

Lotta Saikko

**INVESTIGATING OPPORTUNITIES OF
PLATFORM ECONOMY IN THE
ELECTRICAL NETWORK SERVICE
BUSINESS**

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ABSTRACT

Lotta Saikko: Investigating Opportunities of Platform Economy in the Electrical Network Service Business
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After the electricity market act in 1995, a new electrical network service business was established in which the core business is to provide services. After the initial phase of significant growth, the business has faced severe financial and competitive problems. The operating profits of network contractors are close to zero and sustainable competitive advantage has not been achieved. The competition is restricted by the monopolistic position of distribution network companies and the regulation of the authorities.

This thesis studies the possibilities of platform economy in the electrical network service business. The platform economy has a variety of theoretical and practical benefits but the possibilities have not been explored in this industry. In this thesis, the platform refers to a digital marketplace for selling and buying goods and services. The objective is to find the industry-specific barriers and incentives of different stakeholders to join a platform in order to conclude whether a platform should be developed.

The research was conducted by using the survey strategy. A questionnaire was sent to 45 representatives of the industry, out of which 26 completed answers were gained. The questionnaire inquired the experienced importance of the advantages and disadvantages that platforms can have as well as the interest to join a new platform. The respondents were divided into three groups that were distribution network companies, network contractors, and other companies. The results were analyzed with statistical tests to reveal differences between the three groups. Furthermore, four in-depth interviews were held to explore the reasons behind the results and to discuss the platform further.

The common incentives for all stakeholders include improving the functioning of the electrical network service business, increasing effectiveness, implementing competitive tendering, and creating new kinds of business opportunities. Network contractors believe to benefit from the platform the most and distribution network companies have the least interest to join the platform. However, network contractors need more proximity to customers and the participation of distribution network companies is therefore important. For distribution network companies, an important incentive is that all competitive tendering could be implemented in one platform. Network contractors would want the platform to be an integration platform that consolidates the communication between processes.

The most significant barriers for all stakeholders include the fear of prices or costs increasing, and the risk that one player gains too much power reducing the value for others in the platform. Additionally, network companies might have some statutory barriers regarding the platform and less pressure distribution to change processes. Given the current financial situation and position in the competition, network contractors find all potential disadvantages the most threatening, which needs to be addressed if a platform is developed.

The main contribution of this thesis is that the electrical network service business has a lot of possibilities to gain from building a common platform. However, participation in the platform should not be restricted and the implementation needs to ensure that everyone can equally profit from it. In addition, the platform should be operated by a neutral actor that does not cause distortions in the competition. Getting enough players to join is the key to decrease prices and costs, and collaborative development of the platform reduces the risk that one player gains too much power over others.

Keywords: electrical network service business, platform economy, ecosystem theory, platform ecosystem, network contractor, distribution network company

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TIIVISTELMÄ

Lotta Saikko: Selvitys alustatalouden mahdollisuuksista sähköverkkopalveluliiketoiminnassa
Diplomityö

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Vuoden 1995 sähkömarkkinauudistuksen jälkeen syntyi uusi sähköverkkopalveluliiketoiminta, jonka ydinliiketoiminta on palvelujen tuottaminen. Merkittävän kasvuvaiheen jälkeen liiketoiminta on kuitenkin kohdannut merkittäviä taloudellisia ja kilpailullisia haasteita. Verkstourakoitsijoiden käyttökatteet ovat lähellä nollaa, ja kestävä kilpailuetua ei ole saavutettu. Kilpailua rajoittaa jakeluverkkoyhtiöiden monopoliasema ja viranomaisten hallinnoima regulaatio.

Tässä työssä tutkitaan alustatalouden mahdollisuuksia sähköverkkopalveluliiketoiminnassa. Alustataloudella tiedetään olevan lukuisia teoreettisia ja käytännöllisiä hyötyjä, mutta mahdollisuuksia ei ole aikaisemmin tutkittu tällä toimialalla. Tässä työssä alustalla tarkoitetaan digitaalista markkinapaikkaa palveluiden ja tuotteiden ostamiseen ja myymiseen. Tavoitteena on löytää sidosryhmien eri kannustimet ja esteet lähteä mukaan alustaan, jotta voidaan päätellä, kannattaako alustaa rakentaa.

Tutkimus toteutettiin survey-strategialla. Alan 45 eri toimijalle lähetettiin kysely, johon saatiin 26 vastausta. Kyselyssä tiedusteltiin alustojen erilaisten hyötyjen ja haittojen koettua merkittävyyttä sekä kiinnostusta liittyä uuteen alustaan. Vastajat jaoteltiin kolmeen ryhmään, jotka olivat jakeluverkkoyhtiöt, verkstourakoitsijat ja muut yhtiöt. Ryhmien välisten erojen löytämiseksi tuloksia analysoitiin tilastollisilla testeillä. Lisäksi järjestettiin neljä syvähaastattelua, joissa etsittiin syitä tuloksille ja keskusteltiin alustasta tarkemmin.

Kaikkille sidosryhmille yhteisiä kannustimia ovat palveluliiketoiminnan tehostaminen, tehokkuuden parantaminen, kilpailutuksen toteuttaminen ja uudenlaisten liiketoimintamahdollisuuksien luominen. Verkstourakoitsijat uskovat hyötyvänsä alustasta eniten ja jakeluverkkoyhtiöillä on vähiten kiinnostusta liittyä alustaan. Kuitenkin verkstourakoitsijoiden tarvitsee päästä lähemmäksi asiakkaitaan ja siten jakeluverkkoyhtiöiden osallistuminen on myös erittäin tärkeää. Jakeluverkkoyhtiöille tärkeä kannustin on kilpailutusten toteuttaminen yhden alustan kautta. Verkstourakoitsijat taas haluaisivat alustavan olevan integrointialusta, joka vahvistaa prosessien välistä kommunikaatiota.

Merkittävimmit esteet kaikkien sidosryhmien kannalta ovat pelko kustannusten tai hintojen noususta ja riski, että yksi toimija kasvattaa valtaansa vähentäen toisten saamaa arvoa alustassa. Lisäksi jakeluverkkoyhtiöillä saattaa olla lakisääteisiä esteitä alustaan liittyen ja vähemmän painetta uudistaa prosesseja. Taloudellisten ja kilpailullisten haasteiden vuoksi verkstourakoitsijat pitävät riskejä kaikista merkittävimminä, mikä täytyy ottaa huomioon mahdollista alustaa rakentaessa.

Työn tärkein kontribuutio on se, että sähköverkkopalveluliiketoiminnassa on paljon mahdollisuuksia, joita voidaan saavuttaa rakentamalla yhteinen alusta. Alustaan osallistumista ei tulisi rajoittaa ja toteutuksessa tulee varmistaa, että kaikki voivat hyötyä alustasta. Lisäksi alustan operoijan tulee olla neutraali toimija, joka ei aiheuta kilpailun vääristymistä. Alusta tarvitsee tarpeeksi toimijoita laskeakseen kustannuksia ja hintoja, ja yhteisellä kehittämisellä voidaan pienentää yhden toimijan liiallisen vallan riskiä.

Avainsanat: sähköverkkopalveluliiketoiminta, alustatalous, ekosysteemiteoria, alustaekosysteemi, verkstourakoitsija, jakeluverkkoyhtiö

Tämän julkaisun alkuperäisyys on tarkastettu Turnitin OriginalityCheck –ohjelmalla.

PREFACE

The process of writing a Master of Science thesis consists of five stages: mind-blowing confusion, overwhelming despair, cautious enthusiasm, and major relief. When this frantic emotional journey has proceeded to its final stage, there is only room left for one emotion - gratitude. I am forever grateful for the following people who have given their best to support this research.

I wish to thank Aappo Kontu for providing me this interesting research topic as well as his expertise and enthusiasm throughout the whole process. In addition, Juho Hyysalo and Antti Jukarainen gave me valuable insights from their own fields. My supervisors, Professor Pertti Järventausta and Johanna Kirjavainen contributed to this thesis by sharing their knowledge and support regarding the research process. A special recognition is in place for Professor Saku Mäkinen, whose ability to help people reach their best effort is both exceptional and inspirational. I wish to thank Saku for all his guidance and for introducing me to this whole project.

My family and friends who have been there for me, you are what makes all my ambitions in life worth pursuing. If it weren't for the encouragement (and some benevolent pressurizing) I have gotten from my parents since I started my studies not longer than 17 years ago, I would never have made it this far. And my dear Olli, you should know how lucky I feel because you are by far the best editor-in-chief a girl could have. Moreover, my deepest gratitude belongs to you and Bibi for tolerating me during all the five stages.

"Come on you stranger, you legend, you martyr, and shine" - Pink Floyd

Tampere, 12 May 2021

Lotta Saikko

TABLE OF CONTENTS

1.INTRODUCTION.....	1
1.1 Background.....	1
1.2 Research question and objectives.....	2
1.3 Structure of the thesis	3
2.THEORETICAL BACKGROUND.....	4
2.1 The platform economy	4
2.1.1 Definitions.....	4
2.1.2 Platform types and characteristics	5
2.1.3 Implications to business.....	9
2.1.4 Environmental and societal aspects.....	12
2.1.5 Impacts on the labor market.....	13
2.1.6 Prospects.....	15
2.2 The ecosystem theory.....	16
2.2.1 Definitions and characteristics.....	17
2.2.2 The development of ecosystems.....	19
2.2.3 Value creation in ecosystems.....	21
2.2.4 Ecosystem roles.....	24
2.2.5 Strategic implications	27
2.2.6 Implications and prospects.....	32
2.3 Platform ecosystems.....	34
3.METHODOLOGY.....	37
3.1 The network service business: industry description.....	37
3.2 Methodological premises.....	41
3.3 Data collection	44
3.4 Methods of analysis	46
4.RESULTS	48
4.1 Data description	48
4.1.1 Respondents.....	48
4.1.2 First part of the questionnaire.....	50
4.1.3 Second part of the questionnaire	54
4.1.4 Third part of the questionnaire	58
4.2 Results of the quantitative analysis	60
5.DISCUSSION.....	73
5.1 The advantages of platforms.....	73
5.2 The disadvantages of platforms	78
5.3 Attitudes towards platforms	83
6.CONCLUSIONS.....	91
6.1 Contributions.....	91
6.2 Limitations.....	95
6.3 Future research.....	98

REFERENCES..... 100

APPENDIX A: QUESTIONNAIRE

LIST OF FIGURES

<i>Figure 1. Different types of work-related platforms (adapted from Drahokoupil and Fabo 2016)</i>	6
<i>Figure 2. The sharing economy and its related types (adapted from Frenken et al. 2015)</i>	7
<i>Figure 3. The roles of a platform (adapted from Van Alstyne et al. 2016)</i>	8
<i>Figure 4. The interrelation of different-level platforms</i>	8
<i>Figure 5. A summary of the evolutionary stages in a business ecosystem (adapted from Moore 1993)</i>	19
<i>Figure 6. The schema of an ecosystem (adapted from Adner and Kapoor 2010)</i>	22
<i>Figure 7. Ecosystem challenges by their location in the value chain (adapted from Adner and Kapoor 2010)</i>	23
<i>Figure 8. Roles and activities during different stages of ecosystem birth (adapted from Dedehayir et al. 2018)</i>	27
<i>Figure 9. The formulation of an ecosystem strategy (adapted from Adner 2006)</i>	31
<i>Figure 10. The turnkey delivery and inhouse value chain models (adapted from VALOR Partners 2021)</i>	40
<i>Figure 11. The distributed value chain model (adapted from VALOR Partners 2021)</i>	40
<i>Figure 12. The methodological choices of this research (adapted from Saunders et al. 2016, p. 124)</i>	41
<i>Figure 13. Mixed method research designs (adapted from Saunders et al. 2016, p. 170)</i>	43
<i>Figure 14. Industries of the respondent companies</i>	48
<i>Figure 15. The respondents' role in their company</i>	49
<i>Figure 16. Number of employees in the companies</i>	49
<i>Figure 17. Turnover of the companies (MEUR)</i>	50
<i>Figure 18. The averages of all questions in part 1</i>	50
<i>Figure 19. The averages of the first part by question and industry group</i>	52
<i>Figure 20. The averages of all questions in part 2</i>	54
<i>Figure 21. The averages of the second part by question and industry group</i>	56
<i>Figure 22. The answers of the third part by question and category</i>	59
<i>Figure 23. Box plots of question 6</i>	62
<i>Figure 24. Box plots of question 8</i>	63
<i>Figure 25. Box plots of question 11</i>	63
<i>Figure 26. Box plots of question 12</i>	64
<i>Figure 27. Box plots of question 14</i>	64
<i>Figure 28. Box plots of question 15</i>	65
<i>Figure 29. Box plots of question 17</i>	66
<i>Figure 30. Box plots of question 18</i>	66
<i>Figure 31. Box plots of question 19</i>	67
<i>Figure 32. Box plots of question 20</i>	67
<i>Figure 33. Box plots of question 22</i>	68
<i>Figure 34. Box plots of question 23</i>	68
<i>Figure 35. Box plots of question 24</i>	69
<i>Figure 36. Box plots of question 29</i>	70
<i>Figure 37. The box plots of part two averages</i>	70
<i>Figure 38. Answers to the research question</i>	93

LIST OF TABLES

<i>Table 1. Standard deviations of part one.....</i>	<i>53</i>
<i>Table 2. Standard deviations of part two.</i>	<i>57</i>
<i>Table 3. A description of the statistical analyses conducted.....</i>	<i>60</i>
<i>Table 4. p values of the Kruskal–Wallis tests.</i>	<i>61</i>
<i>Table 5. A summary of the quantitative analysis results.....</i>	<i>72</i>

LIST OF SYMBOLS AND ABBREVIATIONS

API	Application programming interface
App	Mobile phone application
B2B	Business to business
C2C	Consumer to consumer
CEO	Chief executive officer
EU	European Union
IoT	Internet of things
IP	Intellectual property
IPR	Intellectual property rights
IT	Information technology
MEUR	Million euros
PC	Personal computer
SME	Small and medium-sized enterprises

1. INTRODUCTION

1.1 Background

The electricity market in Finland has undergone significant changes during the last decades. In 1995, the electricity market act opened the market for competition and separated distribution network companies from other electricity business, creating a new electrical network service business (Kontu 2019). Since then, the electricity distribution business has been a governed natural monopoly in which the Energy Authority promotes and regulates the operation of the market (Laapotti 2015). The financial governance aims to maintain reasonable transmission prices of electricity and encourages companies to improve the electrical network and to operate cost-efficiently (Aminoff *et al.* 2009). The main drivers for the business development in this industry are the laws and regulations by the government and the EU (Kontu 2019).

On account of these changes, however, the industry has faced several challenges and new issues have emerged. Possibly the most acute problem is the functioning of the electrical network service business. According to Kontu (2019), before the opening of competition, energy company businesses handled production, distribution, operation, maintenance, and construction internally. This has no longer been efficient because of the different drivers behind businesses. Consequently, a new service business was created in which the core business is providing services. The service business grew rapidly at first, but now the service companies have faced severe profitability challenges. The operating profits remain close to zero and sustainable competitive advantage has not been achieved. Differentiation between companies hardly exists and very little resources are allocated to service development and innovation. (Kontu 2019) Already, there have been several service company reorganizations. If the situation deteriorates, the survival of these companies may be threatened, which in turn has severe consequences for the whole industry.

The participants in the electrical network service business value chain have different interests with each other, which also causes issues. Since the new amendment of law obliges distribution companies to make heavy investments on weather-proof networks, the following changes in the regulation model increased transmission prices significantly

(Koistinen 2020). Recently, the problems in regulation models and the public's discontent with transmission prices have been widely featured in the media and the government (Turunen 2020). Since the industry has very traditional practices and is of major significance to society, finding solutions to these problems is an interesting and relevant topic. This thesis addresses the problems by studying new possibilities for arranging competition in a sustainable and collaborative way that is beneficial for all parties. The chosen approach is to assess the platform economy and the ecosystem theory models and their functionality for this particular setting. The platform economy has a myriad of theoretical and practical benefits, especially considering the organization of complex ecosystems (Van Alstyne *et al.* 2016; Kenney and Zysman 2016; Jacobides *et al.* 2018; Frenken and Schor 2017), but the possibilities of it have not been observed in this industry earlier (Kontu 2019). This thesis aims to answer this research gap by studying the industry-specific opportunities this kind of digital marketplace for selling, buying, sharing, and collaborating might have. Therefore, the main interest and motivation for the study is to find the possibilities that a platform business model could offer this industry.

This thesis is part of a larger project that aims to improve the profitability of the network service value business by studying new business models and solutions for implementing the services. The thesis is also a follow-up research to the doctoral thesis "Sustainable Competitive Advantage in the Industrial Service Business" (Kontu 2019). Its main findings were that there are severe profitability, competence, and differentiation problems as well as low investments in innovation and development in the service companies. On the other hand, distribution network companies have been very satisfied with their experiments of outsourcing the services. The research concluded that new business approaches are required for the service companies to recover. (Kontu 2019) These findings are the basis for this thesis and provide the motivation to continue the comprehensive development of the electrical network service business towards a sustainable and productive state of affairs.

1.2 Research question and objectives

As mentioned above, this research studies the possibilities of platforms in the electrical network service business (from now on network service business). In this thesis, **the network service business refers to the whole value chain and its participants**. The participants include distribution network companies (from now on network companies), network contractors, excavation companies, equipment suppliers, wholesale businesses, IT companies, experts, end customers, and the regulator. The objective of

this research is to conclude whether a platform should be developed and which stakeholders would participate in it. More accurately, the aim is to recognize and analyze the stakeholders' own interests and obstacles regarding platforms. By finding the players who believe to benefit the most from a platform, the form of the potential platform and its participants can be concluded. The research question follows directly from the research objective:

RQ1: What industry-specific barriers and incentives are there for different value chain stakeholders to join a platform?

Since the stakeholders have very different interests and functions in the value chain, it is essential to know how each believes to profit from the platform in order to reach the objective. On the other hand, platforms can cause disadvantages to the participants and radically transform competition. The theoretical characteristics of platform-based ecosystems are first discovered from literature and are applied to this industry. Since one characteristic can be negative, positive, or neutral, depending on the stakeholder, the essential characteristics are evaluated by the stakeholders. Another important aspect of the research question is that platforms have different effects depending on the context that they are applied to. Therefore, the specifics of this industry need to be considered in assessing the potential platform.

1.3 Structure of the thesis

This thesis consists of six chapters in total and is structured as follows. The first chapter introduces the background and motivation for the thesis, which is followed by research questions and objectives. The second chapter builds a literature overview on the platform economy and the ecosystem theory and ends with a synthesis of these concepts. The research and theoretical backgrounds set the methodological premises which are introduced in chapter three. The methodology part includes the industry description of the network service business as well as the selection of research methods, data collection, and data analysis.

The fourth chapter introduces the results gained by quantitative analysis methods. The possible reasons for the findings are discussed in chapter five. In the sixth and final chapter, conclusions are made on the basis of research findings. These include the main contributions of the research and the assessment of reaching the research objectives. In addition, the limitations of the research are considered and finally, the need and interest for further research on the subject are evaluated.

2. THEORETICAL BACKGROUND

In this chapter, the literature overviews of platform economy and the ecosystem theory are constructed. In the first subchapter, different attributes of the platform economy are specified and analyzed. The second subchapter considers ecosystems and their characteristics. The final part of this chapter brings together a synthesis of these concepts, i.e., platform ecosystems.

2.1 The platform economy

In recent years, the platform economy has attracted broad discussion and debate among academics as well as the general public. The concept includes a variety of definitions, alternative theories, and practical examples among industries. Its effects on business are undoubtedly significant and disruptive in nature (Kenney and Zysman 2016). In addition, the platform economy has several implications from economic, environmental, and societal points of view, all of which are addressed in the following subchapters.

2.1.1 Definitions

The platform economy has been referred to with phrases such as the gig economy, the 1099 economy (Kenney and Zysman 2016), the on-demand economy, the collaborative economy (Drahokoupil and Fabo 2016), and the sharing economy (Zervas *et al.* 2017). In the literature, the sharing economy is perhaps the most used equivalent to the platform economy, but nevertheless comes with its limitations. As Frenken and Schor (2017) point out, the definition of “sharing” lacks reference to a new phenomenon and monetary remuneration, which platforms usually include. In addition, platforms are a wider phenomenon than the mere sharing economy and the sharing economy does not only contain platforms (Drahokoupil and Fabo 2016). However, the label is significant since it guides how the concept is studied, used, and regulated (Kenney and Zysman 2016). Drahokoupil and Fabo (2016) as well as Kenney and Zysman (2016) prefer the term platform economy as it is neutral and possibly the most describable for this phenomenon. For these reasons, the term platform economy is chosen to be used in this thesis.

According to the definition by Van Alstyne *et al.* (2016), **platform enables and offers a surface to high-value exchanges that happen between producers and consumers.** They create value and competitive advantage through two main assets, information and interactions. Connecting consumers and producers is evidently not a new phenomenon;

for example, merchants and consumers have for long been connected through shopping centers. The new aspect to the platform economy is utilizing information technology to build digital platforms that are both easier and more cost-effective to construct. Analyzing, capturing, and transferring enormous amounts of data adds value to all participants and makes transactions yet more frictionless which in turn reinforces the network effects. (Van Alstyne *et al.* 2016)

Alternatively, Kenney and Zysman (2016) define digital platforms as “multisided digital frameworks that shape the terms on which participants interact with one another.” The origin is in the IT-based transformation of services, where algorithms were built to numerous activities. The creation of markets and ecosystems based on platforms was enabled by the relocation of the algorithms to the cloud where they are easier to access, to the point where the cloud and platforms in fact upend and rearrange globalization. A wider definition is that platforms enable social and economic interactions online, usually with apps. However, it is important to note that platforms lack a concise definition and a clear categorization regarding what is in and what is out of the phenomenon. (Kenney and Zysman 2016)

2.1.2 Platform types and characteristics

The platform types are difficult to define exhaustively, in addition to which they tend to overlap with each other. Kenney and Zysman (2016) have identified marketplace platforms, like Amazon and eBay, and platforms offering social media and search, such as Google and Facebook. The latter ones also represent platforms that contain other platforms. Drahokoupil and Fabo (2016) make the distinction between platforms that grant access to property and platforms offering services or connection to self-employed individuals. These also overlap with each other since, for example, renting property through Airbnb can become the primary source of income and thus affect the labor market. (Drahokoupil and Fabo 2016) Considering digital platforms, Kenney and Zysman (2016) recognize five distinct types. The first is platforms for platforms, such as Android or even the Internet itself. The second type is platforms that help creating other platforms and marketplaces by granting access to online digital tools. For example, GitHub is a central open source for software programs. The third category is work platforms, which either reform independent work like LinkedIn does for headhunters or crowdsource specific tasks for companies like the Amazon Mechanical Turk. The fourth type is retail platforms like Amazon and eBay. Airbnb and Uber are classified as service-providing platforms, which is also the last type of platform in this categorization. (Kenney and Zysman 2016)

Farrell and Greig (2016) divide online digital platforms into two sub-groups: labor platforms and capital platforms. Labor platforms, such as Uber, connect customers and freelance workers who complete certain tasks. Capital platforms connect customers and leasers or sellers of offerings. (Farrell and Greig 2016) The former are estimated to be five times larger than the latter measured by the number of service providers (Manyika *et al.* 2016), although the individual share of total income earned through the platform is much lower for the labor platform than the capital platform (Farrell and Greig 2016). Another distinction is between platforms operating in local and global (labor) markets. For example, Airbnb connects demand and supply with physical services that locate near each other, while CoContest can connect participants in different continents with virtual services. As Figure 1 illustrates, these categories include both high- and low/medium-skilled services. (De Groen *et al.* 2016; Drahokoupil and Fabo 2016)

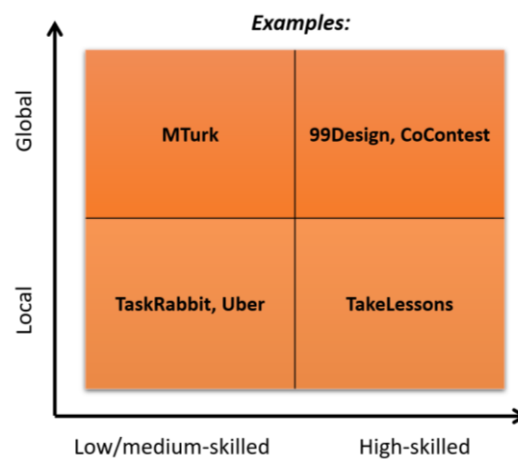


Figure 1. Different types of work-related platforms (adapted from Drahokoupil and Fabo 2016).

Despite its previously mentioned definitional issues, the sharing economy can herein be considered a sub-category of the platform economy. Frenken and Schor (2017) define the sharing economy as “consumers granting each other temporary access to under-utilized physical assets (‘idle capacity’), possibly for money.” Since most goods, like houses and cars, are not used continuously, it provides the owner the opportunity to lend or rent them to others. (Frenken and Schor 2017) These are also referred to as “shareable goods” (Benkler 2004). As such, this definition of the sharing economy excludes the on-demand use of personal goods. For example, ride hailing or buying a property to rent it are not part of the sharing economy but ride sharing or renting your home during a vacation are. While this definition includes the word sharing, which is not a new phenomenon, it does contain some new features such as lower transaction costs or risks and sharing over the usual social circle. (Frenken and Schor 2017)

Figure 2 illustrates the sharing economy with its three characteristics: consumer-to-consumer (C2C) interaction, provisional access, and physical goods. The picture also includes three terms that are closely related to the sharing economy but lack one of these characteristics. The second-hand economy refers to granting other consumers permanent access to goods with or without financial remuneration, thus excluding temporary access. In the absence of C2C action lies the product-service economy where consumers rent goods, such as cars, from companies. If services instead of physical goods are shared, the term used here is the on-demand economy. (Frenken and Schor 2017)

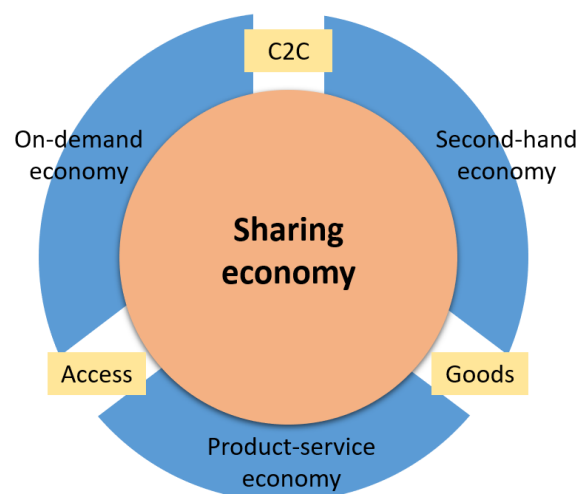


Figure 2. The sharing economy and its related types (adapted from Frenken et al. 2015).

Van Alstyne *et al.* (2016) have identified four different roles that platforms contain (Figure 3). Owners have control over the platform, its intellectual property and governance, for example, Google is the owner of the Android platform. Providers, such as mobile phones are for Android, serve as the interfaces for the platform. As usual, the role of producers is to create the offerings for the platforms which the consumers buy. (Van Alstyne *et al.* 2016)

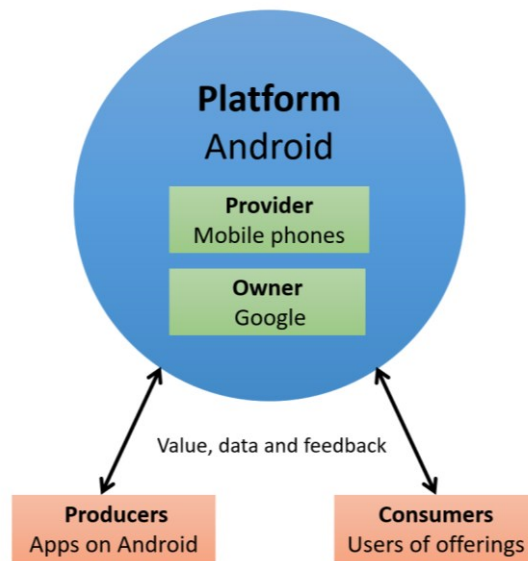


Figure 3. The roles of a platform (adapted from Van Alstyne et al. 2016).

