & Brown, 2019). A digital mindset is needed to foster the ambition level and creativity needed in exploring new opportunities (Gimpel et al., 2018). Agile, digital culture needs to be strengthened and the capabilities of people built or enhanced to enable digital transformation (Kane, 2019). These can be considered as the essential elements of digital

transformation. Changes in value creation (and capture) become visible in digital innovations in new products and solutions to customers (Matt et al., 2015; Verhoef et al., 2019). A business model's role is vital in unlocking digital technologies' disruptive potential and commercializing innovations (Gimpel et al., 2018). The empirical findings supported well the previous research.

The second sub-question was: *What are the main elements of digital business ecosystems and how do they contribute to value creation?*

In digital business, value creation is not controlled by a single organization. The ability to create value among multiple partners in an ecosystem has become a source for building competitive advantages to organizations (Adner & Kapoor, 2010; Keen & Williams, 2013). According to previous research literature, digital business ecosystems are socio-technical networks with a shared vision and governance and create value in collaboration among ecosystem members. Previous research does not thoroughly list the elements that make ecosystems, but the key elements include at least members, roles, collaboration and competition, governance model, shared logic and mindset. In digital business ecosystems, one key element is the digital platform. Digital platforms can help in sharing resources between ecosystem members, increase knowledge sharing and relationship building that can, in turn, enable value creation. (Jacobides et al., 2018; Nambisan et al., 2019; Senyo et al., 2019).

Previous literature exposed various aspects related to ecosystemic value creation. The elements of the ecosystem affect value creation, but also the ecosystem lifecycle and ecosystem archetype. In different stages of the ecosystem lifecycle (for example, creation, development and dissolution), the value creation and capture focus differ. (Letaifa, 2014). Different archetypes can help understand how value creation is affected by the level of complexity and tight or loose orchestration of the ecosystem (Davidson et al., 2015). Value creation in ecosystems is related to the ecosystem's business model and the value creation happens in the interaction between the ecosystem members, that have a shared logic and governance (Thomas & Autio, 2014).

The empirical findings mainly supported the previous research. To summarize the empirical findings regarding the first and the second sub-questions, it can be stated that digital transformation is a complex and challenging change journey, and a digital business ecosystem as a context further increases the challenges. The empirical results also expanded the previous theory. Although the previous research discussed ecosystem governance (Nachira et al., 2007; Senyo et al., 2019), the empirical results emphasized collaborative governance as one of the key elements in ecosystem work.

The third sub-question was: *Why do organizations participate in digital business ecosystems?*

According to previous research literature, being part of an ecosystem has become one source for building a competitive advantage. Organizations join ecosystems to create such value collaboratively that no single organization can create alone. Thus, the whole is greater than the sum of its parts. (Zahra & Nambisan, 2012; Gimpel et al., 2018; Nambisan et al., 2019). In the empirical findings, digital business ecosystems were perceived as one possible way of executing digital transformation. The study revealed that the main motives for participating in digital business ecosystems were new business model innovations, the potential to grow and create or find new revenue streams and the building of competitive assets for the future. Also, the importance of the topic was recognized as an important motivator, especially for the governmental members.

In the empirical findings, besides the targets related to growth and new business opportunities, there were also targets regarding digital economy in a broader context of a society. For the case company, the possibility to build an inclusive digital economy according to Nordic values was one of the motivational factors. Aside from the financial incentives and building new competitive assets for the future, it is good to recognize the more extensive goals at the society level.

The main research question was: *What kind of aspects should be considered when creating value by digital transformation in digital business ecosystems, in order to increase the likelihood of success?*

This study explored value creation by digital transformation in a digital business ecosystem context. Based on previous research literature, there was a need to understand digital transformation as an organizational change process enabled by the use of digital technologies. (Verhoef et al., 2019; Vial, 2019; Hausberg et al., 2019; Nambisan et al., 2019). Previous research on digital business ecosystems has focused on business or technical issues, conceptualization and artifacts. From a value creation viewpoint, the perspective has primarily been in interactions with customers, not within the ecosystem members and collaboration. (Adner, 2017; Scaringella & Radziwon, 2018). The unexplored value creation aspects needed more research as the digital business ecosystem specific theories are developed (Senyo et al., 2019).