If we consider an app that is available on Google Play store, for example, Uber, the consumers are those who order the rides, producers are the drivers, and owner is the one who owns the Uber company. After this the above-mentioned roles look somewhat different. It can be stated that instead of mobile phones, the provider of Uber is another platform, which in this case is Android. In this regard, platforms can be identified to locate in different hierarchical levels; some platforms, such as Windows, Android, and Amazon Web Services, are also providers for other platforms. (Kenney and Zysman 2016). Other platforms are then built upon or within these, for instance, Airbnb, Uber, and Foodora. This illustrates one interrelation of platforms, as is shown in Figure 4.

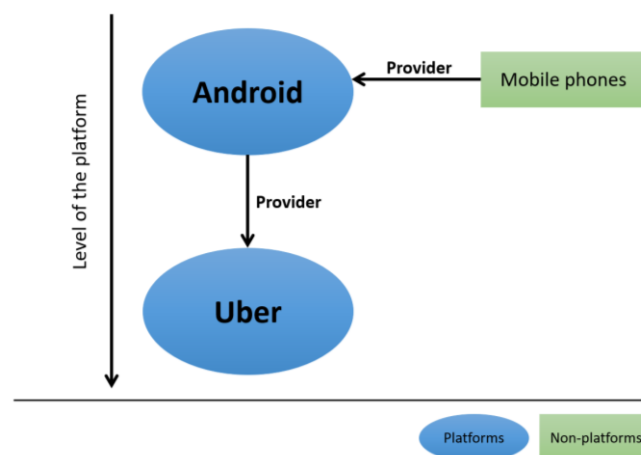


Figure 4. The interrelation of different-level platforms.

Drahokoupil and Fabo (2016) recognize three main characteristics of platforms: they offer algorithms to connect labor providers and their users effectively, technology lowers the transaction costs which enables micro-transactions, and they reduce transactional

risks, such as cheating. Gawer and Cusumano (2008) have argued that an offering needs to fulfill specific characteristics to become a platform. The first is solving a central technological issue for an industry or providing at least one significant function. The second is that it is easy to expand, connect, build upon, and creates new end-uses. (Gawer and Cusumano 2008)

2.1.3 Implications to business

Platforms have many strategical implications to organizations. While the main driver of the industrial economy is the economies of scale on the supply side, platforms are powered by the demand-side economies of scale, i.e., network effects. Companies achieving a larger number of participants have more data and opportunities to create better matches between producers and consumers. Thus, they also have more value to offer through a transaction, which in turn attracts more users. This loop has created many platform monopolies, such as Alibaba in e-commerce, Google in mobile search, and Facebook in social platforms. Therefore, external forces can be an asset in the platform economy, contrary to the pipeline business where they threaten to deprive the value of a business. In addition, the consumers and providers can create value by switching roles, for example, when an Uber customer becomes an Uber driver. Providers can also have a depletive effect, for example, if they leave or start competing against the platform. (Van Alstyne *et al.* 2016)

Gawer and Cusumano (2008) divide platform strategies into two groups: coring and tipping. The challenges in these strategies are both technological (architecture, interfaces, and intellectual property) and business-related (key complements and luring complementary innovations from third parties). In coring, i.e., creating a new platform, it is essential to provide a solution to a business or system problem, get support from complementors, maintain complements dependent on the platform, and keep high platform switching costs. A successful example of coring is Google with search engine platforms. Tipping, which refers to winning platform competitions, is all about attracting users with unique features and pricing, coalitions with competitors, and best incentives for complementors. One well-known case is Linux tipping by the coalition in the market of Web server operating systems. The important thing considering strategy, however, is to decide between product and platform strategies early on, since both include very different decisions across the organization. (Gawer and Cusumano 2008)

Inside a business, the focus shifts from sales numbers to interactions, which can even be small and non-monetary exchanges, as the network effects create the competitive

advantage. Often the key to success is creating value with one interaction at first and then expanding to adjacent interactions with greater volume and value. Governance is experiencing another major change due to platforms. It is important to consider whom to give access to the platforms and how to control the activity of participants in it. The central choices concern the rules and architecture: open governance refers to allowing others than the owner to design the rules and reward sharing, and open architecture means granting access to platform resources, for instance, app developing tools. Often, they are kept rather closed at first and slowly opened as new types of value and interactions emerge. However, opening the rules or architecture must lead to sharing the rewards with participants as well. Sometimes allowing “permissionless innovation” on platforms can result in high-value, successful offerings, like Angry Birds on iOS. On the other hand, it is important to manage the openness since uncontrolled access can lead to misbehavior or low-quality content in which case participants abandon the platform. The final major change is the new metrics that managers need to focus on: the interaction failures that diminish network effects (e.g., no available cars on a ride-hailing app), engagement (e.g., the number of visits and sharing of content on a site), negative network effects (e.g., misbehavior) and the match quality between users and producers. (Van Alstyne *et al.* 2016)

Another central change to businesses is that the value-creating internal functions and processes are moving outside the organization’s boundary lines and direct control. Marketing is not merely about communicating outbound anymore since consumers share messages and reviews on platforms or social media as well. Information technology traditionally supported internal systems and now expands to the external networks. In order to reinforce internal talent, human resources function increasingly shares and leverages the knowledge that networks have. The finance function has usually been recorded on internal accounts, but platforms have created the tendency to make some transaction records public and open the books to share information about the ledgers and to create more trust. Considering operations and logistics, the traditional just-in-time inventory has been challenged since the assets are more often owned by the network participants. (Van Alstyne *et al.* 2016)

The changes that platforms cause are not merely internal: one noteworthy aspect is the way platforms affect competition across industries. Van Alstyne *et al.* (2016) have examined the implications of platforms by comparing them to traditional businesses which they call pipelines. Pipeline refers to a business built on the value-chain model which contains a set of linear, value-creating activities starting from inputs and ending

with a finished product. One well-known example of this is the Apple mobile phone business. Businesses based on the pipeline model have predominated industries for decades. Ultimately, three different ways in which platforms change the competition of businesses can be recognized. First, the nature of the valuable resources that ultimately bring competitive advantage to a business shifts from inimitable assets, like human capital, towards capturing a community of producers and consumers that own the resources required. Second, the importance of internal optimization of processes becomes subsidiary next to creating value through external interactions with consumers and producers, persuading participants and governing the ecosystem effectively. Third, focusing on singular customer values in the end of the pipeline business shifts towards maximizing the whole value created by an ecosystem with a reciprocal process in which feedback holds a central role. All in all, the platform economy indisputably makes competition more complex and dynamic. (Van Alstyne *et al.* 2016)

Many successful platforms conquer new business areas abruptly and aggressively. For example, Google expanded the original web search business to countless new terrains, like home automation and voice recognition. For the traditional incumbents, this means that threats can come from seemingly unrelated industries and the competitive landscape can shift rapidly which makes it even more difficult to detect on time. There are three conventional ways that the competitive platform threats emerge. One is a successful platform entering a new industry with the help of network effects that utilizes its customer relationships, for instance, Google entering the IoT business. Another is targeting an overlapping customer base by creating a new offering, for instance, Uber challenging the taxi business. Finally, competition may also emerge from companies that are collecting similar data but control different parts of it. This has come true in the health care industry, where the traditional providers, retail pharmacies and producers of wearables are creating own platforms with their existing data and presumably competing to broaden it in the future. (Van Alstyne *et al.* 2016) Another competition challenge is that in many cases, only one or a few companies succeed, and the owner captures a vast majority of the value created by all users. The monopolies and oligopolies in turn might hamper following competition and entrepreneurial efforts. (Kenney and Zysman 2016)

There are a growing number of cases where new platform businesses, like Airbnb and Alibaba, have suddenly turned industries around with their success. For example, in 2016, Uber was the fastest growing start-up company of all time and its market value of more than \$60 billion has been reached in merely five years (Van Alstyne *et al.* 2016). Zervas *et al.* (2017) argue that the growth of platforms is enabled by both flexible and

scalable supply as well as technology innovations that create the foundation and keep the transaction overheads low. For example, Airbnb has impacted the hotel revenues around 8–10 % and the competition resulted in more aggressive hotel room pricing in Austin, Texas. Instead of creating an incremental change, the case illustrates how platforms are changing consumption patterns in general. In addition, the impacts on hotel industries were clearly uneven, affecting non-business travel and lower-priced hotels the most. (Zervas *et al.* 2017) Correspondingly, the low effort of renting or sharing a ride may decrease the demand for car production. One strategic solution to these situations is partnering up with the platforms (Kenney and Zysman 2016). Nevertheless, platforms can severely threaten the profitability and competitiveness of traditional businesses.

All in all, platforms have radical and distinct business impacts, especially on creating value and competing for profits (Kenney and Zysman 2016). In addition, the skills that internal resource managing requires are very different from that of these external ecosystems. The failure to transfer a business, including its management style, to this new approach is also the reason behind many business collapses, such as Myspace. Therefore, the challenge is also remarkable from a managerial point of view. In sum, the choice is either to learn the new rules of strategy or to start preparing the exit. (Van Alstyne *et al.* 2016)

2.1.4 Environmental and societal aspects

There are also several impacts on society and the environment emerging from the platform economy. Considering the environment, it can be argued that platforms will loosen the dependence of ownership since they enable easier renting and lending of goods. This has been hypothesized to decrease the amount of goods produced or facilities constructed, thus having sustainability benefits. In addition, platforms usually advertise themselves as eco-friendly and carbon-footprint reducing. (Frenken and Schor 2017) However, it has been indicated that since platforms are significantly decreasing the transaction costs, such as the costs of searching and arranging a contact, the number of transactions has risen by millions (Frenken and Schor 2017; Benkler 2004). It is also important to remember that participating in platforms includes the use of the Internet and consumer devices, which causes emissions. According to Frenken and Schor (2017), there is no solid evidence as to yet that platforms reduce carbon dioxide emissions. In addition, platform activities can cause a rebound effect, for instance, when the earnings from selling goods is used to buy new ones into the household. Since many platforms also create new markets and purchasing power, the relation between platforms and carbon emissions needs more accurate studies. (Frenken and Schor 2017)

Another aspect is the effects that platforms have on a social level. One major advantage to consumers is that because of platforms, sharing can be extended beyond the common social circle. This can lead to new social contacts between different socio-demographic groups since renters tend to be wealthier and older than borrowers. (Frenken and Schor 2017) Böcker and Meelen (2017) found that in home sharing, social motivation is often present in addition to an economic one. Some find socializing and making friends with their guests the most important motivation and would continue even without receiving money. However, there are indications that the social benefits might decline as the platforms grow in popularity and the number of ratings increase. (Frenken and Schor 2017) The downsides are that the sharing economy engages people in multiple exclusionary behaviors, including racial discrimination (Edelman *et al.* 2017). If home sharing and renting grows in popularity, it might affect residents negatively as the rents would go up in certain areas. Home sharing can also cause disturbance or trouble for the neighborhood residents, which has led to tighter regulations in some areas. (Frenken and Schor 2017)

From an economical point of view, platforms cause disruption by rearranging work and the barriers to entry, changing value creation and relocating economic power (Kenney and Zysman 2017). Frenken and Schor (2017) note that platforms lower prices and increase variety, which should benefit all parties. However, they question whether the wealth created by the platforms is distributed to users, including both providers and consumers, since they also tend to create natural monopolies and possibilities to charge customers with high margins. (Frenken and Schor 2017)

2.1.5 Impacts on the labor market

Another important aspect to consider is the impact that platforms have on employment. Already more than four percent of adults have incomes from platforms in the United States. Therefore, they can change the labor market significantly and create more flexible opportunities to earn income. In addition, platforms are a vital contributor to the growing importance of independent work in general. (Farrell and Greig 2016)

Labor platforms are a fast-growing business since their value in Europe has been estimated \$17 billion and almost every fifth EU citizen has utilized these platforms for at least one time (European Commission 2016). In both the EU and the United States, platforms are more widely used by younger and more educated people and in more urban areas (Drahokoupil and Fabo 2016). Most workers also belong to a low-income group and use the platform infrequently as a secondary source of income (Drahokoupil

and Fabo 2016; Farrell and Greig 2016). However, almost every third participant offers their services through a platform only once (European Commission 2016). More than half of the workers leave the platform within a year and one of six participants is new every month. The leavers are most likely to be younger, to have a higher income rate, and to be more stably employed. The participants who stay active after the first year are also more dependent on the income. In addition, unemployed workers enter platforms and stay after a year more often than the employed, which suggests that the labor platforms might be an accessible and flexible option for those who are in need of a job the most. This also indicates that the labor platforms attract people who are already the most economically vulnerable. (Farrell and Greig 2016) The customers of the labor platforms, on the other hand, are most often companies rather than individuals (Drahokoupil and Fabo 2016).

The value created by the labor platforms is the easier access to workers and services with lower transaction costs. In addition, the platform economy can expand to areas that have previously not been a part of the labor markets, for example, pet-sitting. The most important transformation that the labor platforms can cause, however, is reorganizing activities that have previously required an employment relationship or different forms of self-employment. In addition, these platforms enable utilizing services remotely, removing work further from the local markets. Lastly, barriers to entry are lower, pressuring salaries and working conditions to improve. (Drahokoupil and Fabo 2016)

The high turnover and peak in growth are threatening labor platforms, which indicates that they must attract new participants and engage the existing ones at a higher level. Another challenge is the labor market and its growth, since participants with outside employment have a lower engagement in platforms. Platform companies have also relied on salary cuts for profitability which might affect the high turnover of the workers and lower their appeal next to other options. Another reason for these problems could be that platforms lack the traditional benefits of a job like security and promotion opportunities. The platforms could improve employee attachment by creating workgroup and organizational commitment that traditional jobs have. (Farrell and Greig 2016) From the workers' point of view, the implications of being constantly available and the uncertainty attached to working through a platform are also important to consider (OSHA 2015). Some platforms, like Uber, have even been criticized for misleading employment standards and disregarding employee rights, also referred to as bogus self-employment (Jorens 2008; Drahokoupil and Fabo 2016). In addition, Frenken and Schor (2017) point out that platforms attract highly educated people to do tasks previously handled by

workers with a lower educational background, which drives economic inequality between groups. All in all, the platform economy may cause the employment becoming more and more precarious (Drahokoupil and Fabo 2016).

Another important notion is that in addition to labor platforms, platform companies employ people and thus create a new kind of work. These usually come with high wages but also high risks, as most platforms do not succeed. The same high risks apply to the so-called consignment workers, who provide (virtual) goods for platforms like YouTube or app stores. The division between risks and rewards for users is another important aspect that deserves more attention and research. (Kenney and Zysman 2016)

2.1.6 Prospects

As noted above, there are several research gaps concerning the sharing economy. However, many platforms restrict their user data from researchers, which is a major challenge that also hampers regulating the platforms (Frenken and Schor 2017). While there are numerous responses and new alternatives are built, the future of platforms remains unclear (Frenken and Schor 2017) and for many questions and discussions, there are no definitive answers (Kenney and Zysman 2016).

Regulation will have a major impact on the future of platforms (Drahokoupil and Fabo 2016) and is especially important due to the negative impacts, assumed tax avoidance, and unfair competition between traditional and platform businesses (Frenken and Schor 2017). In the sharing economy, one option is to put caps on the number of days that private property can be rented. Another intriguing possibility is to build a socialized sharing sector where users own and control their platforms, and possibly even grant access to the user data. (Frenken and Schor 2017)

Many regulatory issues concern the labor markets. There is an ongoing debate on whether platform work should be regarded as employment or not. The European Commission has stated that platform work is classified as an employment relationship regardless of its anomalies. (Drahokoupil and Fabo 2016) For jobs that locate outside labor platforms, like producing apps or YouTube videos, the determination of the employment category becomes even more complex. In addition, they often come with high risk and do not include any monetary return. (Kenney and Zysman 2016) Another open question considering regulations is the need to protect platform workers' particularly vulnerable position with additional measures, such as allowing breaks from the work without sanctions. In addition, the categories of regulations could be moderated

to include platform workers, although in some European countries the law does specify conditions for occasional work. The future will show how new and traditional industries, trade unions, and political authorities address the issues regarding labor platforms. (Drahokoupil and Fabo 2016) As Farrell and Greig (2016) notice, the current flexibility of labor platforms might not be sufficient to assure their growth, and measures to make it more sustainable and supportive are essential. One option that policy makers are considering is the possibility to automate enrollment processes, as the high turnover creates plenty of administrative burden. (Farrell and Greig 2016)

One major fear the platform economy causes is that it will create a precariat or a clear social underclass. Therefore, regulations play a significant role for society, although the rules for competition and labor markets are difficult to legislate and control. Workers will support this transformation only when they believe it leads to mutual benefits. If, however, workers see exploitation coming from the change, resistance can be anticipated. It is argued that the so far unknown outcome of labor platforms determines whether the future of the platform economy is negative or positive altogether. The major ethical, social, political, and business decisions will determine the future of platforms and nature of this change. They are guided by the beliefs considering how markets should be constructed and what is valued in society. Ultimately, the future is dictated by the way that platform technologies are used and deployed. (Kenney and Zysman 2016)

2.2 The ecosystem theory

First introduced by Moore in 1993, the ecosystem theory has grown rapidly over the last two decades (Adner 2016). Its preceding discussion among networks, referred to as strategic alliances or virtual organizations, did not provide businesses any practical assistance for understanding change or making strategic choices in the innovating environment. The ecosystem theory provides an explanation for the rapid growth, significant success, and sudden failure of companies especially in the high-technology business. (Moore 1993) In the following subchapters, an overview of the ecosystem theory is constructed by examining the alternative definitions, characteristics, development stages, and value creation in ecosystems. In addition, the strategic implications and different roles in an ecosystem are analyzed and prospects are briefly discussed in the closing of the chapter.

2.2.1 Definitions and characteristics

In its essence, the ecosystem theory explains how businesses evolve and flourish. The underlying idea is that development and success never occur in a vacuum. Businesses need resources, partners, capital, and customers to build functioning networks. The theory is built on an allegory to the biological concepts of co-evolution and the natural ecosystem. The former explains how development of species is a continuous reciprocal process and the latter means that outside conditions can sometimes cause the collapse of a dominant species when changing radically. Both have equivalences to the challenging innovation environments that businesses operate in. The approach of the theory is that companies are not considered merely a part of their industry, but a part of a business ecosystem. **Business ecosystems cover multiple industries, and they include companies competing and co-operating around new innovations.** Already in the 1990s, for example, Apple Computer was the ecosystem leader in personal computers, information, consumer electronics, and communication industries. Despite that the center may change, the leadership role is valued by the whole ecosystem and all the members will invest in a future where they see shared profits. Instead, the industrial transformation is seen to be the result of multiple ecosystems competing against each other. Thus, it becomes vital for businesses to observe the creation of new ecosystems and competition among existing ones. (Moore 1993)

Continuing the biological metaphor, Dedehayir and Mäkinen (2012) summarize that ecosystems are “networks of interdependent organizations” in which all members provide a contribution to its prosperity and depend on it for survival. A well-known example of this dependence is Intel, which has faced significant challenges in the development of microprocessors after the rise of personal computers in the 1980s. This was due to the complementary technologies Intel was dependent on, such as software, which lagged behind in development. (Gawer and Cusumano 2014; Cusumano and Gawer 2002) Alternatively, Adner (2006) defines innovation ecosystem as “the collaborative arrangements through which firms combine their individual offering into a coherent, customer-facing solution.” The ecosystem can also be divided into two general views, ecosystem as affiliation and ecosystem as a structure. The former observes ecosystems as communities formed by multiple actors and the affiliation of their networks and platforms. The latter places focus on a value proposition and the activities needed to implement it. (Adner 2017) Dedehayir *et al.* (2018) argue that it is also relevant to distinguish ecosystems from the close concepts of networks and clusters. Unlike ecosystems, clusters are located in a specific geographical area, like Silicon Valley, and they are characterized by unusual competitive success. Value networks, on the other

hand, are hierarchical systems of manufacturers and markets, but they lack the ecosystem perspective on the co-evolution of companies and the inclusion of end-users in the approach. (Dedehayir *et al.* 2018)

The theory was originally introduced with the term “business ecosystem” and has mostly been referred to as “innovation ecosystem” or “ecosystem” in the literature since. There has been some contradictory considering the difference between these concepts. According to Mäkinen and Dedehayir (2012), business ecosystems and innovation ecosystems have been used as interchangeable concepts in the management literature. On the other hand, Jacobides *et al.* (2018) argue that business ecosystems consider a particular company and its environment, while innovation ecosystems are centered around a new innovation or value proposition and the actors supporting it. In addition, Autio and Thomas (2020) have introduced the concepts entrepreneurial ecosystem and knowledge ecosystem. Akin to clusters, entrepreneurial ecosystems produce new business models and ventures (instead of value offerings) which are not targeted at a specific audience. Knowledge ecosystems consist of universities, research institutions, and different organizations to create pre-commercial knowledge to form a shared resource. Thus, the outputs are research-based knowledge and the related applications. (Autio and Thomas 2020) In addition, literature recognizes platform ecosystems, which are addressed in Subchapter 2.3. In this thesis, the term ecosystem refers to a general business-related concept that is used as a hypernym for all the different types of ecosystems.

Jacobides *et al.* (2018) argue that the modularity of interdependent components enables the coordination of interrelated companies with high autonomy. Thus, modularity is an important characteristic of ecosystems and a prerequisite for them to emerge. They also suggest that ecosystems provide a solution to the coordination of organizations distinct from alliances or supply chains. In order to be useful, there has to be a considerable need for coordination that markets cannot fulfill. In addition, the requirement for the authority structure of a central actor cannot exist. By their characteristics, ecosystems apart from buyer-supplier relationships by allowing the end customer to choose the supplied components, and sometimes the way they are combined. For instance, the Android phone ecosystem allows the user to choose from a myriad of apps instead of providing a single standard offering. The difference to market arrangements, on the other hand, is that the end users of an ecosystem can select from a constellation of interrelated producers and complementors. (Jacobides *et al.* 2018)

2.2.2 The development of ecosystems

The most important thing for companies facing an ecosystem competition is to understand the evolutionary stages of ecosystems and manage the changes related to them. The theoretical stages, which might overlap and blur in reality, are birth, expansion, leadership, and self-renewal. (Moore 1993) The four stages of development are summarized in Figure 5.

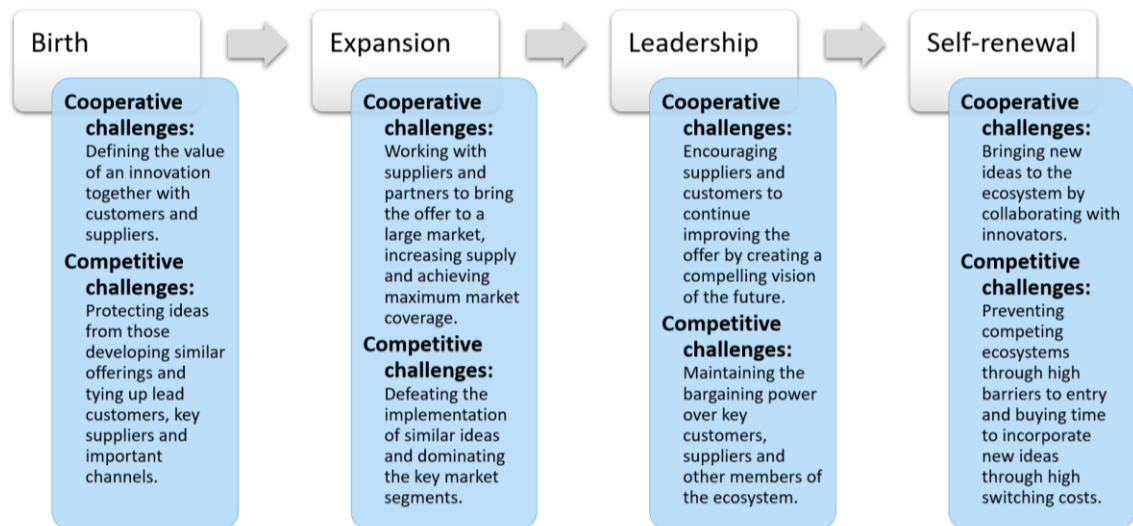


Figure 5. A summary of the evolutionary stages in a business ecosystem (adapted from Moore 1993).

In the first stage of development, companies define the customer needs, the value of the innovation, and the optimal way to deliver it. Defining and delivering the customer value proposition determines the winner of the first stage. For the leader of the ecosystem, it is usually profitable to cooperate with partners in order to maximize the whole value for customers. Luring other companies to follow is also a strategy to hinder competing ecosystems from emerging. An example of this stage is the development of personal computers in the 1970s. Both Tandy Corporation and Apple developed ecosystems around the initial innovation, the microprocessor, but with very different strategies. Tandy tried to grasp the whole supply chain and control the innovation by vertical integration, while Apple only controlled the basic design and encouraged partners to co-evolve the innovation, overpowering Tandy's sales within a decade. The co-evolving thus includes more than satisfying the customers; the leader should set fast improvement in motion for the whole network. For established companies with more traditional organizational cultures, the optimal strategy is to observe the competition and let others try out innovative ideas. They can hold back their move until the following stage by imitating the successful innovations and providing them to a larger market. (Moore 1993)

During the second stage, ecosystems expand to new areas. This might happen either with minor resistance or result in an intensive fight for market share when related ecosystems expand to the same areas. The competition can end with one ecosystem winning or multiple ecosystems existing together and adjusting to a somewhat stable condition. The expansion of the second stage also holds certain conditions. First, the innovation must provide value for the vast majority of customers and second, it has to be scalable to reach the wider market. This is also the stage when established companies overpower smaller ecosystems with sales, marketing, and managing production on a large scale. For example, IBM followed Apple in the 1980s with a rapid and aggressive entrance that resulted in major success and a dominant PC ecosystem. The challenge in this phase is responding to the market demand without creating too much demand to keep up with, which ultimately happened to IBM. The key to success is expanding rapidly and suffocating other ecosystems, while preparing for leadership and power in the next phase. This requires companies to carefully control the value, innovation, and customer relationships. In addition, preventing followers from taking the lead in the future demands the creation of close relationships with these suppliers. (Moore 1993)

The third stage is characterized by a fierce competition for leadership. This requires that the ecosystem has enough potential considering growth and profitability and that the central value-adding aspects of the ecosystem have a moderately stable structure. This enables suppliers to focus on a certain element of value and vie in delivering it. Companies can expand by seizing the closest parts of the value chain, which loosens the dependence on the previous leader. Organizations also begin to focus more on standards, interfaces, and the relationships between customers and suppliers. Through creating value essential for the ecosystem's improvement, companies can hold the only source to something valuable and thus gain bargaining power over the ecosystem. This can also be pursued by patenting or developing contracts. In this stage, central ecological contributors can emerge, such as Intel and Microsoft were in the PC ecosystem. They hold a crucial status in the ecosystem because other members cannot survive without the central contributors. This allows them to capture a bigger share of the total value in the ecosystem. The position is maintained when followers invest in them and value their large customer base. Moreover, the central companies can contribute to the whole ecosystem performance by innovating and thus reinforcing their status. The second and third stages usually reinforce or destroy dominant companies. The strategic implication for lead producers is to grow their power by shaping the prospects and investments of both central customers and suppliers. All in all, bargaining power is the route to profits for all the members of the ecosystem. (Moore 1993)

In the last stage, mature ecosystems are threatened by an abrupt change. This can mean either the emergence of new innovations and ecosystems or a change in outside conditions, like regulations and macroeconomics. These two might also strengthen one another, since turbulent environments are more prone to the rise of new or previously small ecosystems. Reacting to the threat of obsolescence is the main issue for dominant businesses. For the ecosystem's ability to self-renewal and success in the long run, it is essential to create successful generations of innovation. For the dominant companies, self-renewal can also be divided into three common approaches, utilized by themselves or in a combination. The first is to decelerate the growth of the emerging ecosystem by the dominant company. The second approach is to include new innovations into the existing ecosystem, and the last is to adjust to the new environment with a profound transformation. During this phase, companies that established tight and supportive relationships with customers in the earlier two phases can create durability into the ecosystem. Thus, the customers are committed to the ecosystem while the companies create advantage through new approaches. The ultimate and irreplaceable key to survival, however, is constant alertness to the environment. (Moore 1993)

2.2.3 Value creation in ecosystems

In its core, value creation comes from successful innovating in a company and is the central source of competitive advantage. Traditionally, the returns from an innovation have been tried to capture by being the technology leader in an industry and the first to bring an innovation to the market. However, it is essential to notice that in ecosystems, the value creation and returns from an innovation depend largely on other companies and their ability to innovate successfully. Thus, it is not enough to consider the internal innovation challenges, because value creation hinges on other partners to solve their own challenges. However, the effect of these outside challenges on the focal firm and its value creation depends on their magnitude as well as their location. In the flow of activities, there are upstream components providing inputs to the focal firm, a focal actor providing products as inputs to customers, and downstream complements combined by the user to utilize the product (Figure 6). (Adner and Kapoor 2010)

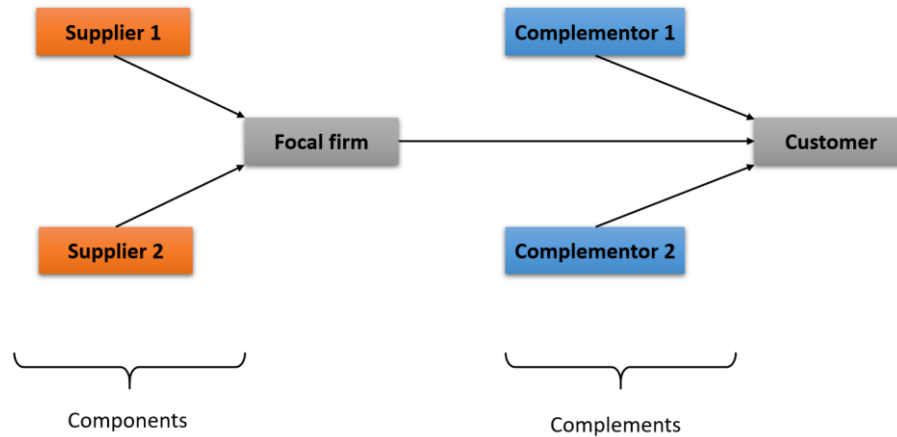


Figure 6. The schema of an ecosystem (adapted from Adner and Kapoor 2010).

The way the external challenges affect the focal firm's value creation depends on their location. Component challenges hinder the production of the company's offering and complement challenges limit the customer's possibility to utilize the product's full benefit. Figure 7 illustrates how internal challenges are in some cases accompanied by the external complement and component challenges. In the absence of external challenges, there are always internal innovation challenges to consider. If both of the external challenges are high, the impacts depend on which external challenges are first solved. An example of this situation would be zero emission vehicles, which cause major internal challenges in car design, component challenges considering engine development as well as complement challenges like fuel infrastructure. Should the component challenges be high, the production of the focal firm is limited because the supplier needs to solve its innovation challenges. For instance, developing hard disk drives of a new generation includes many innovation challenges related to internal design as well as to component suppliers like motors and disk substrate materials. In a situation with high complement challenges, the customers gain only a limited benefit from the focal firm's innovation. For example, the lack of electronic book content limited the value creation of firms developing hardware platforms for electronic books. These categories would seem to have the same effects when analyzed by the magnitude of external challenges. By considering the location of the challenges, the asymmetry of upstream and downstream interdependence is revealed. (Adner and Kapoor 2010)

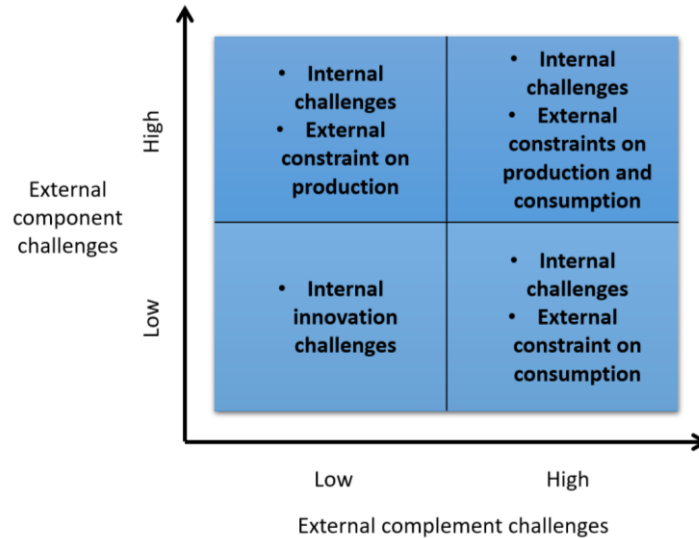


Figure 7. Ecosystem challenges by their location in the value chain (adapted from Adner and Kapoor 2010).

Another way that the component and complement challenges can have different impacts on the focal firm is the learning opportunity related to them. Challenges in developing components can be defeated by exploiting the experience of production and markets, i.e., moving forward in the learning curve. This improves the offer's performance and enhances the added value of the company. The progress in the learning curve as the source of advantage depends on the learning opportunity related to the challenge. The extent of the learning opportunity, on the other hand, depends on the possibilities that the learning can bring and the changes a company must do in order to do so. When the technology leader faces great technological component challenges, it increases the learning opportunity and offers performance advantage from moving down the learning curve before competitors. In addition, component challenges can also hamper competitors' opportunities to imitate progress. On the other hand, the adoption rate of innovations usually depends on complements and their level of development since an innovation is rarely complete in its own. The absence of critical complements restricts the value the product can create for users. For instance, the value creation of the Airbus A380 was limited until airports increased their capacity for the oversized aircraft. The availability problems in critical components therefore slow the adoption of the innovation. For technology leaders, this decreases the performance advantage as it buys competitors more time to innovate. In addition, the progress in the learning curve is slower during the leader's exclusive time period in the market. Thus, the competitive advantage of the leader is smaller when later entrants emerge. All in all, the advantage of being a technology leader is enhanced by component challenges and diminished by complement challenges. (Adner and Kapoor 2010)

Another strategy to pursue competitive advantage is vertical integration, which diminishes the contractual and behavioral uncertainty regarding partners. Technological uncertainty relates to the development challenges of suppliers and they cannot be overcome through vertical integration. In cases where the technological uncertainty declines faster over time, the relative importance of behavioral uncertainty increases. Thus, vertical integration brings greater performance advantage later in the technology life cycle. Another managerial aspect is that companies trying to achieve the first mover advantage should first consider the external challenges, as this strategy is the most beneficial when component challenges are high and complement challenges are low. When faced with high complement challenges and the resulting adoption delays, companies should reconsider the early entry strategy. However, this raises another challenge for companies, as the managerial attention is usually focused on the production bottlenecks and supplier performance instead of analyzing the complementors. (Adner and Kapoor 2010)

2.2.4 Ecosystem roles

Adner (2017) defines two specific roles in ecosystems that companies can pursue, leaders and followers. The decision depends on the company's objectives and the consensus of the actors that the value proposition hinges on. A leader provides the vision of structure and roles which all members must adjust to, defines timing as well as many governance rules and usually gets the vast majority of benefits in the ecosystem. A follower gives the leadership role to another company and agrees to the terms defined by the leader. Sometimes the leadership role can be controversial, such as in mobile payments where Google and Visa both cling to the leadership role. In addition, possibilities for shared leadership have emerged. However, in cases of high risk or burden attached to the pursuing of leadership, the system may remain without leader. Over time, followership roles can also become contestable when companies must secure their roles when some actors are changed and challenged. (Adner 2017) It is also important to note that because of the complexity and high autonomy of ecosystems, the roles in them are not constant (Fuller *et al.* 2019).

Dedehayir *et al.* (2018) have examined the ecosystem roles during the birth of an ecosystem, i.e., the time from the original invention to commercialization. Since this is a very volatile time that determines the following phases to a large extent, it is essential for all the stakeholders to understand the conditions that the network needs to come into existence. A role in this context is defined as a "characteristic set of behaviors or activities undertaken by ecosystem actors." The roles discovered are leadership roles, direct value

creation roles, value creation support roles, and entrepreneurial ecosystem roles. (Dedehayir *et al.* 2018)

The leadership role is essential for the birth of an ecosystem in creating collaboration to deliver value comprehensively. The ecosystem leader will undertake several activities during the birth phase, first of which is the governance of actions, such as designing roles of different actors that are essential in the early stages. The following governance activities are organizing the internal and external interactions as well as the resource flows among members. The forging of partnerships is the second activity, in which the leader first attracts partners to the network and then creates links between them to form an alliance. The following challenge for the leader is to share its vision and to create consensus among actors, in order to create collaboration towards creating value with the innovation. Closer to the end of the birth stage, the leader will also encourage the commitment of complementary innovations and provide opportunities to create niches. If the ecosystem is platform-based, the leader must first design and build the platform, then generate value from the participation of different actors by opening the platform, and finally ensure that the complementary innovations are compatible with it. The final activity for the leader is the management of value by creating and capturing value through offerings of its own and others while ensuring other actors can do the same. On the contrary to the previous, the leadership role can also represent a dominator, for example, Cisco in the internet infrastructure ecosystem. This role is characterized by vertical and horizontal integration, increasing control, and reducing the value for other actors. Therefore, the dominator role threatens the functionality and survival of the ecosystem as a whole. (Dedehayir *et al.* 2018)

The second category of roles essential in the emerging of an ecosystem are direct value creation roles. They include the user, supplier, assembler, and complementor, which are not defined by their position in the value chain but by completing the activities the role includes. The supplier is responsible for delivering key components for other members in the ecosystem to utilize. The receiving part of this role is the assembler, who aggregates the components, materials, and services, and processes the information that others in the ecosystem produce. (Dedehayir *et al.* 2018) For example, hospitals work as assemblers in the healthcare ecosystem since they integrate services by providing doctors who offer treatment for patients (Dedehayir *et al.* 2018; Kapoor and Lee 2013). Another role is the complementor, who extends the core offering and creates value in a platform-based ecosystem by gaining compatibility with the platform. In addition, the complementarities must be designed to collaborate with other offerings in the ecosystem

and to fulfill customer specifications. (Dedehayir *et al.* 2018) The most important initializer for the emergence of an ecosystem is the user, who creates value by determining problems or innovating ideas, like the users in the Lego community (Dedehayir *et al.* 2018; Hienerth *et al.* 2014). However, the supplier, assembler and complementor appear near the ending of the birth phase when the user needs are defined and need to be responded by creating value (Dedehayir *et al.* 2018).

Another distinction is the value creation support role, which does not create value directly but delivers supporting elements as experts or champions. Experts have a crucial role in the emergence of ecosystems since they create knowledge through research for other actors to turn into value. In addition, the experts offer consultation and expertise, all of which usually happen early in the ecosystem birth. Later, the expert also promotes the commercialization and transfer of technology. The role of a champion is characterized by building connections and interacting between different actors. This essential activity can thus be fulfilled by both the leadership and the champion roles. In addition, the champion grants access to local and non-local markets. The role is usually seen as a single organization but can be an interorganizational setting as well. (Dedehayir *et al.* 2018) For instance, in the ICT ecosystem, the EIT ICT Lab provides the role of a champion (Still *et al.* 2014; Dedehayir *et al.* 2018).

The last category, entrepreneurial ecosystem roles, includes the entrepreneur, sponsor, and regulator. The entrepreneur, typically an individual or a start-up company, is essential in the birth stage of an ecosystem. Usually, it relates to other roles, like when the leader is forming partnerships or emerging possibilities to commercialize innovations. (Dedehayir *et al.* 2018) Thus, the entrepreneurs are attracted by areas where the holders of other interconnected roles are located in, such as entrepreneurs in the restaurant ecosystems (Chesbrough *et al.* 2014; Dedehayir *et al.* 2018). Additionally, the entrepreneur creates a network of internal and external collaborators and is an intermediary between researchers and actors pursuing commercialization. The sponsor is responsible for providing support to the new ventures through resources, purchasing, financing, co-development, and connecting the entrepreneurs to other actors. The last role is the regulator, which supports the former two by improving economic, political, and regulatory conditions. (Dedehayir *et al.* 2018)

While the leadership and champion represent intensive and crucial roles through the whole birth phase, the direct value creation roles are most likely implemented closer its conclusion, apart from the user role which is needed early to initialize the ecosystem. The entrepreneur and its supporting roles are also essential from early on, as well as the

expert providing the necessary knowledge to satisfy customer needs. The roles also have different nature depending on their phase in the ecosystem birth, which are summarized in Figure 8. (Dedehayir *et al.* 2018)

		Preparation	Formation	Operation
Leadership roles	Ecosystem leader			
	<i>ecosystem governance</i>	decipher roles	coordinate interactions	orchestrate resource flows
	<i>forging partnerships</i>	attract & link partners	create collaboration	stimulate complementarity
	<i>platform management</i>	build platform	open platform	orchestrate complementors
	<i>value management</i>		decipher bases of value	create & capture value
	Dominator			integrate actors
Direct value creation roles	Supplier			supply components
	Assembler			assemble components
	Complementor			provide complementarities
	User	define need	provide ideas	purchase and use
Value creation support roles	Expert	generate knowledge	provide expertise	transfer technology
	Champion		build connections	provide access to markets
Entrepreneurial ecosystem roles	Entrepreneur	co-locate	set-up network	
	Sponsor	give resources	co-develop offering	link to other actors
	Regulator	provide favorable conditions		

Figure 8. Roles and activities during different stages of ecosystem birth (adapted from Dedehayir *et al.* 2018).

2.2.5 Strategic implications

According to Moore (1993), the ecosystem approach has clear managerial implications. To determine the correct strategic response, it is a necessity for companies to question the situation they are currently in, for example, by asking whether their suppliers and partners are optimal, if the future relies on the best new ideas and how bargaining power and autonomy are sustained. Another aspect to consider is the key competitors, their hidden customer and supplier networks, sources of ideas and supplier support, and comparing these to the focal company. The new innovations possibly threatening current business, requirements for creating a new business ecosystem from a bundle of ideas, and the network needed to take these ideas to the largest possible market are also important to examine in order to prepare for organizational transitions. While on the surface business ecosystems vie for market share, below it lies the competition for controlling the future. However, many dominating companies realize this too late and are blinded by sudden new competition. (Moore 1993)

Mäkinen and Dedehayir (2012) argue that the understanding of ecosystem dynamics can bring crucial strategic information for the organizations in them. Adner (2017) defines

ecosystem strategy as “the way in which a focal firm approaches the alignment of partners and secures its role in a competitive ecosystem.” The term focal firm refers to the fact that each company constructs their own strategy based on the structure, roles, and risks in the ecosystem. The strategies of different participants might differ significantly, which is important to consider as some companies might mistakenly believe that their partners have the same objectives and motivations. A successful strategy also considers and manages the risks related to partner alignment, i.e., the ability to align their roles and positions with the strategy. In addition, the definition includes partners since they have a central role in the defining of value creation, even if they are not directly linked to the company. In this approach, the competition expands from rival companies and potential entrants to rival ecosystems with an alternative value proposition with a similar or less similar structure, such as Uber and the municipal taxi companies. While traditional businesses seek to gain competitive advantage with their strategy, in ecosystems the strategy is essentially searching for alignment in maintaining relationships and fighting off competitors. (Adner 2017)

Adner (2006) has established an iterative, risk-assessing approach to formulating an ecosystem strategy. The inability to assess the risks of innovation ecosystems is the reason many companies fail their ecosystem innovations. Despite an excellent innovation that meets customer needs and excludes competitors, new markets may not emerge since it depends on other players’ performance as well as the company’s own. For example, high-quality HDTV manufacturers did not consider the importance of the supporting innovations, like signal compression and broadcasting, which were not ready for the large market. In consequence, they had to wait for technologies to improve while new rivals entered the competition. The traditional risk assessment processes become inadequate when the value is not created in a single company, but in a complete ecosystem. Therefore, a successful strategy for growth largely depends on the ability to successfully assess the risks of an ecosystem. These include initiative risks, interdependence risks, and integration risks. (Adner 2006)

To address the general project-related initiative risks, the first step is to consider the feasibility of the innovation and its attractiveness to customers, as well as competition and the capacity of the supply chain. The second part is to assess the interdependence risks, i.e., the complementary innovations needed to attract customers, and the probability that they are ready for the market on time. This means evaluating the delay and failure risks of key partners’ projects, which may be the result of numerous different causes. This part of the risk-assessing calls for managerial consultancy, double

confirming with suppliers and looking at past cases. This assessment should be extended to all central partners as well. The more dependence on complementary innovations, the less control there is over the success of one's innovation. For example, if four partners declare a 90 % probability to succeed in their part of the solution within a given time, the total probability of success is all of these multiplied, i.e., only 66 %. The goal of this analysis is not to achieve specific number, but it nevertheless helps to make realistic expectations for the project. Thus, if the probability of success is low, expectations can be set accordingly. (Adner 2006)

The third thing to consider are the integration risks, i.e., the number of intermediaries who need to adopt the innovation before the end users can. Intermediaries cause uncertainty to the success of the innovation, and possible delays in them need to be prepared for. The further the innovation locates in the value chain, the more there are intermediaries and uncertainty of success. This is assessed by adding the adoption cycles in the value chain. This also illustrates that reducing development time in an organization through resource allocation has a minor effect on total time to market. Instead, companies could benefit significantly from resource allocation to partners instead since minor improvements in the value chain can have significant benefits considering the time to market and the required resources. In addition to development cycles, the sales cycles need to be considered, which are caused when every member of the value chain has to test and approve the product. This calls for assessing the costs and benefits of adopting the innovation for all the intermediaries, since if costs exceed the benefits for even one member, the adoption of the innovation will not move forward in the value chain. An example of this risk is the Michelin run-flat tire innovation, which required an electronic system that did not yet exist in vehicles. In consequence, no users adopted the innovation and since the process from car design to production takes many years, the company faced severe delays in the adoption of the innovation. (Adner 2006)

After considering risks in the ecosystem, the strategy should be constructed by assessing where to compete, when to compete, and how to compete. First, it is essential to compare the risks to market opportunities. To assess options and opportunities exhaustively, different target markets and related ecosystem maps need to be examined. Innovations can have several possible target markets, and the nature of the ecosystem risks vary accordingly. If the risks of the innovation ecosystem are high and the success of other participants cannot be controlled, the best strategy is to aim at a market with lower external risks, possibly with a simpler offering. For instance, by targeting a smaller defense market in the United States, the Michelin run-flat tire ultimately succeeded.

Timing is the second aspect in forming strategy, because being ahead of rivals brings no benefit if the complementary innovations are not ready at the same time. If the risk of partners failing is high, the development should be slowed down while maintaining the resources and refining the long-term strategy. Therefore, there is also an upside to the delays, if a company is ahead of its partners and can wait with the development while letting others catch up. This strategy was implemented successfully by Apple's introduction of iTunes. At first, the online music-retailing failed as it lacked critical components, such as digital rights management and broadband connectivity. Therefore, Apple waited before bringing its innovation to the market and succeeded even though it was a late mover. Finally, when assessing how to compete, companies should decide between an active or passive role. The former has an upside of guiding the development in line with own strengths, and a downside of major time and resource investments before pursuing leadership and finding out if the innovation succeeds. In a passive role, a company must assess the leadership candidates it should follow, the level of its commitment, and the way to defend its territory. (Adner 2006)

All in all, failure in ecosystems can occur when technical difficulties or the challenges of coordinating innovations emerge. More often though, it is caused by a lack of market within a certain time frame to support an investment. Thus, competing in an innovation ecosystem requires constant preparing for delays and compromises that are outside the focal firm's control. It is also important to remember that unrealistic expectations can quickly destroy value. The systematic assessment of the ecosystem risks not only enables more realistic expectations but also provides a better view of the external contingencies and, in the end, a successful ecosystem strategy. After developing visions for the target market, the offering, and performance expectations as well as assessing the risks mentioned above, the original plan and its expectations must be reassessed as many times as needed. Figure 9 summarizes this iterative process of developing an ecosystem strategy. (Adner 2006)

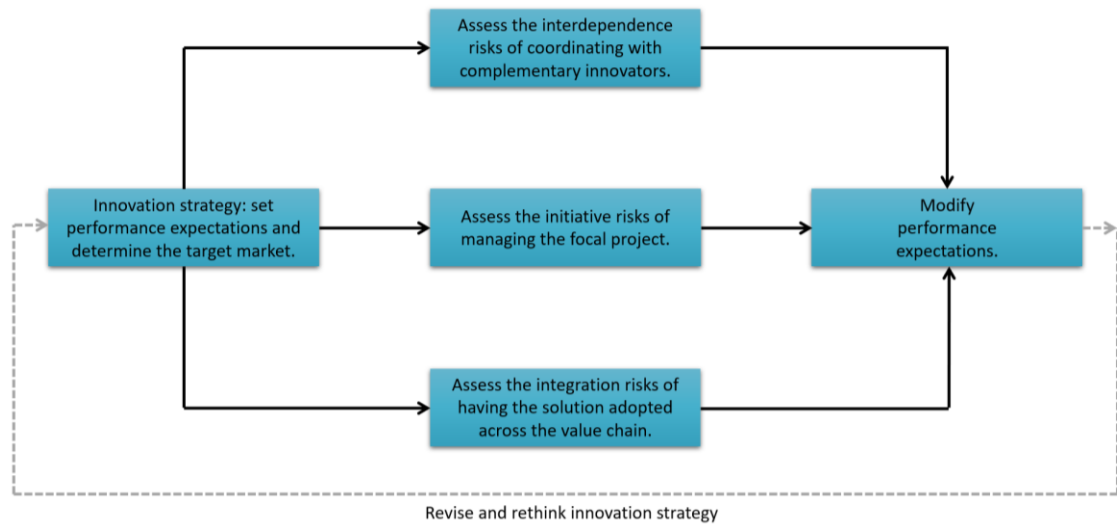


Figure 9. The formulation of an ecosystem strategy (adapted from Adner 2006).

Jacobides (2019) offers an alternative perspective on ecosystems and strategy. The suggested ecosystem-focused framework focuses on five different aspects. First, the focal firm must consider whether it can help others create value, since in successive ecosystems, helping other companies innovate is equally important as being innovative. For example, Google's Nest, a smart digital thermostat has extended to an ecosystem whereby it can connect to other home systems and appliances of partner companies. In result, the value proposition that Nest provides, relying on shared functionality, is far greater than it could be on its own. Considering the value proposition that the focal firm can offer to potential complementors is equally important. Nokia's failure with Symbian is a cautionary example of not taking the complementors' needs and interest into account when creating a platform. (Jacobides 2019)

The second strategic aspect is choosing the optimal role in an ecosystem. Companies often presume that being the prime mover of an ecosystem is the best option, although being a complementor might be the most profitable solution in some cases. The role of leader requires a superior offering that is difficult to imitate and thus, has some combination of IP protection, wide user network, and powerful branding. In addition, traditional companies focusing on tight control, short-term profits, and the prevalent management style might struggle with focusing on long-term value, understanding customer needs, inspiring complementors, and creating adaptability to new challenges. Lacking the qualifications to create an ecosystem, the possibilities are to license or sell on an IP-protected innovation, or buying the way into an ecosystem, which is sensible for big companies with an interchangeable offering compared to competitors. (Jacobides 2019)

The third stage of ecosystem strategy is to decide the terms for participation. This means making governance choices for access and attachment. As with platforms, it is important to consider the degree of access, which determines how closed the ecosystem is and who is able to participate. Open ecosystems have basic standards for participation, managed ecosystems are characterized by specific criteria, guidelines, and limits for the number of participants, and closed ecosystems have tightly controlled rules and approvals of participants. The decision should be made based on the final customer's needs, and also note that openness and quality are inversely proportional. Attachment relates to the exclusivity required from complementors, for example, by forbidding app developers to share their apps on other platforms. Restrictions might drive complementors away while the lack of barriers facilitates recruiting complementors that, however, have no attachment to the ecosystem. (Jacobides 2019)

Fourthly, the organization should consider its ability to adapt, since the needs of end users and the collaboration possibilities or desires of complementors might change dramatically in ecosystems. For established companies in particular, the required outward-facing culture and the managing of relationships with many complementors can be difficult to achieve. One option is to separate the part of the organization which focuses on revenue creation, controlling innovation, and being suspicious of complementors, from the new part that has an external focus. The last strategic assessment is the number of ecosystems to manage. Some companies have succeeded in expanding and creating synergy by managing different parts of business through different ecosystems. This has led to the increasing dominance of few national e-commerce and e-service companies, for instance. By different ecosystems, complementors can also find different pathways to markets. Participation in one ecosystem might facilitate it in another, which also provides many chances to strategize. (Jacobides 2019) All in all, ecosystems require a shaping strategy since there are no default execution methods. Shaping is essentially iteration, adjusting goals, collaboration by mutual influence, responding and adapting to sudden changes, and coevolving the ecosystem for mutual advantage. (Fuller *et al.* 2019)

2.2.6 Implications and prospects

The ecosystem theory provides multiple managerial and societal benefits. According to Adner (2017), the key advantages of the theory are increased focus and attention to novel models of value creation and value capture. In addition, the framework explains the dynamics of change and thus provides organizations with valuable strategic implications (Moore 1993). Companies can analyze their network of suppliers and

partners as well as the strengths of rivals in ecosystems they have built (Mäkinen and Dedehayir 2012). Another strength is that the structure of ecosystems can include and coordinate all types of complementarities in production and consumption without having to resort to vertical integration (Jacobides *et al.* 2018). The common trade-off between flexible decisions and committing to a particular strategy is also facilitated by ecosystems (Fuller *et al.* 2019). In addition, ecosystems can offer new possibilities of connecting private benefit and public good. An example of this is the economy portfolio of the IDEO design company that advises textile and food companies on modifying their ecosystems in a more sustainable manner. (Jacobides 2019)

According to Fuller *et al.* (2019), the term ecosystem has become widely accepted and popular among companies during the past decade. Ecosystems are now seen as “the rise of dynamic, multicompany systems as a new way of organizing economic activity.” Partly the interest is due to the possibilities that ecosystems provide for different services and products exceeding conventional boundaries. In addition, the popularity is explained by the rapid evolvement of business environments requiring companies to quickly procure and coordinate new diverse capabilities. The emergence of ecosystems calls for a new perspective and way of thinking about business. This ecosystem thinking challenges the traditional idea of an industry, characterized by a discrete group of similar companies competing to produce a product through vertical integration. In the next decades, the ecosystems will likely spread further, resulting in the coevolving of companies in clusters of rather unstable relationships that span industry boundaries. This transformation requires the ecosystems perspective that considers the strategic choices based on specific situations, objectives, and capabilities while being cautious about precedents and assumptions derived from the past. (Fuller *et al.* 2019)

Despite the popularity of ecosystems in the changing business environment, it is important to note that building an ecosystem is not sensible in all cases and is not a prerequisite for success. For example, EssilorLuxottica has created one of the largest eyewear businesses through strong vertical integration without the help of an ecosystem. Building one is useful when the business environment is unpredictable and flexible, or if there is a need to explore a new possibility in collaborative development with others. Other optimal situations for creating an ecosystem include developing complex offerings with many complements, building an effective channel to avoid complicated distribution, and co-opting with existing players to disrupt an industry. (Fuller *et al.* 2019)

On the other hand, the ecosystem perspective has several problems and unresolved aspects. For example, the theory has drawn criticism of its biological metaphor. Oh *et al.*

(2016) argue that the concept is not clearly defined and thus cannot be labelled as a theory. The analogy to natural ecosystems is seen as deficient and it does not provide a sufficient basis for research and policies considering the emerging innovations. Hence, future research should provide a concise definition, clear meaning, and practical usefulness to the theory. (Oh *et al.* 2016) Another problem related to ecosystems is the overuse of the term after becoming a buzzword. For example, countries, support functions, and product portfolios have been referred to as ecosystems. In addition, ecosystems are frequently used as a synonym for supply chains. However, ecosystems encompassing a supply chain, characterized by supplier partnerships, also provide a lot wider scope by the ecosystem approach. (Fuller *et al.* 2019)

Despite the wide interest in ecosystems, there are several unanswered questions that should be examined in the future. These include the actions that formulate ecosystems, different actors, and their roles in the birth of an ecosystem, the evolvement of an ecosystem over time, and the possible prediction of later stages based on the emergence process of an ecosystem. These should help the regulation, simulation, and facilitation of ecosystem emergence and the key actors to take a leading role in the process. Considering the ecosystem roles, more research is needed for the dual or multiple leadership roles as well as the key roles that are crucial in leading the emergence process from discovery into commercialization. (Dedehayir *et al.* 2018) In addition, governments should address the regulations and policies related to ecosystems in order to protect societies and foster healthy business environments. For example, restricting the Chinese companies' common activity of accessing wide customer data might limit the relative economic growth in Europe, but has the social benefits of protecting privacy. The legislation also needs a new approach to competition and regulation since competition laws have traditionally focused on the market shares of individual companies. (Jacobides 2019) From a societal point of view, the members of fading ecosystems should be helped into the vital ones while assuring that the competition remains fair, and the best ones survive. (Moore 1993)

2.3 Platform ecosystems

In this subchapter, the synthesis of platforms and ecosystems is constructed by analyzing the literature on platform-based ecosystems, i.e., platform ecosystems, and making further conclusions.