In general, success in ecosystems requires strategic thinking to understand the competition and collaboration aspects (Adner & Kapoor, 2010; Nambisan, 2012; Iansiti & Levien, 2004). Ecosystem lifecycle should be acknowledged considering the key capabilities behind successfully enabling value creation. These are ecosystemic mindset, ecosystem management and building a social community. (Letaifa, 2014). In sum, to increase the likelihood of success when creating value by digital transformation requires a combination of many aspects. Appreciating the importance of shared vision and strategy and maintaining the vision along the ecosystem lifecycle. Selecting the right members for the ecosystem, in terms of organizations and individuals is vital, in balancing the interests and incentives and committing to ecosystem vision. Collaborative governance to structure and guide the collaboration is needed, as it helps to lead the balance between larger ecosystem target and ecosystem members' interests that might be competitive. Practical tools include advisory board and common rulebook. Building and nurturing trust is the glue to tight everything together.

8.2 Theoretical and managerial contribution

8.2.1 Theoretical implications

The elements of digital transformation and digital business ecosystems were explored from a value creation perspective to increase the understanding of them as separate yet interrelated concepts. This study first contributed to academic research by combining a conceptual framework of the elements and key concepts related to digital transformation and digital business ecosystems. The findings supported the previous research (e.g. Matt et al., 2015; Vial, 2019; Verhoef et al., 2019; Hausberg et al., 2019; Nambisan et al., 2019; Van der Borgh et al., 2012; Jacobides et al., 2018; Hinings et al., 2018; Gimpel et al., 2018) that considered the principal elements and characteristics of digital transformation and digital business ecosystems.

This study enhanced the understanding of digital business ecosystems as contexts for value creation by digital transformation. By positioning digital transformation within the concept of the digital business ecosystem, it therefore provided interesting insights of the motivations and success factors. Specifically, this study contributed to the factors of joint business development within ecosystems that emerge in the form of digital innovations and digital business models. Based on the findings of this study, more emphasis should be given to digital transformation processes and the interplay between different actors in a digital ecosystem context.

This study also highlighted the importance of continuous digital innovations and business models. It provided new insight of the organizations' motivational elements towards digital business ecosystems. Significantly, this study contributed to increasing the understanding of the factors behind a successful ecosystem work. The findings of the study suggest that success factors include jointly created vision, the importance of ecosystem members and roles and building trust among members. This study contributed additional evidence by suggesting that collaborative governance setting rules and management mechanisms to ecosystem work would help recognize and avoid the potential pitfalls.

8.2.2 Managerial implications

Based on both the theoretical and empirical findings, there are many aspects and viewpoints to consider. From an individual organization's point of view, the elements of digital transformation and digital business ecosystems need to be recognized to understand different strategic possibilities. Before participating in any ecosystem, an organization should clarify its strategy, evaluate its digital maturity level, and carefully consider the targets, incentives and outcomes. To first understand *what*, then answer the questions *why*, exploring *with whom,* and finally committing to *how.* Value creation elements based on the interview, as presented in table 4, summarized the elements that contribute to value creation in digital transformation and ecosystem initiatives. By familiarizing with various aspects and the theoretical framework, as presented in figure 7, an organization can increase understanding of the elements related to complex concepts. Motivations for ecosystem participation, as summarized in table 5, shed some light on why organizations join digital business ecosystems. An organization can reflect its motivations based on the findings. Identifying the success factors for digital transformation in digital business ecosystems, as presented in table 6, an organization can prepare for ecosystem work. All of the tables and figures mentioned summarized the critical aspects for an organization to scrutinize.

This study provided some practical ideas for organizations dealing with digital transformation and ecosystems. In practice, organizations are at different maturity levels regarding their digital transformation journeys. No general approach to managing value creation by digital transformation in digital business ecosystems can be made. However, but some considerations and general instructions for managers can be drawn based on this study. Encouraged by the findings, organizations should consider strategy, digital maturity, the ways to move from opportunities to concrete actions to get results and what type of leadership and ways of working support that.