The literature provides very different approaches to the relation of platforms and ecosystems. First, platforms can be referred to as platform ecosystems, like in the

platform-pipeline comparison by Van Alstyne *et al.* (2016), suggesting that platforms are themselves considered to be one type of ecosystems. Dedehayir *et al.* (2018) classify Uber and Airbnb as “contemporary platform-based ecosystems” which demonstrate how individuals can be providers and consumers for the platform at the same time. According to Jacobides *et al.* (2018), platform ecosystem is one aspect of ecosystems and it refers to the organization of actors around a platform. These ecosystems consist of the sponsor and the providers of complements linked to the focal platform through technological standards, open-source technologies, or shared technologies. The complementors can, in addition to creating complementary innovations, access the platform customers directly or indirectly. (Jacobides *et al.* 2018) Thomas and Autio (2013), on the other hand, state that ecosystems in management research consider interrelated organizations operating or linking around a central platform or company. Their definition of an ecosystem considers platforms as well: “a network of interconnected organizations, organized around a focal firm or a platform, which incorporates both production and use side participants, and focuses on the co-creation of new value through innovation.” (Thomas and Autio 2013)

Gawer (2014) combines platforms and ecosystems by first making a distinction between internal platforms, supply-chain platforms, and industry platforms. Internal platforms are focused on a particular firm, supply chain platforms concern assemblers and suppliers across a supply chain, and industry platforms comprise an industry ecosystem consisting of a platform leader and its complementors. (Gawer 2014) Therefore, industry platforms are products, services, or technologies upon which other companies organize as a business ecosystem and can develop complementary innovations (Gawer and Cusumano 2014). The platform ecosystem’s sources of innovation are not restricted to suppliers or in-house innovators, because the innovators can be anyone and located anywhere. In addition, the platform owner can disclose programming tools and interfaces for innovators to utilize. Thus, the innovators can self-identify to the owner of a platform who does not have to know their identities in advance. In addition, the possibility for platform members to switch roles, for example, from complementor to competitor, is a characteristic of ecosystems and should be noted in analyzing technological platforms. (Gawer 2014)

As Thomas and Autio (2020) notice, the multiple hyponyms of ecosystems, such as platform ecosystems and technology ecosystems, overlap significantly and lack concise and exclusive definitions, leading to misuse and confusion. Fuller *et al.* (2019) argue that digital platforms and ecosystems are frequently discussed as inseparable, since many

large ecosystems, like Facebook and Airbnb, involve digital platforms. However, the equation is faulty and there are lots of cases where digital platform has not been necessary for the ecosystem. The benefit that technology brings is helping the organization of multiple members in the complex ecosystem. Nevertheless, it is possible to build a successful ecosystem without the help of digital platforms. In addition to digital platforms, ecosystems are often facilitated by APIs, IoT technologies, and new tools for gathering and analyzing data. (Fuller *et al.* 2019) All these suggest that platforms and ecosystems have similar characteristics to a large extent that need further research. In conclusion, both ecosystems and platforms are widely recognized and researched subjects, but the literature is still short of concise definitions and in-depth research on platform ecosystems.

The nature of competition is transforming and facing a paradigm shift caused by digital innovation. The new way of competing is more about finding new tools to cooperate instead of a merely offering different value propositions, which requires adjustment and dynamic experiments instead of controlling frameworks. (Jacobides 2019) When the ecosystem theory was built almost three decades ago, the platform phenomenon was yet to emerge and industries held a more traditional structure, such as the pipeline. Hence, the ecosystem theory must be incorporated into a platform-based structure in order to work in these new business environments. The common base that platforms and the ecosystem theory share is the comprehension and analyzing of complex entities, suggesting that the ecosystem theory can more widely be expanded into platform-based ecosystems. The possible challenges in this, however, are the different structures of ecosystems and platforms (Figures 3 and 6) as well as their different scopes since the platform approach focuses more on a specific focal firm while ecosystems focus on many interdependent ones. In addition, the creation of a platform ecosystem can be a very different process when forming a platform around an existing ecosystem, reorganizing the members of an ecosystem according to the roles of an existing platform or creating a completely new platform-based ecosystem. Concluding from the definitions of platforms and ecosystems, a platform ecosystem can be seen as a platform comprising of multiple organizations, possibly among different industries that form an entity characterized by interdependence and value creation larger than the sum of its parts. In the rest of this thesis, the term platform refers to a platform ecosystem.

3. METHODOLOGY

The following chapter considers the methodology of this research. First, the network service business is discussed to form an overview of the industry studied in this research. In the second subchapter, the methodological choices of this thesis are specified. The third subchapter considers data collection methods, and the final subchapter introduces the methods of analysis for this research.

3.1 The network service business: industry description

The nature of the Finnish electricity market is largely defined by the changes the industry has faced during the last three decades. In 1995, the Finnish electricity market act separated the monopoly network companies from other electricity business and opened the electricity market for competition (Kontu 2019; Aminoff *et al.* 2009). Since then, the Energy Authority has regulated and promoted the operation of the electricity market and the distribution network operation has been a governed monopoly (Laapotti 2015). This is because the electricity distribution business is a natural monopoly, i.e., building parallel networks would not be economically profitable. By governing the distribution network operation financially, the transmission price of electricity can be maintained reasonable, and the companies can be encouraged to improve the electrical network and to operate cost-efficiently. (Aminoff *et al.* 2009) In addition, the laws and regulations set by the EU and the Finnish government have a driving effect on the business development of the electrical network industry (Kontu 2019).

Previously, the production, distribution, operation, maintenance, and construction were internal services of energy company businesses, which was no longer efficient due to the opening of the markets and the different drivers behind businesses. Consequently, a new service business emerged and has grown significantly over the last 20 years, in which the core business is providing services. The service companies were largely outsourced from energy utilities. Currently, the ownership can be municipal, private, an energy company as a parent company or a combination of these. For municipally owned service companies, the main customer is also the parent company. (Kontu 2019) According to Aminoff *et al.* (2009), the service providers must be independent in order to achieve optimal results. The service companies are often owned by energy groups, many of which, in turn, are owned municipally and represent natural monopolies in their operating areas. The outsourcing decision is thus affected by local politics, and these

issues also have an impact on the customer-supplier-relationships as well as the service purchasing processes. The network companies with monopoly positions are governed by economic regulation. (Aminoff *et al.* 2009) These regulations affect their goals considering, for example, the cost of network construction and the service level required, in addition to which the regulations have led to efficiency (Aminoff *et al.* 2009; Kontu 2019). These, as well as other strategic and operative decisions, have an impact on the service companies' operations and performance (Aminoff 2009).

The foundation of the service business led to an active consolidation stage in the years 1990–2010, characterized by mergers, acquisitions, and rapid growth. After this phase, the companies ceased to grow in spite of the heavy weatherproof network and fiber cabling investments. In recent years, competition in the service business has become more intense and international rivals have entered the market. The service companies have low, 0–10 %, profits and only 1–3 % annual investment/revenues ratio, while network companies have 30–60 % profits and 20–40 % investment/revenues ratio. The development resources are limited, and the services are not developed systematically. The service companies also have different business drivers compared to asset owners in the electricity industry. Additional problems include minimal business and competence development as well as the lack of differentiation between service companies. All in all, sustainable competitive advantage has been difficult to achieve, and profitability targets have not been met. The sources of sustainable competitive advantage would be differentiation, innovating new services, and proximity to customers. The most important success enablers are business development, profitability, and employee engagement. It is also essential to understand the regulated the earning model of the customer and its effects on the operations of service companies, since it is the most important driver of network companies and sets the business framework for the service companies. In the future, however, all parties expect outsourcing and service packages to grow. (Kontu 2019)

In the electricity distribution business, the services, such as network asset development, are increasingly outsourced as network companies focus more on the core processes and pursue cost savings. Most purchased services include network construction and maintenance, while activities related to network planning are not largely outsourced as they are considered to be a part of the core business. The electricity distribution is critical for the functioning of society and therefore the outsourcing processes must be carefully designed. The most significant risks in outsourcing services relate to the functioning of the network service business and essential information flows. Many companies have

separated the activities to a subsidiary and thus avoided the risks of transferring the power to an external party. However, some network companies seek to decrease their ownership of the service companies because they consider it to hamper the functioning of the markets. The outsourcing is mainly executed in two different ways: the first is to make a contract directly with service providers and the second is to buy the service from one service provider who governs a subcontracting network. Purchasing a service has been satisfactory for the network companies in around 90 percent of the cases. The purchasing competence of the network companies has also increased significantly. (Aminoff *et al.* 2009) Kontu (2019) has also found that the customers are satisfied with the outsourcing and will continue to outsource even larger service packages. Unlike the service providers, the network companies have improved their efficiency while reducing costs remarkably during this transformation in the service business. (Kontu 2019)

Thus far, the purchased services are those that were previously operated internally, and no new service innovations have been developed to support network businesses. In the future, new possibilities to the business might emerge from changes affecting the electricity distribution industry, such as disruption-free electricity distribution or efficient energy usage and policies related to climate change. Another important aspect is the major role of information systems in ensuring the safety and smooth operation in the industry. The current information systems with closed interfaces can be a barrier to the functioning of the service business. This is partly because they have been designed to fit a situation in which network companies produce most functions on their own, not to support the outsourcing of services. In order to adapt to the new purpose, major improvements need to take place considering the open interfaces and standardizing the systems. The network companies need to consider the current capabilities of the information systems and how outside players can join them. (Aminoff *et al.* 2009) In addition, there is a very limited number of digitalized services and no development has taken place related to platforms (Kontu 2019).

Figures 10 and 11 illustrate the network service business value chain that is the focus of this thesis. There are three primary frameworks in practice. The first two (Figure 10) are the so-called turnkey delivery model and inhouse model, the former of which is the most common one. The center of these value chain models are the network companies, which outsource functions to network contractors. The network contractors deliver their services with the help of equipment suppliers, wholesale companies, and excavation contractors. Other players include experts and IT companies, which impact the network company and the network contractor, as well as end customers and the regulator. The

inhouse model differs from the turnkey model only by the company structure: in the inhouse model, the network company and network contractor belong to the same consolidation. In the distributed model (Figure 11), the network company distributes the outsourcing to multiple network contractors that also affect one another. Experts, IT companies, wholesale businesses, excavation contractors, and equipment suppliers are located between the network company and the network contractors. (VALOR Partners 2021)

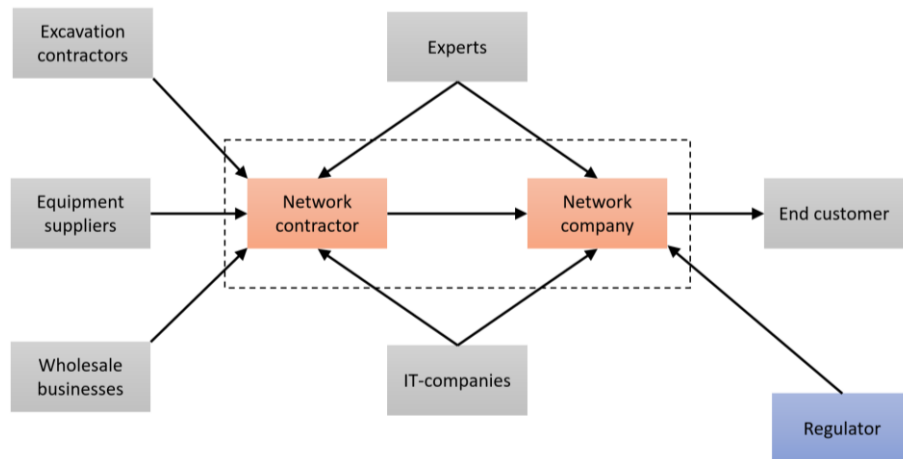


Figure 10. The turnkey delivery and inhouse value chain models (adapted from VALOR Partners 2021).

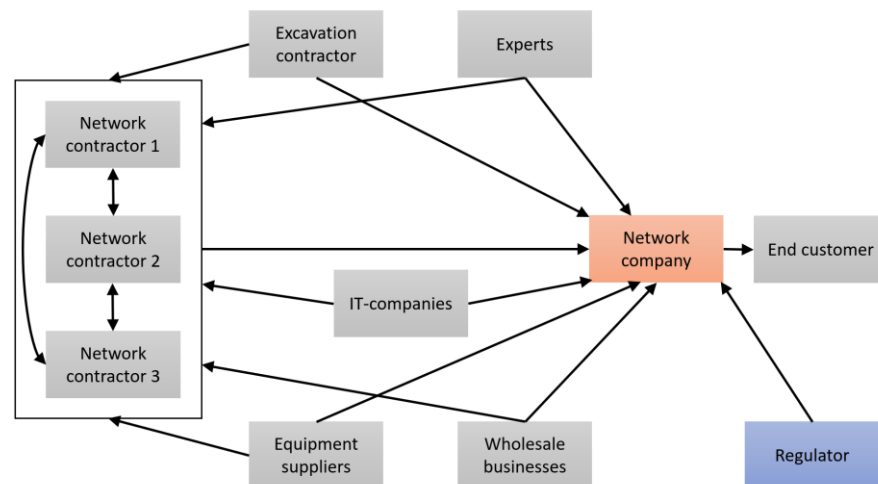


Figure 11. The distributed value chain model (adapted from VALOR Partners 2021).

3.2 Methodological premises

In order to justify the data collection and analysis methods in a research, there are multiple methodological aspects to consider. The so-called research onion illustrates the choices that move from general to specific, i.e., from outmost to the innermost layer. (Saunders *et al.* 2016, pp. 122) The collection of methodological choices made in this thesis is summarized in Figure 12.

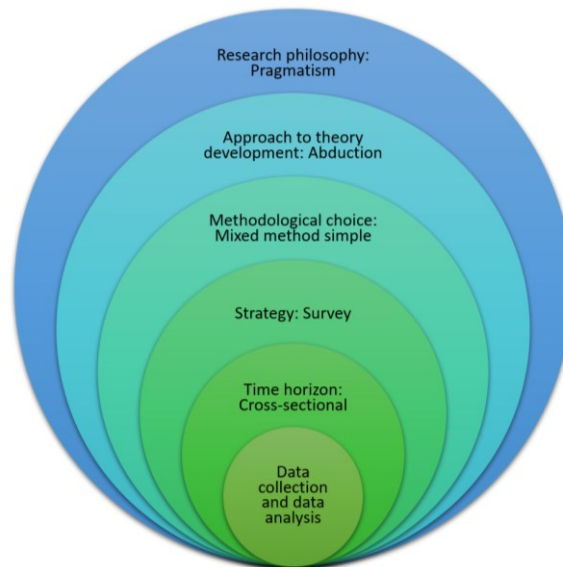


Figure 12. The methodological choices of this research (adapted from Saunders *et al.* 2016, p. 124).

The process begins by selecting either a critical realist, positivist, interpretivist, postmodernistic, or pragmatic research philosophy. The research philosophy reflects the assumptions made about the nature of knowledge, realities in the research, and the values affecting it. In addition, it supports the subsequent methodological choices in the process. This research follows a pragmatic philosophy, which means that the research is driven by a particular problem and it places emphasis on finding practical solutions. (Saunders *et al.* 2016, pp. 122, 137–143) Pragmatism was chosen since the underlying motivation for this thesis are the problematics in the industry and finding practical outcomes to enhance them.

The second outmost layer of the process considers theory development, which is either deductive, inductive, or abductive. In deduction, the general premises are taken to analytically build a specific conclusion. The inductive approach is the opposite of this, where generalizations, that are not analytically implied, are made from particular data. (Ketokivi and Mantere 2010) Abduction is the synthesis of these two, which incorporates an existing theory to make modifications to it or to build a new theory. (Saunders *et al.*

2016, pp. 145) According to Walton (2005, p. 31), the nature of abductive reasoning is presumptive, meaning that the construction of a hypothesis does not have to be based on solid proof but is subject to rejection if contrary evidence transpires later. Abduction is therefore a tool for theorizing, induction for generalizing, and deduction for predicting or (dis)confirming (Mantere and Ketokivi 2013). In this thesis, the known theoretical premises of platform ecosystems are used to test them in a specific setting to make further conclusions and therefore, this research takes an abductive approach.

The methodological choice is either quantitative, qualitative, or mixed method. One distinction between quantitative and qualitative data is that while the former is numerical and standardized, the latter is non-standardized and derived from meanings that are expressed as words and images (Saunders *et al.* 2016, p. 569). In addition, quantitative data, such as counts and test scores, is characterized by not conveying meaning in its raw form (Saunders *et al.* 2016, p. 496). The nature of qualitative data, on the other hand, is complex, multilayered, and rich in expression (Alasuutari 2011, p. 63). This research includes both quantitative and qualitative techniques and is therefore a mixed method research. It has been stated that a mixed method research creates wider understanding around a research problem than either qualitative or quantitative method alone (Tuomi and Sarajärvi 2018, p. 57). A mixed method research design goes well together with pragmatism, where the methodological choice is strongly derived from the research context, questions, and consequences. In addition, this research design can be combined with deductive, inductive, or abductive approach to theory development. Depending on the order in which quantitative and qualitative methods are utilized, the research represents one of four different mixed method research designs (Figure 13). This research uses a sequential explanatory design, meaning that a quantitative method is followed by a qualitative method. Thus, the research approach is dynamic in a way that the first phase directs the following data collection and analysis. (Saunders *et al.* 2016, pp. 169–173)

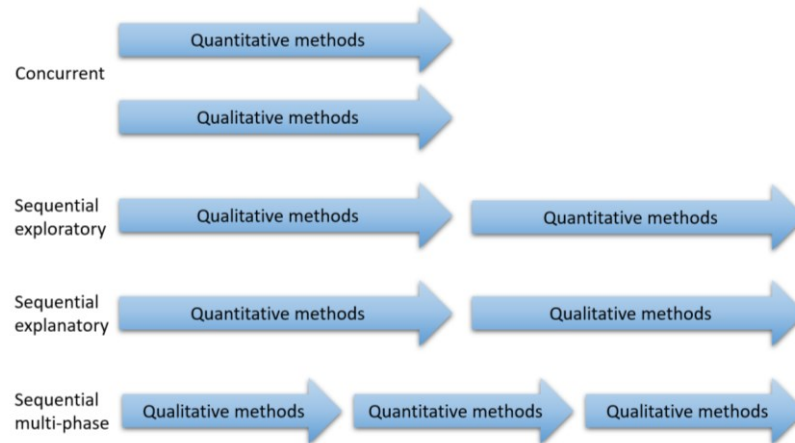


Figure 13. Mixed method research designs (adapted from Saunders *et al.* 2016, p. 170).

The research design also fulfils a purpose that is either exploratory, descriptive, explanatory, or evaluative. This research is an exploratory study, which means that it seeks to discover and make insights about a certain situation or topic. The intention of exploratory studies is to help understand issues, problems, or phenomena. (Saunders *et al.* 2016, pp. 174–175) Given that the aim of this research is to understand the incentives and barriers of different stakeholders to make insights about the potential platform, it supports an exploratory purpose.

After the research design, a researcher must decide on a research strategy. Research strategy is the plan for answering the research question and a link between the research philosophy and methods for data collection and analysis. This research exploits a survey strategy, which is frequently used together with exploratory studies and a deductive approach. Surveys are relatively easy to understand and generally considered to be authoritative. Questionnaires, structured observation, and structured interviews are common data collection techniques in the survey strategy. (Saunders *et al.* 2016, pp. 177–183)

Before the data collection and analysis methods, the time horizon for the research must be determined. The time horizon depends on the research question and it means that the research provides an overview of the phenomenon either at a particular time, i.e., cross-sectional, or over a given period of time, i.e., longitudinal. This thesis represents a cross-sectional study, since the data was collected over a short period of time to build a picture of the current state of affairs. Additionally, cross-sectional studies frequently exploit the survey strategy. (Saunders *et al.* 2016, pp. 200)

3.3 Data collection

The main data collection method in this research is questionnaire, which is supplemented by multiple in-depth interviews. As a sequential explanatory research, the quantitative method (questionnaire) was used before the qualitative method (interviews).

Questionnaire is the most common method to collect data in a survey research strategy. It is an efficient way for collecting data from a big sample since each respondent gets the same set of questions in a predetermined order. The two primary categories are self-completed questionnaires and interviewer-completed questionnaires. These contain a variety of data collection methods, for example, internet questionnaires, postal questionnaires, and face-to-face questionnaires. The challenge in using a questionnaire, however, is the difficulty of ensuring that the collected data will answer the research question and fulfil the research objectives. Additionally, there is usually only one chance to use the questionnaire and collect all the required data from it. Questionnaires function the most efficiently when used together with other methods, for example complementing the understanding gained from the data with in-depth interviews. (Saunders *et al.* 2016, pp. 436–440)

The theoretical background and the characteristics of the industry were utilized to build the questionnaire, which consisted of four parts. The introduction page included background information of the research, defined platforms in general, and introduced the idea of the new platform. In the first part, 15 theoretical advantages that platforms and ecosystems have for participating companies were listed. The respondents evaluated the importance of these advantages for their company using the Likert-scale. The second part included nine theoretical disadvantages and was identical to the first part in other respects. In the third part, previous experiences about platforms were inquired to identify the current utilization rate and considered importance of platforms. In the end of the third part, the interest to develop existing platforms and to join the platform in question were asked. Since open questions are useful in exploratory research (Saunders *et al.* 2016, pp. 453), why-questions were included to give the respondents a possibility to argue for their answers. The final part of the questionnaire included background questions of the company size, industry, and the respondent's role in the organization. The whole questionnaire, which was conducted in Finnish, is available in appendix A.

The questionnaire was built in an iterative matter, where all the advantages and disadvantages drawn from the theoretical background in chapter two were first listed and evaluated. Some benefits were also gained from the industry description, utilizing the

industry-specific problems that the platform could improve, which resulted in more than 50 questions overall. As Dillman *et al.* (2014) have pointed out, there is a great risk for low motivation to read questions and instructions carefully and to provide complete answers when the interviewer is not present during the questionnaire. Therefore, it was prioritized that the number of questions in the final version is compact enough to maintain motivation when fulfilling the questionnaire but also covers all relevant topics. The questions were left out by considering their relevance for this industry and research and by utilizing the feedback gained from different testers.

The final questions were taken to the LimeSurvey tool and the questionnaire was sent via email to 45 employees, most of which represented different companies. These included network companies, network contractors, wholesale companies, excavation contractors, equipment suppliers, experts, and IT companies. The sample was selected by purposive sampling. Some companies were invited as participants of the same project with this thesis, and others were picked by being known companies in their industry. The value chain includes a rather small number of players, especially considering large companies. The smallest companies were expected to be the least interested in the survey and a sample of the biggest companies was presumed to represent the industry well. The employees that were asked to participate were all managers or CEOs. The respondents were given a week to complete the questionnaire and multiple reminders were sent during this time.

After the questionnaire, data was collected with in-depth interviews. Interviews can be defined as asking purposeful questions from two or more interviewees and listening to the responses attentively to make further discoveries. The nature of interviews varies from informal conversations to structured and standardized questions. As such, they can be categorized to structured, semi-structured, and in-depth interviews. Also known as unstructured interviews, in-depth interviews are informal and explore essential topics in depth. The questions are not predetermined or listed, and the interviewee can freely talk about the events, opinions, and behaviors related to the topic. In-depth interviews are especially useful in an exploratory study to understand the current situation and the context. In addition, they can help to explore participants' opinions and choices further and uncover the reasons behind their responses. (Saunders *et al.* 2016, pp. 388–392)

After the questionnaire was conducted and analyzed, four in-depth interviews were held. The interviewees were manager-level representatives of relevant companies in the industry, including one network contractor, one network company, one IT company, and one wholesale business. The interviewees were selected by their experience and

expertise in the industry to gain insights related to the results of the quantitative analysis. In addition, the interviews were used to find if there were some important aspects the questionnaire did not take into account. The interviews were conducted remotely and lasted 1.5 hours each. Before the interviews, information of the companies was collected to gain relevant expertise for the discussion. As usually in in-depth interviews, there was no predetermined list of questions because the topics were discussed openly. Instead, the main quantitative findings and topics to be explored were listed and sent to the interviewees before the interviews.

3.4 Methods of analysis

After the questionnaire was closed, the answers were imported into Microsoft Excel to explore, organize, and build a general understanding around the data. The responses that lacked company background information were not used in the research at all, but other questionnaire parts could include empty answers. The first analyses were made by examining the respondents, comparing key figures, and drawing graphs. Before importing it to SPSS, the data was reorganized and edited by deleting the qualitative responses and recoding all the other answers into numeric.

The definition of quantitative analysis is arguing by numbers and the systematic, statistical connections between them (Alasuutari 2011, p. 28). The statistical analyses were conducted with SPSS. Since the data was not normally distributed, a nonparametric test was made to find if there were statistical differences in the answers of different respondent groups. This was conducted with the Kruskal–Wallis test, which has a null hypothesis that independent samples come from the same population. When the resulting p value is less than the significance level set, the null hypothesis is rejected, meaning that the samples belong to different populations. (Allen 2017, pp. 832–834) Since this is an exploratory study, the significance level was set to 0.10 instead of the generally used 0.05. The respondents were divided into three groups: network contractors, network companies, and other companies. These categories were set as independent variables and all the other questions as dependent variables. The test was first run with all three groups and then by combining two groups to compare with the third, resulting in three different combinations. In addition, pairwise comparisons were conducted for all three combinations by leaving one group out from the data.

The results of the Kruskal–Wallis test were tabulated and the questions that resulted in at least one statistically significant result were graphed with boxplots to conclude the reciprocal order in which the answers of different respondent groups are distributed.

Boxplots present the data in a vertical axis, with a box that corresponds the interquartile range from first quartile (25th percentile) to third quartile (75th percentile). The sample median (50th percentile) is marked inside the box with a horizontal line. The so-called whiskers are drawn up from the upper quartile to the largest observation that lies within 1.5 times the interquartile range and down from the lower quartile to the smallest observation that lies within 1.5 times the interquartile range. (Dekking *et al.* 2005, p. 236–237) Low potential outliers are more than 1.5 times the interquartile range, but at most three times the interquartile range below the first quartile. The same applies for high potential outliers, but they are at most three times the interquartile range above the third quartile. Low and high potential outliers are indicated with circles. Extreme values score more than three times the interquartile range below the first quartile or above the third quartile and are marked with asterisks. (van den Berg 2021) Data description and results of the quantitative data analyses are presented in chapter four.

Traditionally, qualitative data is analyzed by theoretical methods, such as grounded theory, discourse analysis, thematic analysis, qualitative content analysis, or narrative analysis (Flick 2014, p. 151). On the other hand, Roulston (2014, p. 297) has stated that although there are many forms of qualitative interviews, a single correct method to analyze the interview data does not exist. Gibbs (2018, p. 4) has mentioned that qualitative data collection and data analysis cannot be separated since the data is already analyzed during the collection, for example, by taking notes in an interview situation. In this research, the qualitative data represents a secondary source of data and traditional methods of qualitative analysis are not utilized. The statistical analysis explains how the platform characteristics are evaluated in different companies but do not explain the reasons behind these results. The two sources of qualitative data are the open questions in the questionnaire and the in-depth interviews. The open why-questions were used to explain the corresponding numeric answers and it was analyzed by listing, evaluating, and comparing. The interviews were used as a source of insights on explaining and interpreting the quantitative results. This data was analyzed mostly during the interviews and simultaneously with writing the discussion. Therefore, the qualitative data analysis followed the notion of Gibbs, in that the collection and analysis did not have a clear separation. Chapter five presents the insights gained from the qualitative analysis in more detail.

4. RESULTS

This chapter considers the results gained from the quantitative data analyses. The first subchapter describes the data gained from the questionnaire with the help of graphs and key figures. In addition to the initial data examination, it was tested if statistically significant differences in the questionnaire data can be found. These results are presented in the second subchapter.

4.1 Data description

4.1.1 Respondents

The questionnaire was sent to 45 individuals, out of which 26 completed answers were gained. Thus, the response rate for the questionnaire is 58 %. The respondent companies include eight network companies, eight network contractors, three experts, two wholesale companies, two consulting companies, one advocacy group, one energy company, and one IT company (Figure 14).

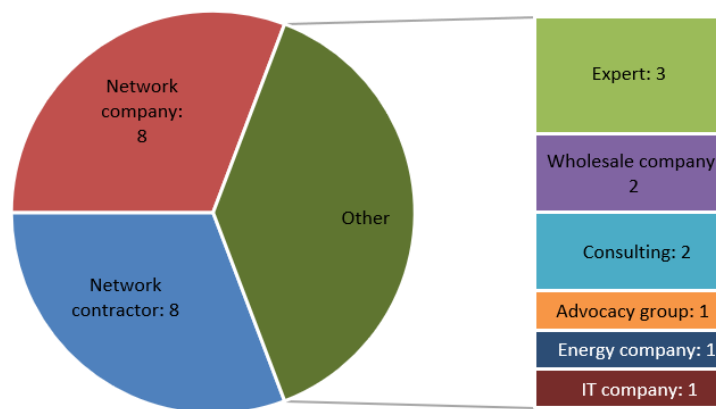


Figure 14. Industries of the respondent companies.

Figure 15 presents the job descriptions of the respondents. The largest individual group is CEO (8), and the second largest is manager (6). In addition, some managers reported their role more accurately. The remaining roles are expert, consult, advisor, and chairman of the board.

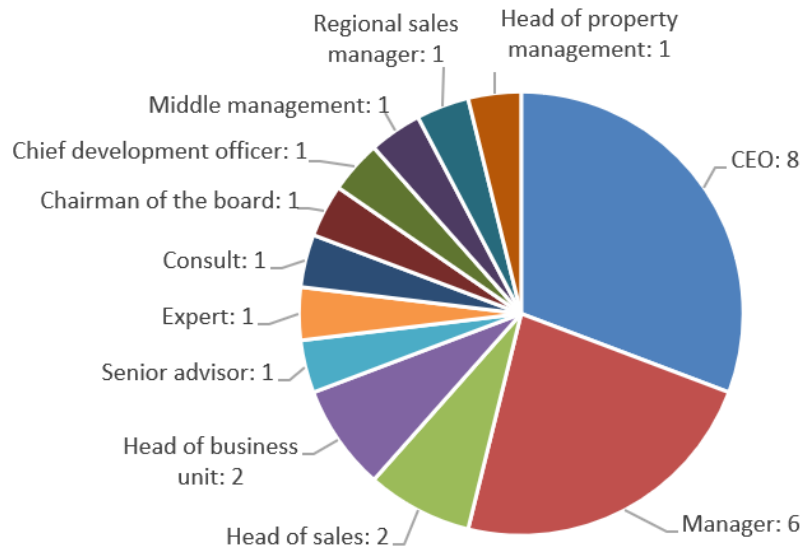


Figure 15. The respondents' role in their company.

The distribution of the number of employees is illustrated in Figure 16. The majority, 17 companies, are SMEs and nine out of 26 are large-scale enterprises. The smallest companies represent network companies and other companies.

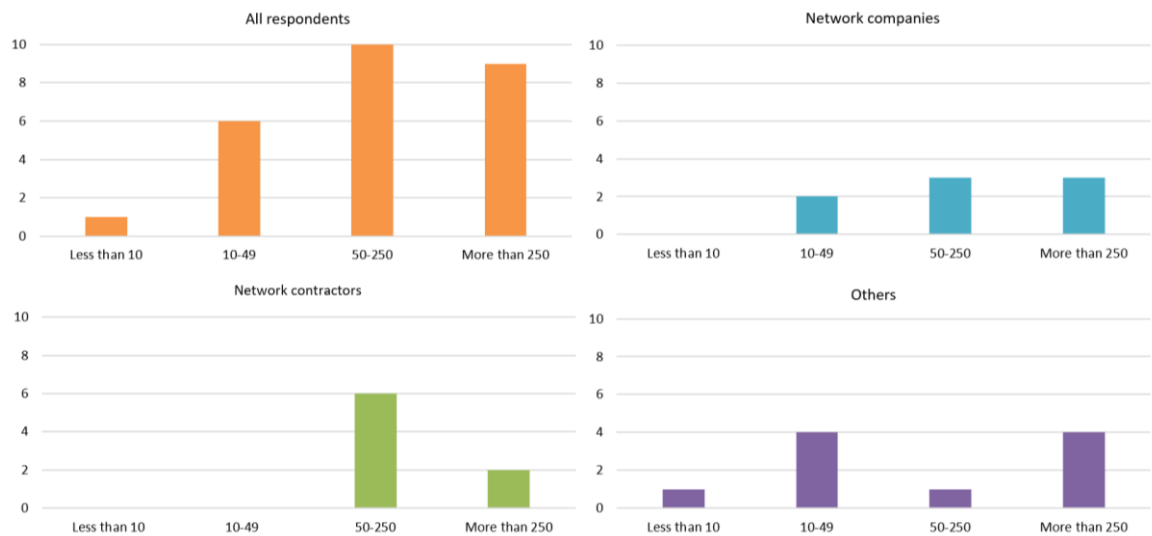


Figure 16. Number of employees in the companies.

The turnover of the companies is presented in Figure 17, which shows that the distribution is rather level excluding one company that had a turnover of less than two million euros. The turnover of all network companies is 10 MEUR or more, while network contractors have a turnover between 2 and 250 million euros. The other companies are more distributed to both ends of the scale.

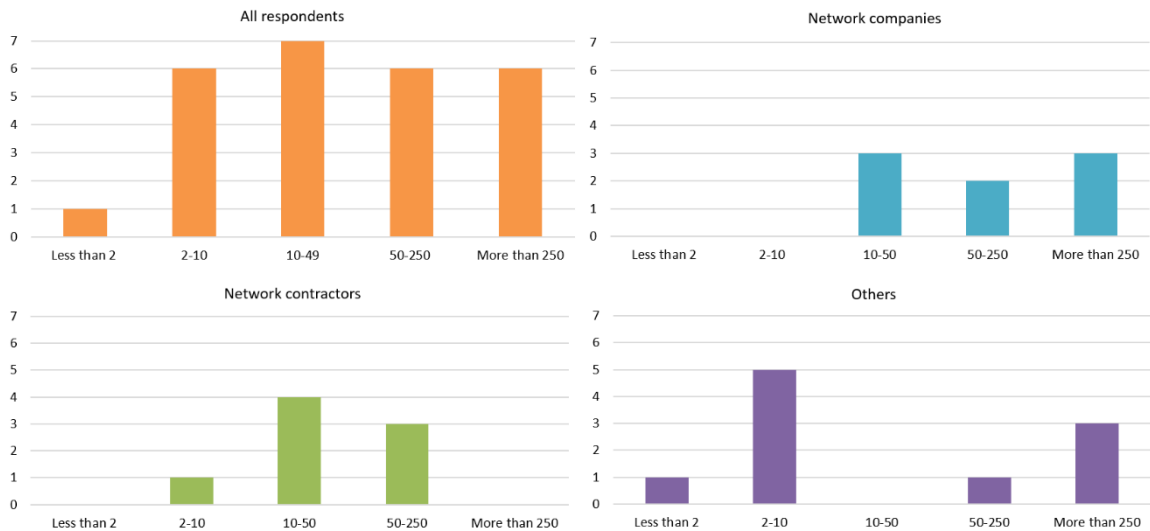


Figure 17. Turnover of the companies (MEUR).

4.1.2 First part of the questionnaire

Part one of the questionnaire considered the benefits of platforms. The questions were evaluated on a scale from 1–5, where the numbers equal strongly disagree (1), moderately disagree (2), neither agree or disagree (3), moderately agree (4), and strongly agree (5). The average of the fifteen questions is 3.84 for all 26 respondents, 3.66 for network companies, 3.99 for network contractors, and 3.84 for the others (Figure 18). This indicates that the benefits of platforms are valued slightly above average by network contractors and below average by network companies. Additionally, the average of all respondents is above scale average (3), implicating that in general, the benefits are valued distinctly above neutral.

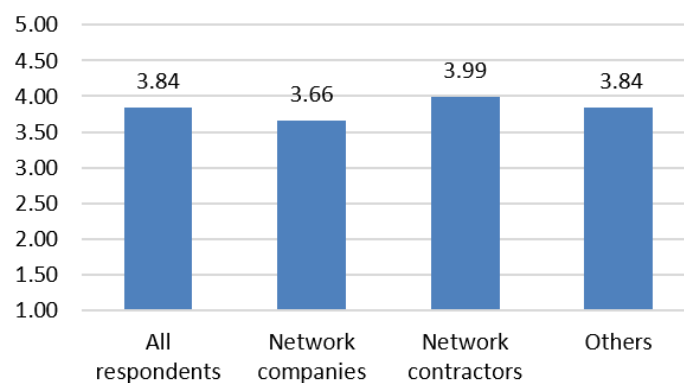


Figure 18. The averages of all questions in part 1.

In Figure 19, the averages of each question are presented by all respondents, network companies, network contractors, and other companies. When all the respondents are observed as one group, it appears that improving the performance of the network service

business is the most valued benefit with an average of 4.54. Almost as significant are that the platform enables new possibilities for products or services exceeding conventional boundaries (4.52) and that the variety of supply and demand is increased (4.38). The least valued benefit with an average of 2.28 is the ability to control participants' access and activity in the platform. In addition, the strategic benefits, e.g., differentiation, flexible decision making, organization of the platform, and focusing on the core business, tend to be less important for the respondents. Thus, the most important benefits are related to the functioning of the whole network service business, ranking the interorganizational benefits higher than the internal benefits.

When the answers of network companies are observed, the same two questions appear in the top with higher than the total averages (4.75 and 4.71). However, the third most important aspect is combining customers and producers more cost-effectively (4.38). The least valued benefits are control over the platform (2.57) as well as the different strategic benefits. The network contractors' answers show that while creating new possibilities to offerings exceeding conventional boundaries is the second most important benefit (4.40), the most important one is getting closer to customers (4.63). For network contractors, improving the performance of the network service business is only the third most important aspect (4.38). Saving time in the acquisition of customers is clearly less important for the network contractors compared to other groups (3.63). The least important benefits consider controlling the platform (2.38) and the strategic advantages.

The last graph includes all ten other companies outside network contractors and network companies. For this group, both increasing the variety of supply and demand as well as improving the effectiveness of the network service business are considered the most significant, with a 4.50 average. Reducing the risk of disruption in critical information flows (4.40) and saving time in the acquisition of customers (4.30) rank slightly higher than in the other categories. The least important aspects are the possibility to control the platform (2.00) and the different strategic benefits.

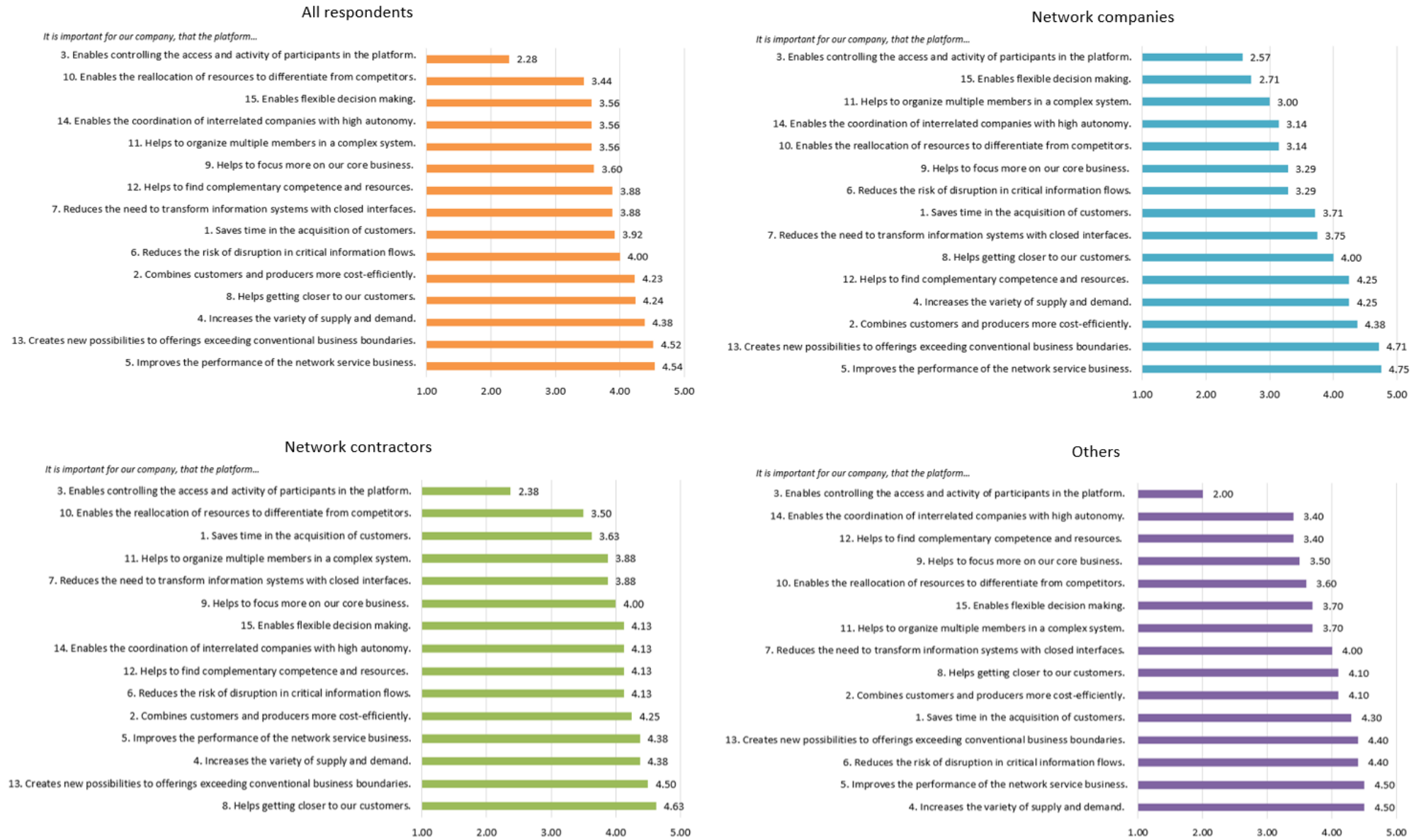


Figure 19. The averages of the first part by question and industry group.

Table 1 presents the standard deviations of all questions in part one. For all respondents, the lowest standard deviation is in question 13 (0.59), meaning that respondents are the most unanimous about the importance that the platform creates new possibilities to offerings exceeding conventional business boundaries. Helping to focus on the core business has the highest standard deviation (1.26), with the most variation among network contractors (1.41) and the least among other companies (1.08). Improving the performance of the network service business, which is the most significant benefit for all respondents on average, has little variation among the respondents (0.65). The least valued benefit, the ability to control access and activity in the platform, has little variation among network contractors (0.52) and the others (0.82) but considerably more variation among network companies (1.40). Another question that has divided the groups is saving time in the acquisition of customers, which is more evenly distributed among other companies (0.48) than network companies (1.38). Reducing the need to transform information systems with closed interfaces clearly has more variation among network contractors (1.55) than among other companies (0.94). In addition, getting closer to customer has no variation among network companies, but a 0.88 standard deviation among other companies.

Table 1. Standard deviations of part one.

<i>It is important for our company, that the platform...</i>	n	All respondents	Network companies	Network contractors	Others
1. ...saves time in the acquisition of customers.	25	1.00	1.38	1.06	0.48
2. ...combines customers and producers more cost-efficiently.	26	0.71	0.74	0.71	0.74
3. ...enables controlling the access and activity of participants in the platform.	25	0.94	1.40	0.52	0.82
4. ...increases the variety of supply and demand.	26	0.75	0.71	1.06	0.53
5. ...improves the performance of the network service business.	26	0.65	0.46	0.74	0.71
6. ...reduces the risk of disruption in critical information flows.	25	0.91	0.76	0.99	0.70
7. ...reduces the need to transform information systems with closed interfaces.	26	1.18	1.16	1.55	0.94
8. ...helps getting closer to our customers.	25	0.66	0.00	0.52	0.88
9. ...helps to focus more on our core business.	25	1.26	1.38	1.41	1.08
10. ...enables the reallocation of resources to differentiate from competitors.	25	0.96	0.90	1.20	0.84
11. ...helps to organize multiple members in a complex system.	25	0.87	0.82	0.64	0.95
12. ...helps to find complementary competence and resources.	26	0.91	0.71	0.64	1.07
13. ...creates new possibilities to offerings exceeding conventional business boundaries.	25	0.59	0.49	0.53	0.70
14. ...enables the coordination of interrelated companies with high autonomy.	25	1.08	1.07	0.64	1.26
15. ...enables flexible decision making.	25	1.00	0.95	0.99	0.67

4.1.3 Second part of the questionnaire

Figure 20 shows how the disadvantages of platforms are evaluated by the respondents. The response options are the same as in part one. On average, the questions are rated 3.26, which is above neutral (3). Network companies and the others see the disadvantages somewhat less important than average (2.98 and 2.93), while the average of network contractors is almost one unit higher (3.89).

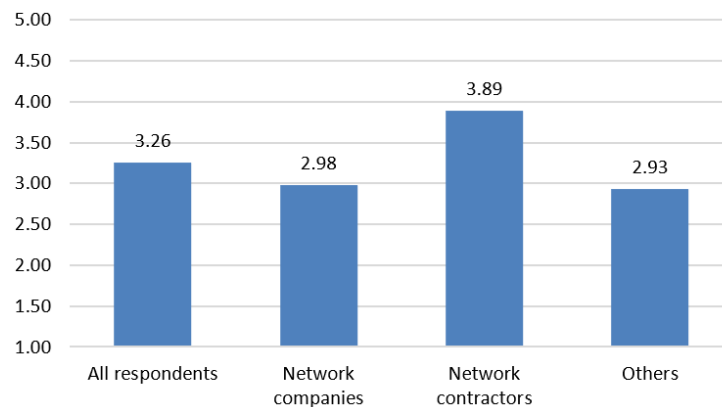


Figure 20. The averages of all questions in part 2.

Figure 21 presents the averages of part two by question and industry category. It indicates that the risk of a dominator emerging in the platform is considered all in all the most significant disadvantage with a 3.88 average. Preparing for delays and compromises outside the company's own control is the second most important disadvantage (3.72). Increasing dependence on other companies' innovating (3.52) and making traditional risk assessment processes inadequate (3.48) are almost as significant for all the respondents on average. The least ranked question is aligning partners' roles with the organization's strategy (2.58). Giving other companies, even if not directly connected to the focal firm, a significant role in creating value is the second least important disadvantage of platforms in this part of the questionnaire (2.92).

For network companies, the risk of a dominator emerging is also the most significant disadvantage. However, the 4.00 average is a little higher than among all the respondents, meaning that the threat is more important for the network companies than average. Otherwise, the highest ranked questions show little difference compared to all respondents. The least important questions are also similar to all respondents, but the averages are clearly lower. The figure also indicates that on average, network contractors consider all the disadvantages more significant than other respondents. Especially the risk of a dominator is ranked almost one unit higher by the network contractors (4.75) than by all respondents (3.88). Making competition more complex and

dynamic is also slightly more important for the network contractors (3.75). Unlike in other categories, giving other companies a significant role in value creation (3.50) and capturing a community of producers and consumers to create competitive advantage (3.50) are the least significant disadvantages. It can also be noticed that other companies have rated all the disadvantages less important than average. For them, the risk of a dominator is only the third most important (3.10) and preparing for delays and compromises outside the company's control is the most significant disadvantage with a 3.60 average. Otherwise, the averages show no major differences to all the respondents combined.

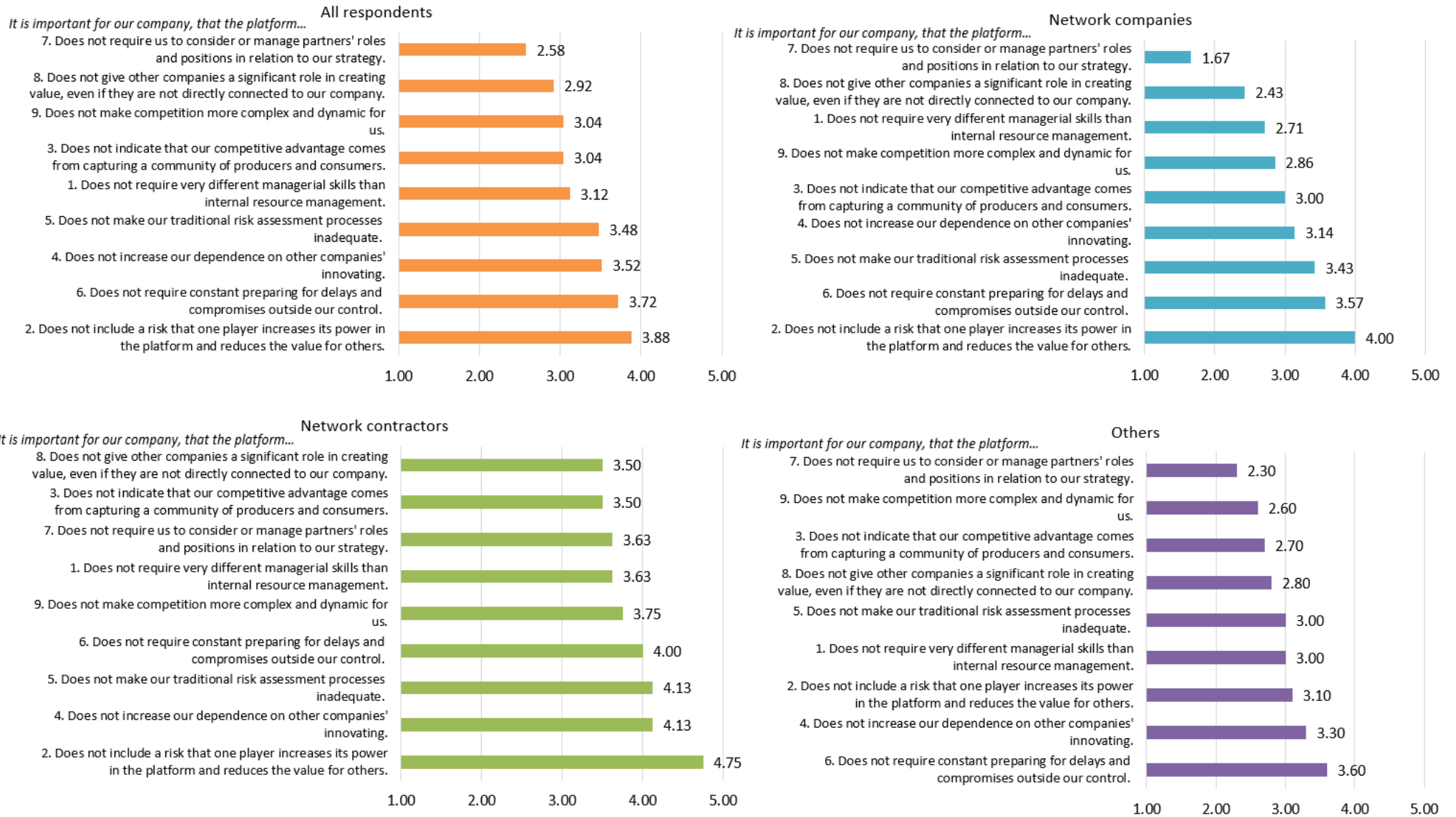


Figure 21. The averages of the second part by question and industry group.

The standard deviations of part two are presented in Table 2. The highest standard deviation is in question 6 regarding the constant preparing for delays and compromises (1.28). The lowest standard deviation is in question 3 which considered the indication that competitive advantage comes from capturing a community of producers and consumers (0.86). The most important disadvantage, the risk of a dominator, has a standard deviation of 1.17 and the least important disadvantage, considering partners' roles and position in relation to own strategy, has a standard deviation of 1.14 among all respondents. Question 5 about the traditional risk assessment becoming inadequate divides the industry groups, with network companies having a very strong variation (1.51) compared to network contractors (0.35). In addition, the risk that one player increases its power and value over others has a low standard deviation of 0.46 among network contractors and a lot higher, 1.20, among other companies. Network companies have more variation about the platform making competition more complex or dynamic (1.46) compared to other companies (0.97).