An organization should have a clear strategy to guide the digital transformation and investigate the maturity level of digital transformation. In the strategy, digital

business ecosystem should be considered as one possible way for digital transformation to unfold. Based on this study's findings, the decision to participate in a digital business ecosystem should be a carefully chosen path. Suppose a company is seeking to innovate entirely new business models by exploring digital technologies. It could engage itself in such digital business ecosystems focusing on creating value with new digital innovations through the use of shared resources and collaborative ways of working and identifying "unknown-unknows" embedded in exploration with digital technologies. A company could choose a strategy to defend and extend its' current business by utilizing current technologies more efficiently and enhancing the existing business models and processes.

A digital maturity assessment could be beneficial for organizations while considering the strategic approach. The different elements of both digital transformation and digital business ecosystems, as described in this study, are beneficial in understanding the complexity of the phenomena and that change is an essential element. Considering the elements and also the success factors may help organizations evaluate different choices and options and make better decisions regarding their digital transformation journeys and the role that digital business ecosystems can have in those endeavors. The higher the digital maturity level, the higher the capability to balance the ambidexterity model of both keeping and enhancing existing business and exploring disruptive innovations.

With the digital strategy and understanding of the maturity level, the organization can choose the actions. Suppose an organization has decided to participate in a digital business ecosystem that focuses on creating value with disruptive innovations utilizing new digital technologies, this study showed that active contribution is essential. It would be beneficial for organizations to the value creation potential and the elements and complexity embedded in digital transformation. Based on the findings in this study, ecosystem as a context adds complexity, which should be recognized. The ecosystem success factors found in this study highlighted that having a joint vision for the ecosystem is essential. It is important to nurture the joint vision, build collaboration and "ecosystemic mindset", and emphasize trust-building and emergence. This study did not focus on value capture,

but the theoretical findings suggested that the same technology commercialized with different business models ends up with different results. Therefore, when vision becomes a reality in the shape of a business model, organizations should notice and be prepared for possible frictions between the vision and business model of the ecosystem and individual organization's visions and business models. Considering the aspects described here would further advance organizations' success in digital transformation in digital business ecosystems.

8.3 Limitations and suggestions for future research

The main limitations are related to the complex and evolving concepts of digital transformation and digital business ecosystems. Although the aim was to find conceptual clarification before conducting the empirical study, this was done partly at the expense of details. Bringing together the elements of both digital transformation and digital business ecosystems created a multitude of aspects. It was impossible to define which elements would impact value creation based on previous research literature. Hence, all the elements needed to be included. As more focused research scope would have increased the depth of findings, it might have led to missing something important.

One pre-assumption was that the elements and characteristics that make digital business ecosystems unique contexts for value creation might influence how digital transformation unfolds. From a value creation point of view, digital transformation is a process of continual change, triggered by the disruptions caused by digital technologies. Within this limited study, it is impossible to say how to separate value creation by digital transformation and value creation by digital business ecosystems. Both share common elements, digital technologies being one of them. In future research, it might be interesting to investigate one single element more thoroughly. To focus on strategic aspects, leadership and organizational culture and research how these affect success or failure to create and capture value in digital transformation initiatives. A quantitative research approach to investigate digital maturity would also be interesting. For example, does the digital maturity level of an organization affect how digital transformation in digital business ecosystems is

addressed, or what kind of approaches exist in justifying the usage and balance of expenses, effort and outcomes.

Concerning the digital business ecosystem as a context, the limitation was to understand the complexity of relationships, interaction, collaboration, dependencies and competition between the ecosystem members. As this study addressed the success factors, it touched these issues only on the surface. Also, the previous research on the reasons for success or failure is scarce within the academic literature. Further research could select one ecosystem and follow it throughout the lifecycle of planning or setting up, building, managing and end phases. Collaborative governance, as it was defined in the results of this study, would provide an exciting research opportunity for the future, aiming at, for example, drawing the models or frameworks of digital business ecosystem archetypes. Quantitative methodologies could also be utilized to examine all ecosystem members' viewpoints, for instance, during some specific phase of an ecosystem lifecycle.