Table 2. Standard deviations of part two.

	n	All respondents	Network companies	Network contractors	Others
<i>It is important for our company, that the platform...</i>					
1. ...does not require very different managerial skills than internal resource management.	25	1.20	1.11	1.41	1.05
2. ...does not include a risk that one player increases its power in the platform and reduces the value for others.	25	1.17	1.00	0.46	1.20
3. ...does not indicate that our competitive advantage comes from capturing a community of producers and consumers.	24	0.86	0.63	0.93	0.82
4. ...does not increase our dependence on other companies' innovating.	25	1.12	1.35	0.99	0.95
5. ...does not make our traditional risk assessment processes inadequate.	25	1.16	1.51	0.35	1.15
6. ...does not require constant preparing for delays and compromises outside our control.	25	1.28	1.27	1.31	1.35
7. ...does not require us to consider or manage partners' roles and positions in relation to our strategy.	24	1.14	0.52	0.92	0.95
8. ...does not give other companies a significant role in creating value, even if they are not directly connected to our company.	25	1.08	0.98	1.20	0.92
9. ...does not make competition more complex and dynamic for us.	25	1.21	1.46	1.04	0.97

4.1.4 Third part of the questionnaire

The third part of the questionnaire considered the utilization and interest related to platforms. The quantitative questions of this part are summarized in Figure 22. The first question regarding how many platforms are currently used in the company was compulsory, and the next two were voluntary ones asked only if the first answer was other than zero. Six out of eight network companies use only one or two platforms, one uses 3–4 platforms, and one company utilizes five or more platforms. Five out of eight network contractors use 1–2 platforms, and three use five or more. The other companies have less variance and the utilization is more evenly distributed, including one company that does not use any platforms. Most network companies utilize the platforms to some amount, while network contractors either use them (very) little or (very) much. The others differ from the rest by mostly using the platforms very much. Some companies have participated in platforms for only a few years, but the vast majority has used them for more than 5 years.

The last three questions in the third part were non-voluntary, meaning that all questions include 26 responses, apart from the last question regarding the interest to operate the platform which was not asked if the respondent was not at all interested to join the new platform. Five network companies and five network contractors have some interest to bring together the members of the value chain by expanding an existing platform. The rest have much or very much interest, excluding one network company that has very little interest to the expansion. The other companies have more interest than network companies and network contractors, apart from one company (an advocacy group) that has no interest at all. When asked about the interest to join the new platform introduced in the survey, six out of eight network companies had some interest, one had very little interest, and only one reported having much interest for joining it. Half of the network contractors have much or very much interest, and the other half have some interest. Other companies are evenly distributed to some, much, and very much interest, apart from one company (an energy company) that has no interest at all. None of the network companies and only one network contractor is willing to operate the platform as a leading actor. However, four out nine respondents among other companies answered yes.



Figure 22. The answers of the third part by question and category.

4.2 Results of the quantitative analysis

Table 3 presents all the seven nonparametric Kruskal–Wallis tests that were conducted with SPSS. The industry categories were set as network companies, network contractors, and the others, which included all ten remaining respondents. The test fields were all the questions regarding the advantages and disadvantages, the sum of the advantages and disadvantages, and the questions from part three excluding the non-scalable qualitative questions and the question regarding the interest to operate the platform. The answers regarding the advantages and disadvantages of platforms were coded on an ordinal scale from 1 to 5. The answers regarding the number of platforms used were coded with an ordinal scale of 0–3. Other answers in the third part were coded using an ordinal scale of 1–3 or 1–4, depending on the number of response options. The significance level of the test was set to 0.1. The first test looked for differences among all the three groups. Tests 2–4 compared two industry groups combined to the one remaining group. In tests 5–7, one of the three groups was left out from the data and the two remaining groups were compared with each other.

Table 3. A description of the statistical analyses conducted.

	Group	Test fields	Test
1	Network companies vs. network contractors vs. others	Questions 1–15 (part 1), questions 16–24 (part two), questions 25–29 (part three), averages of advantages, averages of disadvantages	Independent samples Kruskal–Wallis test
2	Network companies + network contractors vs. others		
3	Network contractors + others vs. network companies		
4	Network companies + others vs. network contractors		
5	Network companies vs. network contractors		
6	Network companies vs. others		
7	Network contractors vs. others		

Table 4 presents the resulted p values of each question and test. The tests found between four and eleven significant results within the 31 test fields, and all the Kruskal–Wallis tests gained 51 significant results in total. All p values below the significance level (0.1) are bolded.

Table 4. p values of the Kruskal–Wallis tests.

<i>It is important for our company, that the platform...</i>	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Test 7
1. ...saves time in the acquisition of customers.	0.425	0.225	0.842	0.278	0.715	0.526	0.135
2. ...combines customers and producers more cost-efficiently.	0.701	0.455	0.468	0.952	0.687	0.413	0.662
3. ...enables controlling the access and activity of participants in the platform.	0.554	0.277	0.564	0.558	0.902	0.416	0.308
4. ...increases the variety of supply and demand.	0.673	0.768	0.385	0.576	0.452	0.453	0.800
5. ...improves the performance of the network service business.	0.535	0.854	0.301	0.401	0.268	0.452	0.690
6. ...reduces the risk of disruption in critical information flows.	0.031	0.076	0.010	0.534	0.056	0.011	0.591
7. ...reduces the need to transform information systems with closed interfaces.	0.915	0.779	0.678	0.906	0.820	0.636	1.000
8. ...helps getting closer to our customers.	0.057	0.621	0.078	0.027	0.013	0.357	0.147
9. ...helps to focus more on our core business.	0.339	0.486	0.447	0.144	0.229	0.835	0.192
10. ...enables the reallocation of resources to differentiate from competitors.	0.636	0.503	0.356	0.854	0.548	0.320	0.852
11. ...helps to organize multiple members in a complex system.	0.131	0.535	0.049	0.214	0.046	0.138	0.700
12. ...helps to find complementary competence and resources.	0.151	0.056	0.190	0.483	0.680	0.085	0.141
13. ...creates new possibilities to offerings exceeding conventional business boundaries.	0.593	0.505	0.315	0.789	0.414	0.340	0.841
14. ...enables the coordination of interrelated companies with high autonomy.	0.153	0.644	0.166	0.069	0.052	0.545	0.188
15. ...enables flexible decision making.	0.017	0.726	0.009	0.032	0.014	0.030	0.164
16. ...does not require very different managerial skills than internal resource management.	0.392	0.708	0.346	0.194	0.189	0.684	0.330
17. ...does not include a risk that one player increases its power in the platform and reduces the value for others.	0.013	0.010	0.949	0.008	0.068	0.130	0.006
18. ...does not indicate that our competitive advantage comes from capturing a community of producers and consumers.	0.171	0.123	0.855	0.075	0.263	0.491	0.077
19. ...does not increase our dependence on other companies' innovating.	0.145	0.300	0.363	0.049	0.116	0.879	0.070
20. ...does not make our traditional risk assessment processes inadequate.	0.092	0.054	0.924	0.053	0.431	0.453	0.015
21. ...does not require constant preparing for delays and compromises outside our control.	0.680	0.773	0.571	0.396	0.329	0.920	0.571
22. ...does not require us to consider or manage partners' roles and positions in relation to our strategy.	0.004	0.361	0.019	0.002	0.003	0.159	0.013
23. ...does not give other companies a significant role in creating value, even if they are not directly connected to our company.	0.100	0.507	0.157	0.039	0.064	0.462	0.087
24. ...does not make competition more complex and dynamic for us.	0.121	0.107	0.778	0.050	0.245	0.611	0.035
25. How many platforms does your company currently use?	0.517	0.365	0.281	0.902	0.478	0.248	0.737
26. How much does your company use the most utilized platform?	0.630	0.438	0.945	0.372	0.513	0.661	0.379
27. How long has your company participated in the most utilized platform?	0.905	0.655	0.819	0.805	1.000	0.698	0.714
28. How interested would you be to extend a current platform, so it could bring together more players of the value chain?	0.556	0.502	0.282	0.712	0.361	0.322	0.884
29. How interested would you be to join the platform introduced in this questionnaire?	0.131	0.243	0.044	0.435	0.069	0.077	0.851
Averages of advantages	0.855	0.791	0.780	0.577	0.636	0.964	0.622
Averages of disadvantages	0.028	0.063	0.486	0.009	0.055	0.625	0.011
Statistically significant results in total	7	5	6	11	10	4	8

The rest of this subchapter considers the questions including statistically significant differences in more detail. Figures 23–37 show the box plots of each question that has statistical differences, in which the boxes include the middle 50 percent of observations and whiskers include the lower and upper 25th percentiles. The horizontal lines correspond the sample median, circles indicate the potential outliers, and asterisks the extreme values (Subchapter 3.4). The box plots of tests 5–7 are not included in the figures since the box plots of test 1 include the pairwise comparison box plots as well. Not all statistically insignificant p values and tests are mentioned in the text.

The first test for question 6 comparing all three industry groups gives a p value of 0.031, resulting in the rejection of the null hypothesis. Combining the others and network contractors in the same group and comparing them to network companies gives a statistically significant p value as well (0.010). If network contractors are combined with network companies and compared to the others, it appears that the others value the benefit more than the rest of the respondents (0.076). A statistical difference is also found when network contractors are compared to network companies (0.056) and the others are compared to network companies (0.011). Therefore, the pairwise comparisons and the box plots of question 6 reveal that network companies consider reducing the risk of disruption in critical information flows less important than network contractors and the others (Figure 23). The pairwise comparison of the others and network contractors does not find a statistical difference, thus no group stands out by finding this benefit more important than the rest of the respondents.

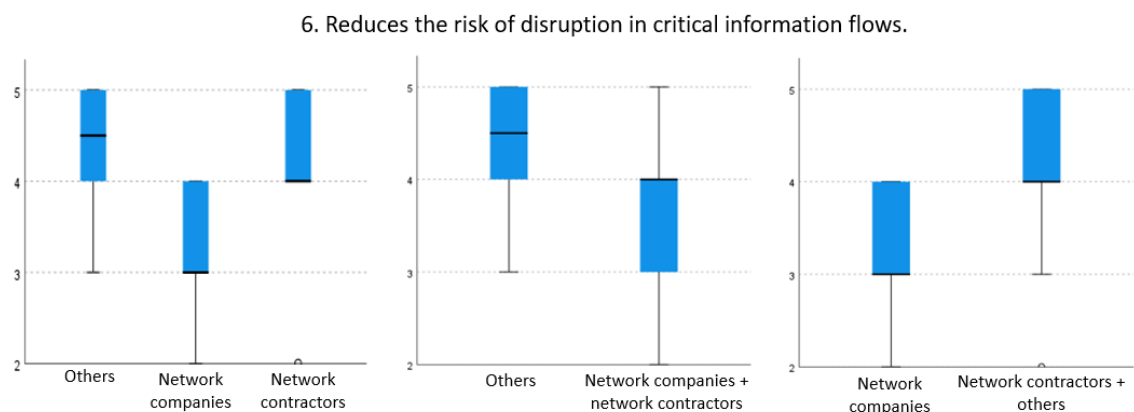


Figure 23. Box plots of question 6.

The first test of question 8 results in a p value of 0.057. Tests 3 and 4 signify that the statistical difference remains if the others are combined with either network companies (0.027) or network contractors (0.078). According to the fifth test, network companies and network contractors have a statistical difference (0.013). The other pairwise

comparisons show that there are no statistical differences between the others and network companies or the others and network contractors. Hence, according to both the pairwise comparisons and the tests 3–4, the extreme ends are network contractors and network companies. In conclusion, network companies differ from network contractors by finding this benefit less important and vice versa (Figure 24).

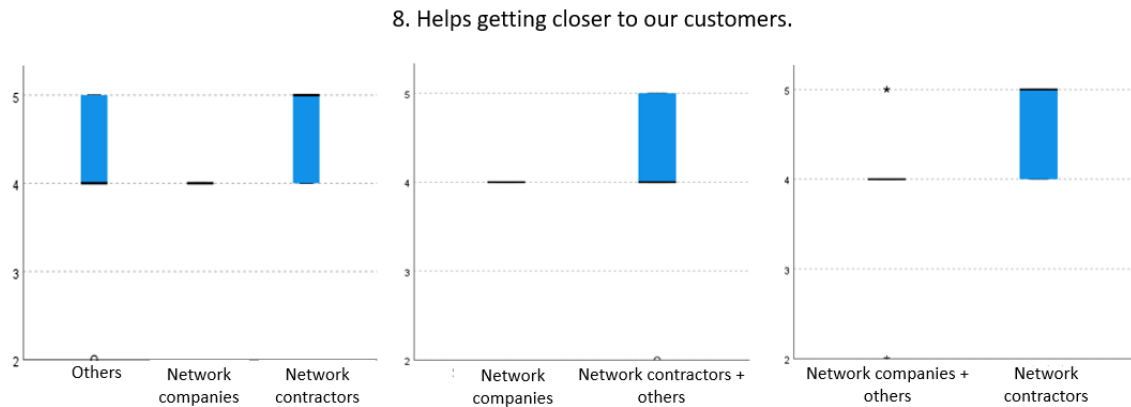


Figure 24. Box plots of question 8.

The advantage of organizing multiple members in a complex system (question 11) is rated lower among network companies compared to network contractors only (0.046) or compared to network contractors and the others combined in test (0.049). However, the other comparisons show no statistically significant differences. Therefore, the pairwise comparisons indicate that network companies and network contractors differ from each other as extreme ends, and test 3 reveals that the one group standing out from the rest is network companies. The conclusion is that network companies value this benefit less compared to the rest of the respondents combined and network contractors more compared to network companies, as the box plots show as well (Figure 25).

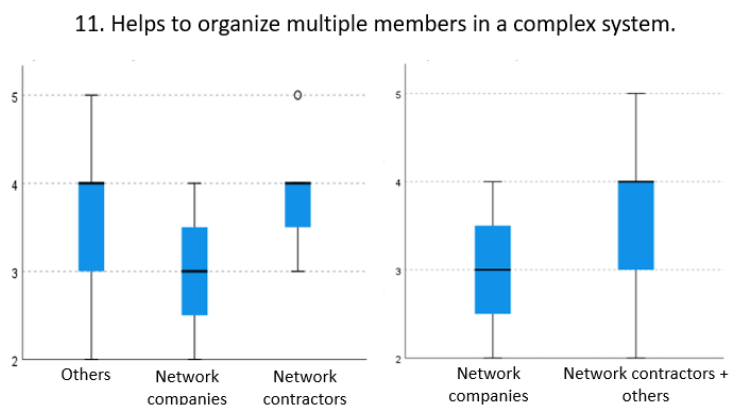


Figure 25. Box plots of question 11.

For question 12, a statistically significant difference is not found in test 1 with all three groups compared. The only pairwise comparison resulting in a statistically significant p

value is between network companies and the others (0.085), revealing the extreme ends differing the most from each other but not the one group standing out from the rest. However, test 2 and the box plots (Figure 26) implicate that finding complementary competence and resources with the help of the platform is significantly less important for other companies than for network companies and network contractors combined (0.056). In conclusion, the one group standing out by considering this benefit the least important compared to the rest of the respondents combined is the others. In addition, network companies find the advantage more important than the others.

12. Helps to find complementary competence and resources.

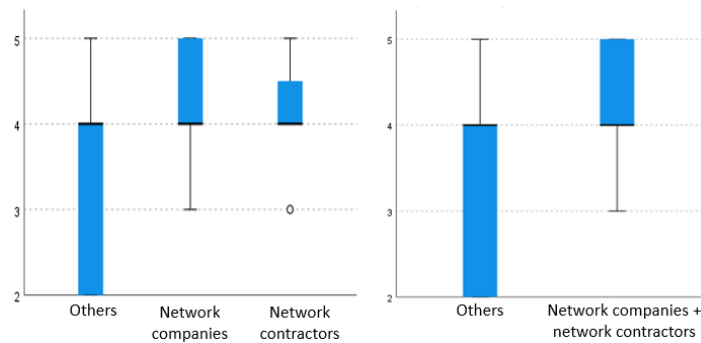


Figure 26. Box plots of question 12.

The comparison of question 14 is statistically significant between network companies and network contractors (0.052). The other pairwise comparisons or test 1 do not result in statistical significance. According to the fourth test and Figure 27, enabling the coordination of interrelated companies with high autonomy is an aspect of the platform that network contractors value significantly more than network companies and the others combined (0.069). In conclusion, network contractors differ by finding this benefit more important than other groups combined and network companies by finding it less important than network contractors.

14. Enables the coordination of interrelated companies with high autonomy.

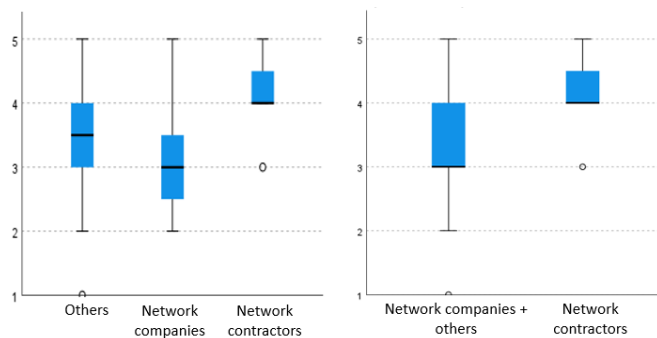


Figure 27. Box plots of question 14.

The comparison of all three groups gives a p value of 0.017 for question 15 regarding flexible decision making. The combination of network contractors and the others is also statistically significant compared to network companies (0.009), as is the combination of the others and network companies compared to network contractors (0.032). The comparisons of network companies vs. network contractors (0.014) and network companies vs. the other companies (0.030) are statistically significant as well. The pairwise comparisons reveal that network companies clearly differ from the other groups, and from Figure 28 it can be inferred that network companies have considered this benefit the least important compared to the other groups. Since no statistically significant difference is found between network contractors and the others, no group stands out by valuing this benefit more compared to the other groups.

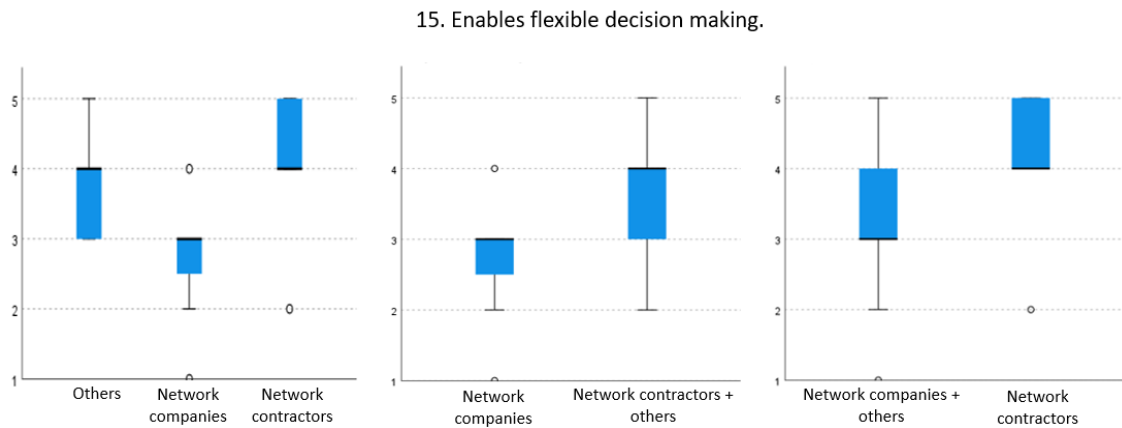


Figure 28. Box plots of question 15.

The risk of a dominator emerging in the platform and reducing the value for others (question 17) clearly divides the three respondent groups with a 0.013 p value. Network contractors find this disadvantage more significant than network companies and the others combined (0.008). A statistical difference is also found if network companies and network contractors are combined and compared with the other companies (0.010). The comparison of the others vs. network contractors gives a 0.006 and network contractors vs. network companies a 0.068 p value. From the pairwise comparisons and Figure 29 can be concluded that network contractors distinctly find this disadvantage more significant for their business than the other respondents. The others vs. network companies comparison does not have a statistically significant difference, meaning that a group finding this disadvantage the least important cannot be concluded.

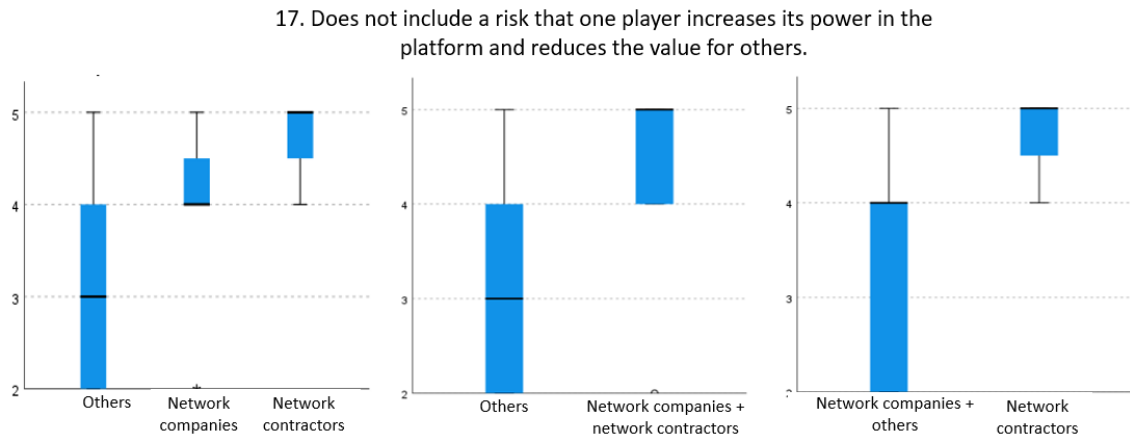


Figure 29. Box plots of question 17.

The pairwise comparisons of question 18 indicate that network contractors and the others have a statistically significant difference in their answers (0.077), meaning that these groups differ from each other the most. Combining the others with network companies and comparing them with network contractors in test four is also statistically significant (0.075). The other tests are above the significance level. Thus, the fourth test and the box plots (Figure 30) indicate that network contractors consider it the most important compared to other groups combined that competitive advantage does not come from capturing the community of producers and consumers in the platform, while the others consider it less important compared to network contractors.

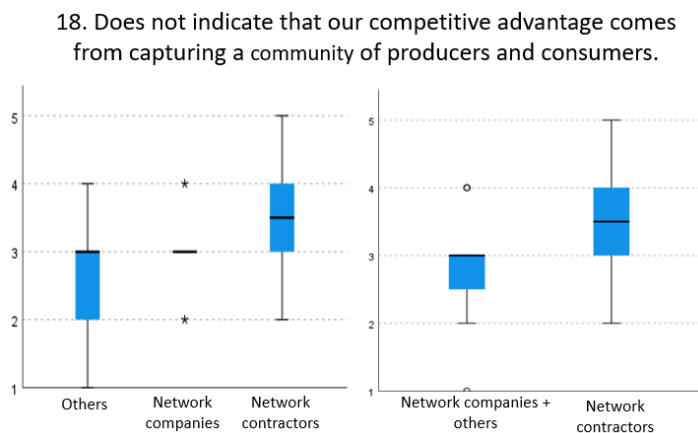


Figure 30. Box plots of question 18.

In question 19, network contractors and the others have a statistically significant difference (0.070). Adding network companies to the others group in test four results in a p value of 0.049. Other tests do not have statistical differences. From test four and Figure 31, it can be inferred that the platform not increasing dependence on other companies' innovating is the most important for network contractors compared to the other groups combined and less important for the others compared to network contractors.

19. Does not increase our dependence on other companies' innovating.

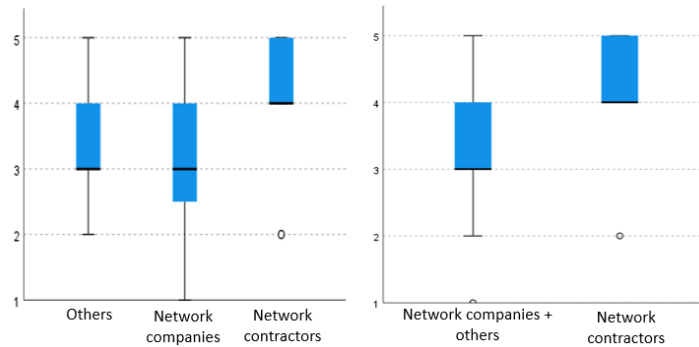


Figure 31. Box plots of question 19.

A p value of 0.092 is found when all three groups are compared in question 20. If network companies and network contractors are combined, a 0.054 p value is resulted. If network companies are combined with the others, the corresponding p value is 0.053. The last test comparing only network contractors and the others is significant with a p value of 0.015. Thus, the others and network contractors differ the most from each other considering the disadvantage that the platform could make traditional risk assessment processes inadequate. The conclusion is that the others find this disadvantage less important compared to network contractors and network contractors more important compared to the others (Figure 32).

20. Does not make our traditional risk assessment processes inadequate.

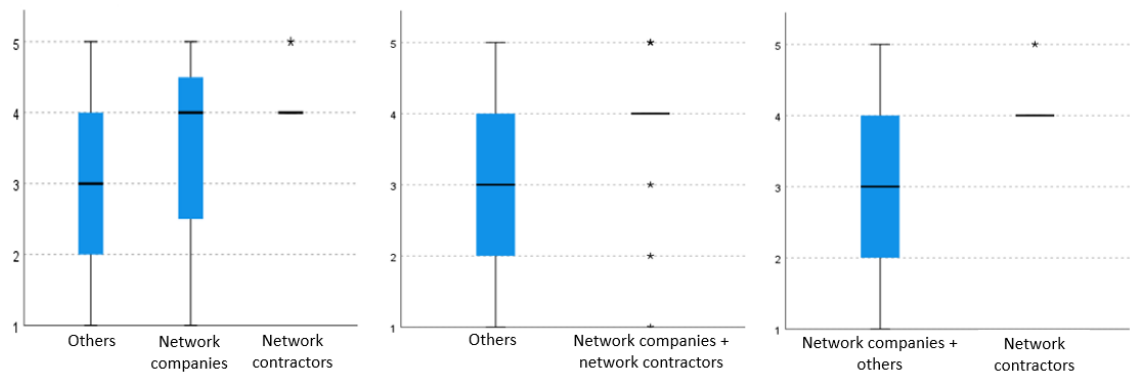


Figure 32. Box plots of question 20.

Question 22 considers the disadvantage that companies have to control partners' roles and position in relation to their own strategy. The first test reveals a difference between the three groups (0.004). Combining the others with either network contractors (0.019) or network companies (0.002) are statistically significant as well. The pairwise comparisons of network contractors vs. others are significant on a 0.013 level and

network companies vs. network contractors on a 0.003 level. The pairwise comparisons thus reveal that network contractors differ from the other respondents, and Figure 33 shows that they consider this disadvantage more significant. Since a significant difference does not exist between the others and network companies, a group finding this disadvantage less important than other respondents cannot be concluded.

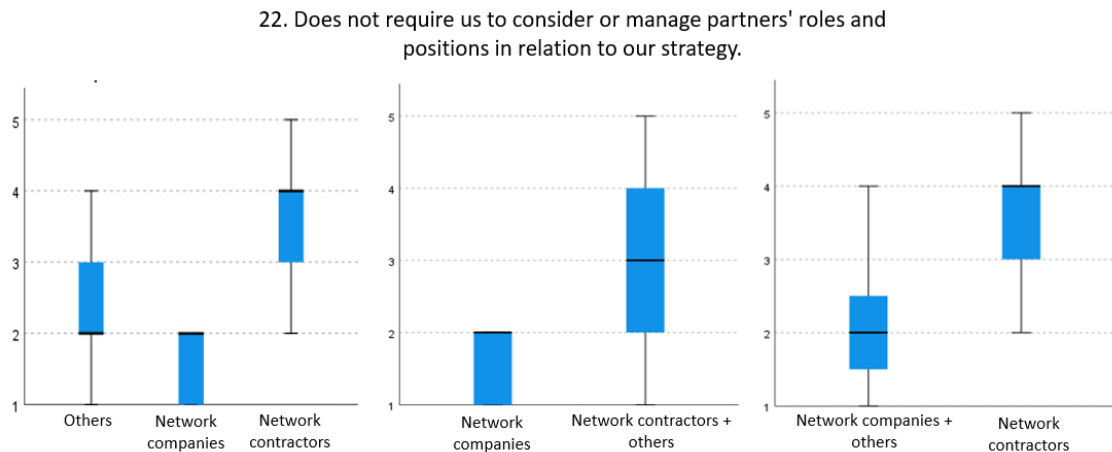


Figure 33. Box plots of question 22.

The Kruskal–Wallis tests of question 23 are significant when comparing network companies and the others to network contractors (0.039), network companies to network contractors (0.064), and network contractors to the others (0.087). Therefore, network contractors clearly stand out from the other groups. The box plots (Figure 34) show that network contractors consider it more important compared to the rest that the platform does not give other companies a significant role in value creation. Network companies have rated this disadvantage the least important on average, but the difference to the others is not statistically significant.

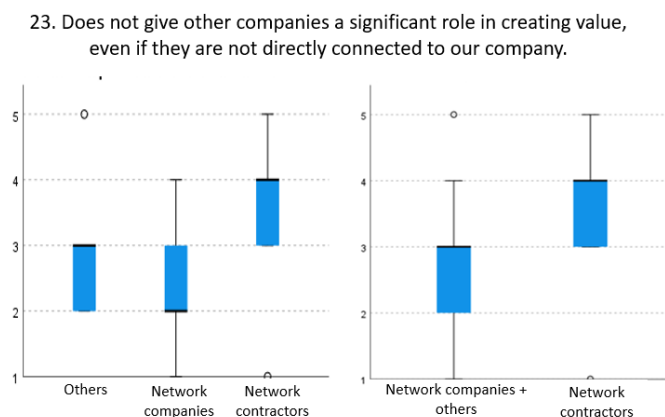


Figure 34. Box plots of question 23.

The comparison of all three groups does not result in a statistically significant difference for question 24. The pairwise comparison is significant only when network contractors and the others are compared (0.035), revealing that these groups differ the most from each other. However, if network companies and the others are tested together as a group and compared to network contractors, a p value of 0.050 is found. It can therefore be concluded that network contractors stand out as a group by finding it more important that the platform does not make competition more complex and dynamic than the rest of the respondents combined (Figure 35). In addition, the others find this disadvantage less important compared to network contractors.

24. Does not make competition more complex and dynamic for us.

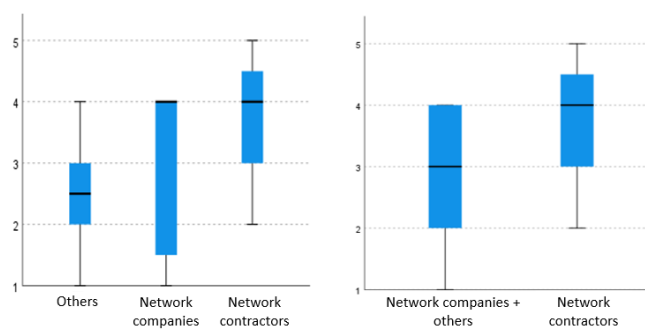


Figure 35. Box plots of question 24.

The interest in joining the platform introduced in the questionnaire is the same across the three industry groups. However, a difference is found when network companies are compared to network contractors and the others combined (0.044). The pairwise comparisons tell that there is a difference between network companies vs. others (0.077) and network companies vs. network contractors (0.069). Thus, the group standing out from the rest is network companies and the box plots (Figure 36) show that they are the least interested to join the platform compared to the other groups. The conclusion is that network companies have the least interest towards the new platform, but a statistically significant difference between the others and network contractors is not found to conclude which group is the most interested.

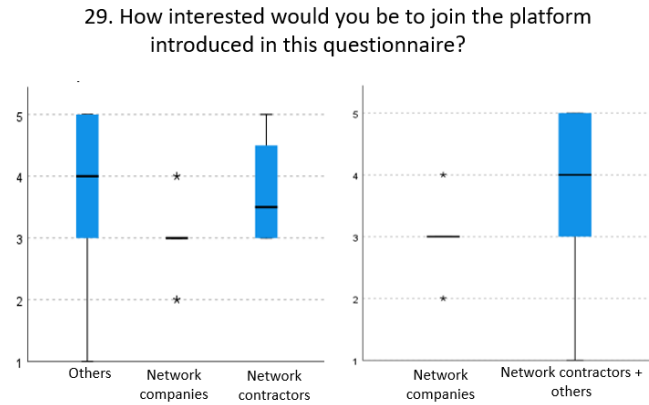


Figure 36. Box plots of question 29.

The average of all responses to the disadvantages (questions 16–24) is polarized between the three groups (0.028). A result below the significance level is also gained if network companies and network contractors are combined and compared to the others (0.063). Network contractors stand out if network companies and the others are combined as one group (0.009). The pairwise comparisons tell that network companies and network contractors have a significant difference (0.055), as do network contractors and the others (0.011). These comparisons and the box plots in Figure 37 implicate that network contractors differ from the other groups by finding the disadvantages more significant for their business. However, the others and network companies do not have a statistical difference to conclude that one group finds the disadvantages significantly less important compared to the other.

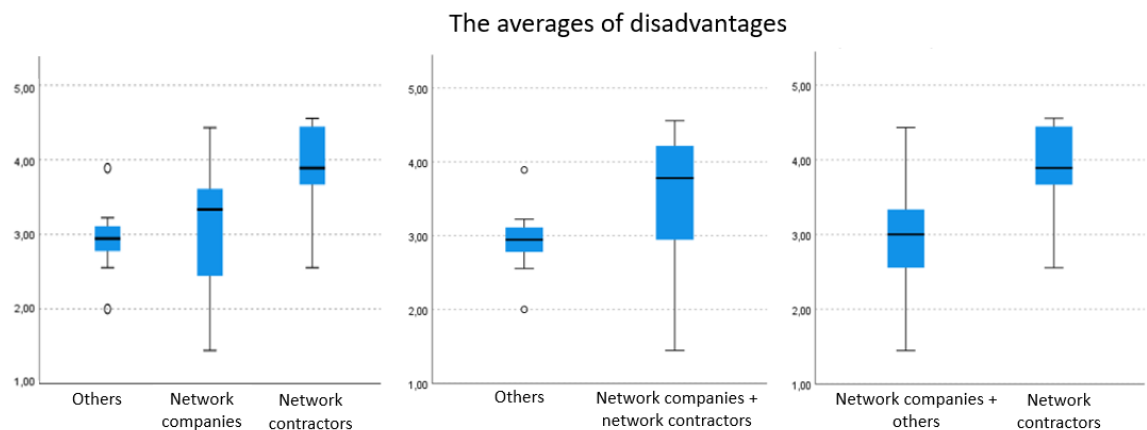


Figure 37. The box plots of part two averages.

All the conclusions drawn from the Kruskal–Wallis tests are summarized in Table 5. Considering the benefits that the platform could have, network companies clearly value many of them less compared to other groups separately or combined. Reducing the risk of disruption in critical information flows and enabling flexible decision making are

advantages that network companies find the least important compared to all rest of the respondents. Additionally, helping to organize multiple members in a complex system is the least important for network companies compared to the other respondents combined, and more important for network contractors than network companies. Enabling the coordination of interrelated companies with high autonomy is the most important benefit for network contractors compared to other groups combined and less important for network companies than network contractors. Getting closer to customers is also less important for network companies than for network contractors. However, helping to find complementary competence and resources is the least important for other companies compared to the rest of the respondents combined and more important for network companies than the others.

The risk of a dominator, the requirement to manage partners' roles in relation to own strategy, and giving other companies a significant role in value creation are the disadvantages that network contractors find the most significant compared to other groups. Changing the source of competitive advantage, increasing dependence on other companies' innovating, and complicating competition are the disadvantages that network contractors value more compared to other companies and all the other respondents combined. Correspondingly for the other companies, these disadvantages are less important than for network contractors. Disqualifying the traditional risk assessment has a pairwise difference between network contractors and the others, by network contractors considering it more important and the others less important. In addition, the sum of all disadvantages indicates that network contractors in general consider them the most significant.

The only statistically significant difference found from part three of the questionnaire is that network companies stand out from other groups by having the least interest to join the new platform. All in all, it can be noticed that the only group finding some aspects more important compared to other groups is network contractors, apart from question 12 which is more important for network companies. On the other hand, network companies and other companies are the only groups that consider some aspects less important compared to other groups.

Table 5. A summary of the quantitative analysis results.

<i>It is important for our company, that the platform...</i>	Network companies	Network contractors	Other companies
6. ...reduces the risk of disruption in critical information flows.	The least important		
8. ...helps getting closer to our customers.	Less important compared to network contractors	More important compared to network companies	
11. ...helps to organize multiple members in a complex system.	Less important compared to network contractors The least important compared to all respondents combined	More important compared to network companies	
12. ...helps to find complementary competence and resources.	More important compared to other companies		Less important compared to network companies The least important compared to all respondents combined
14. ...enables the coordination of interrelated companies with high autonomy.	Less important compared to network contractors	More important compared to network companies The most important compared to all respondents combined	
15. ...enables flexible decision making.	The least important		
17. ...does not include a risk that one player increases its power in the platform and reduces the value for others.		The most important	
18. ...does not indicate that our competitive advantage comes from capturing a community of producers and consumers.		More important compared to other companies The most important compared to all respondents combined	Less important compared to network contractors
19. ...does not increase our dependence on other companies' innovating.		More important compared to other companies The most important compared to all respondents combined	Less important compared to network contractors
20. ...does not make our traditional risk assessment processes inadequate.		More important compared to other companies	Less important compared to network contractors
22. ...does not require us to consider or manage partners' roles and positions in relation to our strategy.		The most important	
23. ...does not give other companies a significant role in creating value, even if they are not directly connected to our company.		The most important	
24. ...does not make competition more complex and dynamic for us.		More important compared to other companies The most important compared to all respondents combined	Less important compared to network contractors
29. How interested would you be to join the platform introduced in this questionnaire?	The least interested		
The average of disadvantages		The most important	

5. DISCUSSION

In this chapter, the main results are discussed and evaluated. The objective is to find possible explanations for the results by utilizing theoretical knowledge and the qualitative data gained from the research. The reflection of the main findings is structured in the following order: the advantages of platforms (first part of the questionnaire), the disadvantages of platforms (second part of the questionnaire), and attitudes towards platforms (third part of the questionnaire).

5.1 The advantages of platforms

Finding 1. The benefits of platforms are valued above average by network contractors and below average by network companies.

This finding suggests that the network contractors need the benefits and new innovations more to help their businesses grow and evolve. According to latest research results, 80 % of the profits in the value chain are gained by network companies and network contractors' profits are close to zero, even though their total turnover is 130 MEUR (Kontu and Hyysalo 2021). This could explain the gap in the averages of network companies and network contractors. The perception was reinforced when the interviewees' opinions were inquired. According to one interviewee, the difference results from the asymmetry between network companies and network contractors since the pressure to standardize operations is small for network companies and there is more freedom to operate as desired. As one interviewee summarized, network companies are doing well but network contractors are not, and this finding indicates that something needs to be done about it. The interviewed network contractor was of the opinion that the current challenges regarding unshared data and ineffectiveness in different processes are the most probable reason for this finding. A network company interviewee, on the other hand, found that this could be explained on their part by fear of the platform hampering competition or not being open enough if everyone cannot join the platform because of IPR or licensing, for instance.

Finding 2. The interorganizational benefits are considered more important than the internal benefits on average.

When all respondents are observed as a group, it is noticed that the strategic benefits, such as differentiation, flexible decision making, and focusing on the core business, are

less important on average than benefits related to the whole network service business and its functioning. Possible explanations are that improving the effectiveness of the value chain is important for all participants, or that problems in the network service business are seen as a threat that has effects on all companies. According to the interviews, the platform is most likely seen as a way to increase ineffectiveness between organizations rather than a tool for internal development. Furthermore, an interviewee was of the opinion that the platform is considered interorganizational, i.e., to cover the whole value chain and since it is used for operations, the benefits are not believed to be significantly strategic.

Finding 3. The most important benefit for all respondents on average is improving the functioning of the network service business.

According to the interviews, this finding tells that the effectiveness of the whole business is everyone's mutual aim and that improving effectiveness across the value chain is more important than sub-optimizing for the own organization. Another interviewee considered that this finding reflects the current needs and expectations. A network company representative noted that if network contractors perform poorly, it inevitably has effects on network companies as well in the long run. All in all, the interviews clarified that the current situation has most likely led to this result. This question is also one of the most unanimous which reinforces the perception of a common interest. However, improving the effectiveness of the network service business is only the third most important benefit for network contractors and getting closer to customers is the most important benefit. According to an interviewee, this might reflect the different aims of the companies; effectiveness is the common aim but for network contractors, proximity to customers is the key to achieve the goal.

Finding 4. The second most important benefit for all respondents on average is that the platform would enable new possibilities to offerings that exceed the conventional boundaries of business.

The underlying reason driving this result could be that the network service business is compelled to innovate and evolve in order to survive and grow. It also implicates that being a traditional industry with embedded ways of operation, it might have met its limits regarding innovation and needs new ways of thinking about business. The low standard deviation also highlights the importance of this benefit for all respondents. An interviewee contemplated that this might also result from the implementation of the energy revolution since new energy technologies do not include large players and there might be

possibilities for a platform. Another interviewee pointed out that offering services disrupting the traditional value chain is difficult and the platform could help to bring visibility to new ideas that do not directly fit to the current division of operations.

Finding 5. The least valued benefit for all respondents on average is the ability to control the access and activity of participants in the platform.

This finding refers to the fact that the companies want the platform to be as open as possible, for example, so that the number of participants would not be restricted. In the interviews it was brought up several times that the platform should be completely open in order to work. According to an interviewee, if the business can be developed and improved, there probably is no need to control anything since that only brings things to a halt. Therefore, this advantage is the least valued because the companies consider it more a threat than advantage.

Finding 6. Reducing the risk of disruption in critical information flows is the least important for network companies compared to other respondents.

This finding indicates that network companies do not find this risk significant in the first place or that they consider it already well managed. However, this is found to be one of the most significant risks for network companies in the outsourcing of services in earlier research (Aminoff *et al.* 2009), which suggests that either the risk has not materialized for the companies or the significance of it has decreased during the last decade. According to the interviews, another possible reason is that the critical information flows of network companies would not be affected by the platform, and therefore they consider to be safer in this matter than the other players. A network company interviewee remarked that network companies might connect this question with the data related to measuring services. For their business, the meaning of data is so essential that it has to function properly, and a good functionality has also been achieved. This can explain why the benefit has not been considered to have as much influence on network companies. However, the interviewee also commented that the physical network has no value if the surrounding data is missing, an aspect that network companies might have bypassed in the questionnaire. It can also be noticed that on average, this benefit is clearly more important for the other companies. An IT company interviewee explained that this could result from different standpoints since distance from the focal part of the value chain facilitates to detect that many problems arise from information not moving forth and back in the value chain.

Finding 7. Getting closer to customers is more important for network contractors than network companies.

This finding is especially interesting considering that network companies and network contractors have a relationship where the network company is the network contractor's customer. Therefore, network contractors find it important to get closer to network companies with the help of the platform, but network companies have a notably lower need to get closer to the end customers. For network contractors, getting closer to customers is also the most important benefit of the platform on average. This tells that network contractors have difficulties in getting closer to customers and that they find it more essential for their business. The finding is also aligned with that of Kontu (2019) regarding the proximity to customers being one of the main sources of sustainable competitive advantage, which has not been achieved by service companies. As noted previously, the significance of this advantage for network contractors is that it is the key to achieve the pursued effectiveness. As the network contractor interviewee stated, in order to create additional value, the network contractors must understand the customers and their processes better, which has been detected difficult. In addition, an essential aspect is the ability to advise customers how to operate more profitably. During the interview with a network company representative, it was discussed that network companies have perhaps not seen proximity to customers as important because of the local monopoly position and the prevailing courses of action regarding customers.

Finding 8. Helping to organize multiple members in a complex system is the least important for network companies compared to other respondents combined.

This aspect is found to be more important for network contractors than network companies and the least important for network companies compared to network contractors and other companies combined. Theoretically, the advantage refers to the effectiveness of assembling a large number of players with the help of technology. As Fuller *et al.* (2019) have noticed, building an ecosystem is useful when the business environment is unpredictable and flexible, or if there is a need to explore a new possibility in collaborative development with others. This implicates that network contractors consider the current situation more complex and problematic than network companies and they also find it important that the platform could reorganize competition. According to the interviews, it clear that network companies have less drivers towards change given the solid monopolistic position and that network contractors are the most eager to transform the whole business which explains this result as well.

Finding 9. Helping to find complementary competence and resources is the least important for other companies compared to other respondents combined.

According to the results, this is the only benefit that network companies find more important compared to other companies and which they in turn find the least important compared to all respondents combined. This benefit refers to the fact that with the platform, companies can more easily find expertise and resources that they themselves are not in possession of. This can also mean that the platform helps to find competence and resources the companies did not previously know they could need or utilize. The most probable explanation for this finding is that since the electricity market act, network companies have had to outsource functions and find more competence and resources outside their companies. Therefore, network companies consider this aspect important as they are more dependent on others and their expertise. However, the other companies find this benefit the least important compared to all respondents combined which can indicate that they are more in the position of offering competence and resources to other players in the value chain instead of needing those themselves. This makes sense considering that equipment suppliers, wholesale companies, and excavation contractors offer resources and IT companies, and experts offer competence in the value chain. As such, the platform can also be a threat to these companies considering that competition would be concentrated more on one place where the current customers could easily find complementary competence and resources from competitors. An IT company interviewee was also of the opinion that the role of other companies is to offer tools to manage the ecosystem, and therefore the platform would not significantly help the other companies to find complementary competence and resources. Network contractors, on the other hand, could rent equipment that are not used constantly, for instance. According to a wholesale company interviewee, this result can be explained by the other companies having the flexibility and willingness to change when necessary.

Finding 10. Enabling the coordination of interrelated companies with high autonomy is the most important for network contractors compared to other respondents combined.

This benefit means that companies related to one another can be organized around a platform ecosystem and at the same time maintain high autonomy. Network companies find the benefit less important compared to network contractors and network contractors find the most important compared to all other respondents combined. For some reason, network companies and other companies do not have as strong interest towards maintaining or achieving high autonomy by the platform but network contractors have.

This can implicate that network contractors already feel too dependent on other players or that they find their current position more threatened. Another possibility is that they are more afraid to lose their autonomy in the platform. The difference between network contractors and network companies can result from network companies finding their monopolistic position to ensure their autonomy or from network contractors feeling too dependent on network companies in particular. In an interview with a network contractor representative, it was further explained that their productivity is linked with the fact that the customer's processes are embedded in the contractor's own system and it is essential that they are not obligated to use their customer's system. Therefore, this result can also relate to the different needs regarding the organization and autonomy of information systems.

Finding 11. Enabling flexible decision making is the least important for network companies compared to other respondents.

The strategic benefit that the platform would enable flexible decision making means that the platform facilitates the traditional trade-off between short-term flexibility and committing to a long-term strategy (Fuller *et al.* 2019). This is considered the least important among network companies, revealing that the companies are already able to make flexible decisions or that it is not a valuable aspect for them. One of the reasons could be the traditional ways of operating, suggesting that network companies have well managed internal (strategic) processes that do not need improving. Therefore, the strategic benefit does not bring as much value for network companies as it does for network contractors and other members of the value chain. One interviewee contemplated that operating an existing network through the platform requires hardly any decision making for network companies and that explains why they do not believe to gain as much advantage from this.

5.2 The disadvantages of platforms

Finding 1. The disadvantages are more significant for network contractors.

According to the averages, network contractors have rated the disadvantages higher than other respondents. The averages of other companies and network companies are about one unit lower than the network contractors' average, and they are below the neutral answer. Counting the averages of all answers in the second part for all respondents and comparing them with the Kruskal–Wallis test shows that the network contractors' answers are significantly higher. This finding indicates that network

contractors see the disadvantages more threatening for their businesses and that network contractors have the most to lose in regard to the platform. In the interviews, this was considered resulting from the same reasons that network contractors valued the benefits more than others: with the latest returns, they cannot afford any additional problems to materialize and there is a possibility that if not designed carefully, the platform only creates more unproductiveness. Another interviewee remarked that for network contractors, the turnover comes from the business around the platform and therefore is probably a bigger disruption for them. The turnover of network companies consists of investments which are always guaranteed a certain profit by the regulation. Therefore, some risk is included for network companies as well although it does not have a fatal effect.

Finding 2. The most significant disadvantage for all respondents on average is that one player increases its power in the platform and reduces the value for others.

This risk refers most of all to an ecosystem dominator (Dedehayir *et al.* 2018), but platforms have also been dominated by a single company in many cases. For this industry, the risk that one company will turn the industry around with a platform surrounding a new innovation is rather small, but the possibility remains that when building a common platform, one player will gain more advantage from it compared to others. This finding indicates that it is a great threat for all players, and it has the most undesired effects on competition or the industry in general compared to the other disadvantages. Currently, the competition is restricted by the regulation, network contractors' dependence on network companies, and the financial difficulties of network contractors. That could be why the risk of a dominator emerging and hampering competition further can be seen the most unvalued consequence by all participants. Especially for network companies, it might be considered threatening because of their currently powerful position and for network contractors because of their more vulnerable position. The interviews reinforced that network companies have a fear of losing control or having to give up something because of the platform. Furthermore, it was pointed out during several interviews that the reason for this finding could also be the fear of prices increasing. Another interviewee was of the opinion that some dominators have emerged previously in the industry, and the companies might fear this happening again. On the other hand, it was discussed that a fear exists of the platform operator restricting the functionality of the markets by excluding participants or compelling everyone to operate according to its conditions. Another interviewee added that the most significant risk in addition to the dominator could be that one network company participating in the

formation of a platform decides to take the idea and build an own platform with the network contractors to maintain control. This risk could be reduced in the formation stage, for example, if everyone involved in the development would also invest in the platform.

Finding 3. The second most significant disadvantage for all respondents on average is constant preparing for delays and compromises outside the company's own control.

As for the most significant advantage, this also relates to the control and dependence on others. According to the interviews, this might result from the fear that the platform is an intermediary between the own company and the customers and therefore causes delays or complexities. For network companies, this might be seen threatening because of the disinterest towards compromises and changes that emerged in the interviews. Furthermore, this is the most significant disadvantage for the other companies on average. If network companies and network contractors believe the dominator would be one of the other companies, it will explain the difference. According to the open answers, effectiveness is an important driver for other companies regarding the platform and therefore another reason could be that this disadvantage is seen as a barrier to achieving it. An interviewee also contemplated that this finding might result from the other companies not being as agile. It is also important to note that the delays and compromises are usually caused by a lack of market to support an innovation in an ecosystem within a certain time frame (Adner 2006). Considering the nature of this industry where new product innovations are rarely introduced and new markets are not actively pursued, the probability for that particular threat is small. In other words, the disadvantage would most likely materialize differently in this context.

Finding 4. The least significant disadvantage for all respondents on average is the requirement to consider or manage partners' roles and positions in relation to own strategy.

One explanation for this finding is that the aspect has already been accepted as a standard in the strategy processes of the companies. On the other hand, it can be seen as an inherent consequence of the desired proximity to other companies and thus less threatening compared to the other disadvantages. One interviewee pointed out that the underlying possibility in the platform might be more significant than all the changes resulting from it. Additionally, a disadvantage that only affects a certain part of a strategy process is less significant than the disadvantages having wider effect on business, like the dominator risk. Another interviewee was of the opinion that this can be seen as more

of a possibility since strategic renewal is always useful, which might also explain the smaller importance.

Finding 5. Including a risk that one player increases its power in the platform and reduces the value for others is the most significant for network contractors compared to other respondents.

The meaning of this disadvantage for all participants was already considered in finding 2. However, the statistical test indicates that it is the most significant for network contractors. This disadvantage also has a low standard deviation among network contractors, indicating that it is equally important for all of them. A possible explanation behind this finding is the natural monopoly position of network companies. Monopolies might hamper competition and entrepreneurial efforts in platforms (Kenney and Zysman 2016), which makes competition even more difficult for other players in the value chain, especially network contractors. Thus, it is apparent that network contractors consider a platform dominator significantly hampering their position and business, which is amplified by the current problematics. According to the interviews, the fear of prices increasing is probably a significant driver for network contractors finding the dominator threatening as well. Additionally, the financial situation does not give much clearance for more problems and expenses. As one respondent remarked in an open answer, building a platform demands resources.

Finding 6. The requirement to capture a community of producers and consumers to create competitive advantage is the most significant for network contractors compared to other respondents combined.

This disadvantage refers to the transformation of competitive advantage from the supply side economies of scale towards demand-side economies of scale (Van Alstyne *et al.* 2016). For other companies, the requirement to capture a community of producers and consumers to gain competitive advantage is less important compared to network contractors. Network contractors find this the most significant compared to all other respondents combined. One reason for this could be that network companies and other companies already focus on the network effects, or the transformation is not seen threatening because economies of scale is not as significant for an industry emphasized on services and construction. Most likely, this finding is linked to the problems that the network contractors have considering sustainable competitive advantage: if it hardly exists in the first place, the more difficult it is to achieve during a transformation that requires a lot of flexibility and competence. The difference to other companies can be

explained by the open answers, in which other companies describe the collaboration and network effects as important aspects for them. Network contractors, on the other hand, have joined platforms mostly because of customers' wishes and therefore might not have as much competence to capture and control a network.

Finding 7. Increasing dependence on other companies' innovating is the most significant for network contractors compared to other respondents combined.

This disadvantage is less significant for other companies compared to network contractors and the most important for network contractors if compared with all respondents combined. As other companies want to achieve collaboration by the platform, it is probably why the dependence is not as severe for other companies. One interviewee even challenged the relevance of the disadvantage in this particular platform since it only adds possibilities for innovation and collaboration. If network contractors want to maintain autonomy and decrease their dependence on others, it makes sense that this disadvantage is also more threatening for them. Another possible reason is that innovations are traditionally developed inside the organizations with little collaboration or dependence on other companies in the industry. According to the network contractor interviewee, it is essential the platform does not hamper the background development. On the contrary, solutions must be found to create innovations around critical service products and a new perspective is needed to find the productivity innovations. The interviewee also underlined the significance of collaboration in achieving these and according to Adner (2006) the threat is the more significant the more complementary innovations are required to attract customers, which further explains the finding.

Finding 8. Making traditional risk assessment processes inadequate is more significant for network contractors compared to the other companies.

There is a parallel difference between network contractors and the others when it comes to the disadvantage of the platform making the traditional risk assessment inadequate. For network contractors it is perhaps more significant because they do not possess enough competence to manage the risks. The finding is also in line with a report stating that network contractors must intensely add competence to risk management (Kontu and Hyysalo 2021). According to an interviewee, the risk assessment might be underlined among network contractors if the platform enables easier subcontracting since it also increases the risks. The qualitative data in part three of the questionnaire reveals that many network contractors have joined platforms because a customer has wanted to, and other companies seem to be driven by more genuine interest for the benefits. Therefore, other companies might be more prepared for and willing tolerate the disadvantages as

well. The ability to change and be flexible was also mentioned in the interviews regarding the other companies.

Finding 9. The need to consider or manage partners' roles and positions in relation to own strategy is the most significant for network contractors compared to other respondents.

The results reveal that network contractors find it the most significant compared to other respondents that the platform does not require the alignment of partners' roles and own strategy. Given the current position of network contractors, there might not be enough control over partners in order to manage their roles. The interviews and open answers of the questionnaire indicate that ineffectiveness is the most severe problem for network contractors. Since they want to most of all reduce costs with the help of the platform, any additional transformation of processes can thus be more significant for network contractors. However, the interviewed network contractor found it to be a possibility if the roles of partners in relation to own strategy are reinforced. The fact that the platform changes processes is seen more as a natural consequence than a threat. This could be because in spite of the difference between the groups, the disadvantage is among the least important ones for network contractors as well.