The qualitative case study approach utilized in this study brought some aspects to consider. In this study, a case study approach was used to explain complex issues, simultaneously guided by theory and empirical observations. The qualitative nature of this study also caused some limitations. As a single case study, the perspective was narrowed down to one case organization and its operations in Finland. The number of interviewees was limited and even though several digital ecosystems were exposed and discussed during the interviews, the results may not apply to completely different settings. Another limitation is that the focus was on value creation, and thus, the value capture in the ecosystem context was not included.

With respect to the identified limitations, the results of this study can also be generalized. This study provided insights of the digital transformation and digital business ecosystem concepts, motivations and success factors. The reasons for organizations to join digital business ecosystems, explored in this study, are valid to any organization. Also, the identified success factors are not related to the case organization only or a specific type of digital business ecosystem. The findings can be applied to similar setups of organizational networks and hence, aim to increase

the potential for successful value creation. The study also provided practical ideas for organizations dealing with digital business ecosystems issues as one possible way to execute digital transformation.

Drawn by the findings of this study and limitations caused by the holistic nature and approach, several suggestions for future research can be identified. As this study focused on value creation, one very natural path to future research is to focus on value capturing aspects. For example, to investigate the intersection of an ecosystem's business model and individual organizations' business models and how they evolve. Another natural path for future research would be to conduct a multiple case-study to compare ecosystems across different geographical locations, e.g. between Nordic countries or more globally. This type of study could utilize both qualitative and quantitative methods.

One main finding in this study was collaborative governance as a success factor. Collaborative governance and other success factors identified in this study could be researched from every ecosystem member's viewpoint. To further research the aspects from different viewpoints, e.g. comparing different ecosystems or following an ecosystem throughout its lifecycle, it would contribute to current understanding of the factors that influence ecosystem success or failure and hence, significantly help future ecosystem endeavors.

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APPENDICES

APPENDIX 1: Interview questions

Introduction – background and GDPR

The purpose of this study is to research how value is created by digital transformation in digital ecosystems. Digital transformation is fundamentally changing the ways organizations create value. Changing business and technology environments bring both opportunities and challenges and collaborating with other organizations in ecosystems is one way to co-innovate. There are different types of ecosystems, but in this study the focus is in digital ecosystems.

Checking that the interviewee understands:

- Privacy statement
- The interview is recorded and transcribed
- The results will not reveal the identity of the informant
- The transcripts of the interviews will be discarded once the thesis has been approved
- The name of the company and cases will be anonymized

Questions: ecosystem -theme

- What is your current role in the organization?
- I would like to have your views and experiences from the ecosystems you have participated. What does the concept of digital ecosystem mean to you?
- In which cases you have been involved and in what role?
- In this/these cases, what is/was the purpose/vision/mission of the ecosystem?
- What is/has been the typical role of your company in these different ecosystems you described?
- In this/these cases, who are/were the other ecosystem members? (companies, public sector organizations, individual)
- Do/did the other ecosystem members have pre-defined roles?

- In your opinion, what are the key motivations for your company to participate in ecosystems? What about the other organizations' motivations?
- In your opinion, do organizations have ecosystem strategies?
- What are the key success factors in ecosystem work? Additional question: Can you elaborate something on ecosystems members and roles, governance, collaboration and competition, shared vision, right mindset or business model?

Questions: digital transformation -theme

- Let's discuss digital transformation. What does it mean to you?
- In your opinion, do organizations have digital transformation strategies? If so, how are they related to ecosystem strategies?
- Why do organizations engage in digital ecosystems to do digital transformation?
- How would you describe the role and importance of [digital technologies, organizational culture, people and leadership] in value creation?
- Do you have experience of a successful digital transformation case done in an ecosystem?
- Do you have experience of an unsuccessful case?
- If you think of a successful case (digital transformation in ecosystem), what are the key things or elements to consider? An what are the key barriers or things to avoid?