Finding 10. Making competition more complex and dynamic is the most significant for network contractors compared to other respondents combined.

This disadvantage is less important for other companies compared to network contractors and the most important for network contractors than all respondents combined. This finding also supports the perception that network contractors do not want the platform to have any negative consequences on competition because of the current problems and difficult position. On the contrary, effectiveness is the main driver of development and interest towards the platform. The difference might also result from other companies having more flexibility regarding changes and network companies not having to fear for their position in the competition. According to the interviews, network contractors fearing that another network contractor becomes the dominator could also explain this result.

5.3 Attitudes towards platforms

The closed questions of part three tell that the vast majority, 18 out of 26 respondents, represent a company that currently use only from zero to four platforms. From the eight companies using five or more platforms, five belong to the other companies and three to network companies. Among network companies and network contractors, most

respondents use 1–2 platforms and other companies are more evenly distributed. An interviewee contemplated that especially among network companies and network contractors, platform is not a well-known concept which might affect the answers. Another possibility is that there are only few primary platforms that are utilized in the industry or that the potential of platforms is not yet widely recognized.

The amount of utilization seems to follow a somewhat similar pattern, since the majority of other companies use the most utilized platform very much, network companies some, and network contractors evenly (very) little and (very) much. Three network companies, four network contractors, and five other companies, i.e., the vast majority, have participated in the most utilized platform for more than five years. In total, only six companies have used the platform for 1–2 years and two companies for less than a year. Therefore, there is less recently emerged interest towards platforms and most seem to have been familiar with them longer. According to an interviewee, this describes the low awareness around platforms but, on the other hand, highlights the opportunity that the new platform would have. Another interviewee pointed out that since the barrier to enter the industry is low, there are many small businesses in which the large-scale platforms are not required.

According to the voluntary open answers, the reasons to join the platform(s) are somewhat different between the industry groups. Among network companies, legislation is mentioned three times and effectiveness twice. Other reasons are the accessibility for potential customers or subcontractors, competitive tendering of acquisitions, and easier documentation. One network company states that it wants to explore whether the company could offer a platform to other companies and customers. Network contractors, on the other hand, mention digitalization or automation three times and customer's wish to join a platform three times as well. Additional reasons include reducing mistakes, standardization, and concentrated directories. As one respondent describes, the platform is a way to manage the order-delivery process. Another remarks that platforms have been a standard procedure along with digitalization. For other companies, competitive tendering is a single most mentioned reason with two mentions by an expert and one mention by an energy company. The consulting companies and experts also tell that they have joined platforms for observation and because they enable a broader supply than services offered by single companies can offer. In addition, the platforms have created new information and competence. The IT company has developed platforms and participated in them to improve quality and the performance of network industries. One wholesale business argues that it makes business more effective, and

the other states that they have participated in platforms because of customer needs and transformation in the industry.

It can be concluded that the industry groups have somewhat different incentives behind joining platforms. Some network companies say that the platforms are at least partly statutory for them, but some voluntary incentives exist as well. This raises the question whether the interest towards platforms is completely voluntary, and to what extent the authorities play a role in it since it could have further (negative) influence on the attitudes towards platforms. In addition, if it is statutory to use them, the quality of the platforms might not be a priority. Network contractors, on the other hand, find the most use of automating and standardizing processes. The reasons to join the platform are often digitalization or customer's initiative. Clearly, the network contractors believe to benefit from the platforms, but the question is whether there is enough voluntary interest towards participating and developing platforms. The customer's initiative might awake curiosity and further interest in a positive matter, or it might decrease the feeling of control and therefore hinder the interest to develop the systems further and gain competence around platforms. The other companies, however, seem to have genuine curiosity and incentives to use platforms. Instead of being compelled, they seem to find enough reason from public competitive tendering, transformations in the industry, and new competence to keep up with the platforms.

The second open question considers the needs for development or extension in the current platforms. Network companies raise ease of use, accessibility of stakeholders, cyber security, cost structure, and flexibility as potential development possibilities. One respondent writes that the platform must create additional value in the long run instead of merely being a marketplace for services. Network contractors mention the integration to other systems twice and the functionality of the user interfaces. The experts wish to improve the network service chain, create new service concepts, enable collective innovating, and add quality rating for competitive tendering. One expert company mentions that an active sales channel for service providers should be created to bring them on display. The wholesale companies wish to improve the user interfaces and to make the platforms more diverse according to roles. All in all, network companies seem to find more flaws in the platforms than others, which are various and quite detailed in nature. Network contractors highlight the integration of platforms and their own systems, suggesting that they find it important to have only one, integrated platform for their processes. However, other companies seem to be more interested in finding additional value and possibilities through the platforms related to innovating, collaboration, and

improvement. One of them has even recognized that platforms could bring visibility and offer a marketplace for service providers, which include network contractors.

The question regarding the interest to extend a current platform to bring together more players of the value chain shows that most respondents in each category (14/26) have some interest and one network company has very little interest. The advocacy group states having no interest at all, probably because it does not participate in the trading that happens in platforms, and therefore does not see interest to develop a platform as a member of one. The rest of the respondents (10/26) have much or very much interest. When coded into numeric (on a 1–5 scale), the answers show that network contractors have the most interest (3.50), other companies the second most interest (3.40), and network companies the least interest (3.13) to extend a current platform.

Eleven respondents answered the following why-question, all of which have some or much interest to extend a platform. A network company says that platforms have a possibility to create competitiveness through cost-effectiveness and competitive advantage through additional value. Another network company considers new offerings and innovation projects to be the reasons behind the interest. Three network contractors, on the other hand, mention effectiveness or productivity since people will not use many platforms at the same time and cannot do it effectively. Another reason is that while current business activities reduce, new ones are required in the long term. A network contractor remarks that the interest depends on the supplier since current platforms are expensive and an integration platform would be good. The three experts mention the significance of collaboration networks in the future, new business opportunities, and effectiveness as reasons behind their interest. The IT company remarks that acquisition and service ecosystems become increasingly diverse in the future. Therefore, the single most important reason according to the answers is effectiveness and different kinds of possibilities that would not be come to exist without the platform.

The interest to join the new platform introduced in the questionnaire has mostly some but also very little and much interest among network companies. Network contractors have mostly some but also much and very much interest, while other companies have equally some, much, and very much interest. One energy company had no interest at all to join the platform, which can result from having more distance to the network service business. The averages reveal that network contractors are the most interested (3.75), other companies are the second most interested (3.70), and network companies clearly less interested (3.00) in the new platform. The highest interest among network contractors is not surprising given that they also believe to benefit from the platform the

most. The overall interest to join the new platform (3.50) is slightly higher than the interest to extend a current platform (3.35) on average. All interviews reinforced the perception that the development should be started from scratch. One interviewee argued that is also reduces the risk that one player takes too large a role.

Ten out of eleven answers to the following why-question are given by companies that have some, much, or very much interest to the platform. Two of the network companies have listed the reasons as follows: accessibility to stakeholders, decreasing the number of platforms, effectiveness, ease of use, new offerings, and innovation projects. Network contractors mention new business activities, the exploring of development possibilities, and that available information can be used to improve total effectiveness. The experts also recognize the advantages of new business opportunities and additional effectiveness. The IT company is very interested because they already offer such platforms as a service to their customers. All in all, it can be concluded that there is a variety of advantages that the respondents believe to gain from the platform. Most of them relate to effectiveness and new kinds of business opportunities. The answers of network contractors seem to align with the recent research findings that network contractors have to invest in developing services and renewal (Kontu and Hyysalo 2021).

The open answers also point out some barriers and suspicions towards the platform. One network contractor that has (only) some interest stands out from the others by stating that the platform demands resources, the network created by the platform already exist, and that the competition already functions well. One explanation for this is that the company in question has not faced the problems that most other service companies have. Another network contractor having some interest towards the platform remarks that the platform introduced in the questionnaire lacks consumers and therefore, an actual scalability is missing. The only mentioned barrier is by a network company, stating very little interest because legislation restricts possibilities to utilize platforms in network contracting. However, in the interviews this was questioned since legislation should not be a barrier for network companies to join the platform.

Furthermore, all interviewees were inquired about their company's incentives and barriers to join the platform. The network company interviewee stated their main incentive to be the network service business, which is a common concern for all parties. The situation should be balanced so that network contractors have a possibility to their operation and the ability to develop it further. In addition, it emerged that network companies might see possibilities in two different platforms. One is the platform around network building, and another is the electric network in itself as a platform for new players

in the energy market that includes consumers. Therefore, including consumers in the same platform can also be seen as a possibility to persuade network companies in it, especially regarding vertically integrated organizations. This is also supported by the research finding that communication between network companies and consumers should be improved (Kontu and Hyysalo 2021).

The network company interviewee also explained that for them, the problems in the service business have emerged as quality problems in construction, which have further negative effects on the life-cycle costs. One solution for this could be a quality rating or feedback that is visible for all platform participants, which encourages the receiver to act when the implementation does not meet expectations. This could also help to attract network companies to join the platform. Another mentioned incentive for network companies is that the platform creates new competences rather than offering only the existing competitive tendering. In addition, the transformation from operating a network to a network system operator might create pressure for change since the more challenging the network balancing and controlling capacity becomes, the more there is need for new technologies. As network companies do not have enough ability for these kinds of technologies, it is something that the platform could offer. The barriers are the uncertainty regarding how the platform works and possibly legislation since competitive tendering is compulsory in certain situations. If the platform is just another system for competitive tendering, it does not reduce the need to use other systems as well. Having enough players is the key to ensure that competitive tendering in one platform is possible and that network companies profit from it as well. Additionally, if the platform does not include enough players, the required openness is not fulfilled and it brings no added value.

The interviewed network contractor stated the incentives to be the possibility to change the industry and to improve competitiveness and differentiation. It was further explained that there is a common interest among network contractors to develop but no financial clearance to enable it. Since further leaps in productivity are not possible, the competence and eagerness to develop should be allocated to common improvement of the value chain in order to survive from future challenges. Furthermore, there is a lot of ineffectiveness in the number of systems and the communication. Therefore, an integration platform is better than having an application supplier that manages how the application should be used especially since every player already has application to integrate with. As the network contractor summarized, system integration is the key and compulsory usage of a user interface is the barrier. An IT company interviewee evaluated

that an integration platform would be difficult to build but nevertheless useful and the possibility is worth exploring. In addition to reducing the number of systems needed, it was the network contractor interviewee found it important that the platform is implemented and priced in a way that everyone can gain advantage from it and that it creates additional value instead of merely adding costs. The interviewee also found it a prerequisite for their interest that network companies join the platform as well. It emerged in another interview that network contractors cannot always give feedback directly to the customer and allocate it to other players in the value chain instead. A feature of giving open feedback to the customers might be attractive for network contractors, although it has earlier been detected difficult to implement. All in all, it can be presumed profitable to include a possibility for all kinds of open feedback in the platform.

The wholesale company interviewee stated having strong interest to all kinds of change as well as looking at matters from a new perspective and found no specific barriers or problems in regarding the platform. According to the interviewee, a low threshold to join the platform would be the key to make it successful. However, the nature of the system should be chosen later according to the form and needs of the platform. In this, a comprehensive cross-section of all existing platforms should be made and discussed further with the participants.

The IT company interviewee expressed strong interest to participate in the platform. The interviewee saw possibilities that the platform could increase awareness around the quality, work safety, and environment directives. The platform could help to develop them and ensure that they are accessible for everyone. In this way, the transparency across the value chain could be improved. Another incentive is that the platform would extend the area that is accessible for their customers. Furthermore, their systems could be partly integrated with the platform so that offerings included in their systems would automatically appear in the platform as well. The interviewee stated that there are no barriers to join the platform since on the contrary, not joining it would be problematic for them. The interviewee believed that getting the biggest network companies to join is the most challenging aspect in forming the platform but network contractors will participate if even one of them joins the platform.

An important finding regarding the third part of the questionnaire is that network companies have significantly less interest to join the platform. This result seems to be somewhat contradictory with the project meeting discussions, and the finding was further discussed during the interviews. It was mentioned that possible reasons for the less interest is the conservatism of the business, and that therefore the potential that the

platform would have is not yet seen. The interviewee added that the fear of losing control or having to renounce some of the current advantages are another aspect that might explain the result. It was also speculated that the network companies having none or very little interest towards the platform are those that already offer these platforms themselves. The open answers in the questionnaire also support this opinion. Another reason could be the legislation but since this was questioned by multiple interviewees, it is not probable. The finding can also result from the few companies having no interest to join the platform since they have a lot of effect on the statistical differences. In addition, there are still network companies that have interest towards the platform according to the questionnaire and therefore the participation of network companies cannot be ruled out based on this finding especially since it might be a prerequisite for network contractors.

The final question of part three considered the company's willingness to operate the platform as a leading actor. The vast majority was either negative or uncertain, and five companies (a network contractor, an expert, a wholesale business, an IT company, and a consulting company) answered yes. Therefore, the interest towards operation seems to have no connection to the industry of the company and is more probably related to the individual companies' long-term interests, financial situation, or competitive position. However, in the parallel research it was found essential that the operator should be an independent actor (Kontu and Hyysalo 2021) and the question emerges whether the current players in the value chain fulfil this prerequisite sufficiently.

The network contractor interviewee stated that the operator can be a participant of the value chain, as long as competition is not distorted or participation is not restricted. The network company interviewee was also of the opinion that the operator can be a player in the value chain since it would have the required competence of the business. In addition, the operator can pursue their own advantage as long as the platform is profitable for everyone. The IT company interviewee found that their company could participate in the operating somehow but underlined that the operator should nevertheless be independent, meaning that it does not have too much at stake in a way that is not controllable or raises suspicions. Only the wholesale company interviewee was of the opinion that the operator should not be one of the participants of the value chain. The same interviewee believed that using a system supplier is also problematic and will lead to the supplier pursuing its own financial benefit.

6. CONCLUSIONS

Subchapter 6.1 presents the main findings and contributions of this research as well as the answers to the research question. The second subchapter considers the limitations of the study especially in regards of validity and reliability. In the closing subchapter, future research possibilities of this research subject are discussed in brief.

6.1 Contributions

The research question is: what industry-specific barriers and incentives are there for different value chain stakeholders to join a platform? The answers to the research question are summarized in Figure 38, in which all barriers and incentives of the three stakeholder groups are listed. It includes all barriers and incentives mentioned in the questionnaire or interviews and therefore cannot be generalized to every company in the group. Nevertheless, each mentioned aspect is significant to consider in the formation of a platform. Additionally, the figure includes conclusions of what kinds of features are needed of the platform according to each group. These are not answers to the research question but they are also essential to consider in the practical development of a platform. The starting base in forming the platform should be a marketplace for selling and buying goods and services, and the desired additional aspects should be discussed and included if feasible. The shared perceptions of the important platform characteristics are openness, mutual advantage, and neutral operator. Openness means that participation is not restricted by any means, mutual advantage refers to the fact that everyone should equally be able to profit from the platform, and neutral operator means that competition is not restricted or distorted by the platform operator.

The most important incentives for network companies are improving the network service business, improving quality and effectiveness, implementing all competitive tendering through the platform, and enabling new innovation possibilities. The most common barriers are the dominator risk, possible compromises and delays, risk of increasing prices or costs, and fear of losing control. Network companies have less interest to join the platform than the other groups and they have less pressure to change the current ways of operating. Another possible barrier for network companies is legislation. Therefore, the statutory aspects should be investigated further and focus on getting enough players in the platform. By creating additional value and focusing all competitive tendering in one place, network companies can be attracted to join the platform. What

might encourage network companies further is that for them, a significant financial risk is not included. Additional aspects that could bring use to network companies are integrating all of their systems in one place, enabling visible feedback to improve quality, and extending the platform to the whole electric network, including end users.

Network contractors clearly believe to gain more advantage from the platform compared to other groups. They also have the most incentives to improve the current functioning of the business especially considering effectiveness and productivity. In addition, getting closer to customers is an essential advantage of the platform and enables a more comprehensive understanding of the customers' processes. The financial situation is both incentive and barrier since an increase in prices or costs is a significant threat for network contractors. Additional barriers are the risk that one player dominates the platform and that network companies might be difficult to persuade into the platform. Another thing to consider is that network contractors have somewhat different needs regarding the platform. It appears that they need an integration platform that consolidates the telecommunication between processes, whilst the original idea of the platform is a marketplace for selling or buying services and products. However, these two are not exclusionary and to induce network contractors in the platform, the possibility of including both functionalities should be explored. An integration platform would bring network contractors the additional value they need and therefore persuade them to join it. Other aspects to attract network contractors are that network companies join the platform as well and that the platform enables open feedback.

The other companies of the value chain are also very interested in the platform and have multiple incentives, such as improving the network service business, creating additional effectiveness and new business opportunities, and implementing competitive tendering in the platform. Additionally, the other companies wish to increase the variety of supply and demand as well as reduce the risk of disruption in critical information flows with the help of the platform. The barriers include that the platform might increase prices or costs, create a dominator position, or cause uncontrollable delays and compromises. The lower interest among network companies is also possible barrier for getting other companies to join the platform. Other companies would benefit from features such as making directives more transparent, integrating some of the existing systems with the platform, and ensuring that there is a low threshold for everyone to join it.

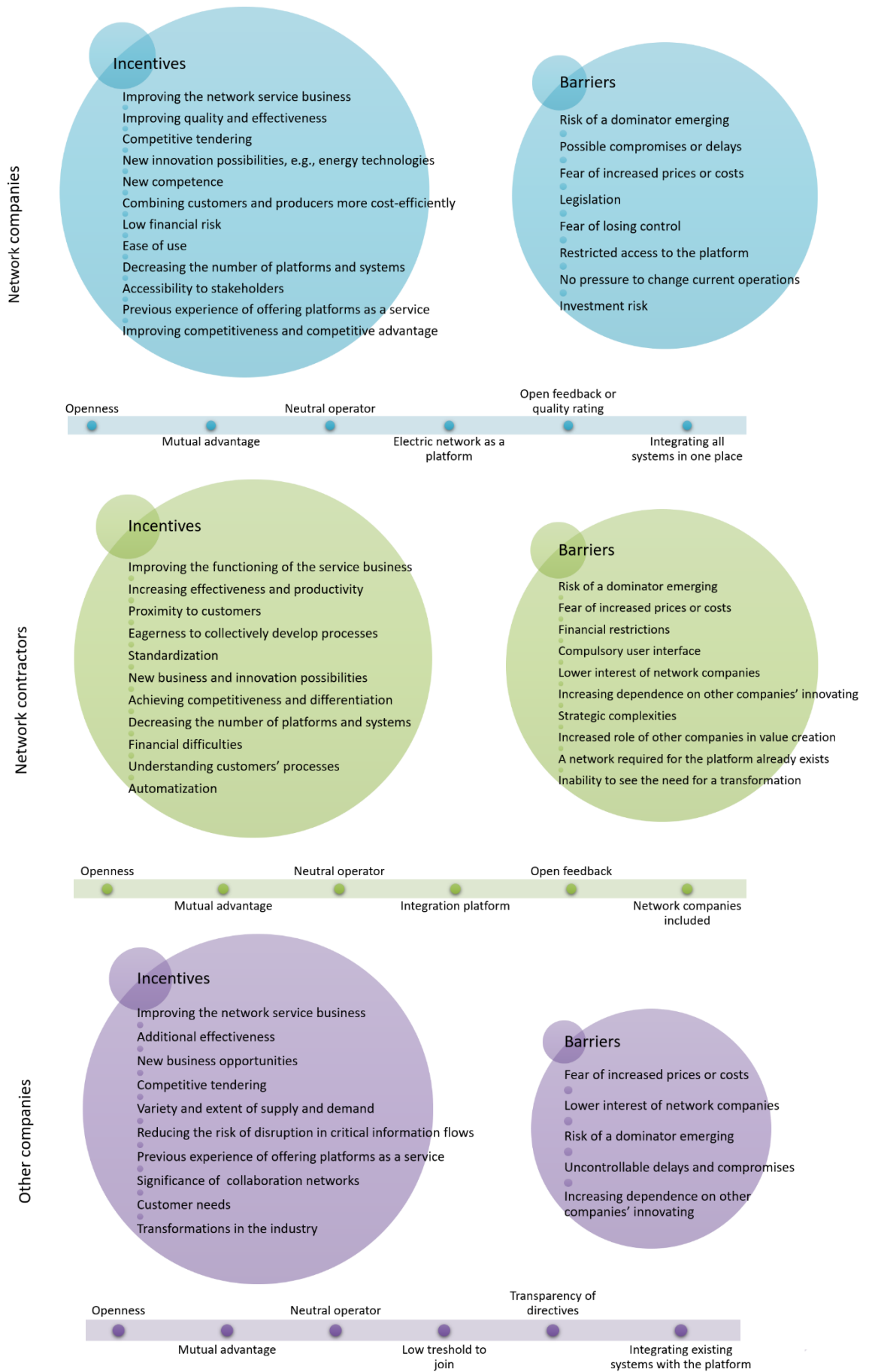


Figure 38. Answers to the research question.

All in all, there are more incentives than barriers for the stakeholders to join the platform and the conclusion is that a platform should be constructed in collaboration with different stakeholders of the industry. However, the risks and barriers need to be taken into account to ensure that the benefits outweigh the possible side effects and everyone has a possibility to profit from the platform. Since network contractors have the most at stake, it is especially important to make sure that the threats do not come true for them. Increases in costs or prices are possible but having enough players should both decrease the amount of resources needed as well as the prices in general. Another common concern is that the platform creates more ineffectiveness by adding the number of systems. Combining the central processes of each group in one place is the key to create additional value and to get all participants to join. Furthermore, the platform should not control participation but the activities in the platform need to be controlled. For example, only the data that is relevant for the user should be visible instead of enabling complete access for everyone.

As Fuller *et al.* (2019) have remarked, building an ecosystem is not sensible in all cases and it cannot be seen as a prerequisite for success. However, the industry examined in this research seems to fulfil the optimal situation to develop a platform ecosystem. The main contribution of this thesis is that the network service business has a lot of possibilities to gain advantage from constructing a common platform. The industry has many very traditional ways of operating that do not function any longer and the attractiveness of the network service business must be improved. The competition is on an unhealthy base that will not be durable in the long run. If the financial problems in the network service business originate in regulation, even the platform might not solve everything. However, changes in the regulation model are probably ahead and those might even accelerate digitalization and platform thinking. There is a clear need for new ways of thinking about business, building new innovations, and exploring new possibilities in collaboration with others. Furthermore, the value chain members have a common interest to organize and coordinate competition better. As one network contractor interviewee expressed, collective development is the key and digitalization is the means. Platforms have radical and distinct business impacts on creating value and competing for profits (Kenney and Zysman 2016), which is especially useful for the service companies.

The scope of the research leaves some essential questions to be answered in the near future. The most important ones are how to attract all players to join the platform and how to make it profitable for everyone. The practical questions are how the platform

should be implemented, which companies will start the initial development, and what the correct corporation structure is. The most profitable way is that the most innovative and eager companies from each group start to develop the platform. When the platform grows and begins to add a lot of value among other benefits, the rest of the players will most likely join as well. Regarding the future after the formation stage, the possibility to extend the platform to be international can be explored. It should also be noted that there is a possibility that some one player sees the possibility and creates a platform on its own terms. Beginning a collaborative development in the near future can prevent this kind of dominator position from forming. Another question that is left open for the time being is how the monopolistic position of some stakeholders affects the platform and its functioning.

6.2 Limitations

A responsible conduct of research refers to integrity and accuracy in conducting research and handling the research results, applying ethically sustainable and scientific criteria fulfilling methods, and respecting others' work with appropriate citing and credit (TENK 2021). All principles of responsible and ethical research are followed in this study, and the originality of this thesis has been evaluated with the Turnitin tool. However, the possibility of errors and limitations can never be ruled out entirely. Evaluating the quality of research practice is a significant aspect at many levels (European Science Foundation, 2012). Therefore, quality should be evaluated with as objective and reliable measures as possible (Mårtensson *et al.* 2016). However, qualitative and quantitative research methods are evaluated by different quality measures. As a mixed-method study, all of these need to be considered to assess the limitations of this research.

Quantitative research is evaluated by two main criteria, reliability and validity. Reliability refers to the consistency of the research process (internal reliability) and replication (external reliability). (Saunders *et al.* 2016, p. 202) In this research, internal reliability was affected by ensuring that the data was collected and analyzed in a consistent matter and double-checking for errors at all stages. Another method is to use more than one researcher in data collection and analysis (Saunders *et al.* 2016, p. 202). In a thesis this is not possible but the research was conducted in constant collaboration with others and reviews and feedback were utilized. External reliability can be tested by replicating the study (Saunders *et al.* 2016, p. 202). The possibility for replication is ensured by carefully describing the data collection and analysis and by including the questionnaire in the appendix. The reliability can be assessed by re-testing, measuring the internal consistency in a subgroup of questions, and using an alternative form of questions

(Saunders *et al.* 2016, p. 451). These methods were not utilized since it was important to have a short and concise one-time questionnaire to gain a large sample.

Reliability can also be assessed by considering the most common threats to it, which are participant error, participant bias, researcher error, and researcher bias. Participant error is caused by a factor that changes participant's performance. (Saunders *et al.* 2016, p. 203) For a questionnaire completed remotely by the respondent, the participant error cannot be verified. However, the possibility to fill out the questionnaire at any time within a week's period reduces the probability that such errors have occurred. In addition, the necessary theoretical information to answer the questions and the definition of a platform were available for the respondents in the questionnaire. Participant bias means that the participant gives a false response because of a factor such as fearing for their anonymity (Saunders *et al.* 2016, p. 203). Therefore, the questionnaire invitation underlined that the anonymity of respondents is maintained, and the data is handled with extreme caution. In addition, no information was asked in the questionnaire that would enable identification of the respondent or the company. Since the questionnaire was voluntary and anonymous, the possibility for false responses is assumed small. Researcher error, on the other hand, is caused if the researcher's interpretation is affected by any factor and researcher bias means that the responses are evaluated subjectively (Saunders *et al.* 2016, p. 203). The possibility of misunderstanding the questionnaire data is small since most of it is quantitative, and the analyses were conducted multiple times to reduce the possibility of errors. The responses are recorded as broadly and accurately as possible in this study, and the interpretations made are openly discussed in the text to ensure that they do not include subjective views or dispositions.

Another possible limitation to reliability in a survey is the sample size (Heikkilä 2017, p. 28). The sample size in quantitative research should be at least 100, if the target group is small and the results are observed on a general level (Heikkilä 2017, p. 43). The gained sample size from the research was 26. However, the overall population is small since the value chain is quite limited and most of the companies are very small. Thus, the sample can be seen to represent the population to a large extent measured by its influence and monetary value compared to the whole value chain. In addition, achieving results from the whole population or a vast majority is considered very difficult. Furthermore, Plowright (2010, p. 47) has argued that in small-scale research that tries to solve a specific problem or question, the population and participants is usually a rather small group. On the other hand, Evans (1991) has remarked that it is better to achieve a high response rate from a small sample than a low response rate within large samples.

The response rate (58 %) is also a lot higher than the ten percent usually expected in a survey (Saunders *et al.* 2016, p. 441). A high response rate is also said to be linked with the credibility and quality of the research (Groves *et al.* 2009, p. 413). The interviews conducted after the qualitative analysis can also decrease the possibility that the questionnaire results give an incorrect interpretation since if the results did not correspond reality, it would probably have transpired during the interviews. The benefit of using multiple methods to achieve the best aspects of them and overcome some unique deficiencies of each is also known as methodological triangulation (Denzin 1978, pp. 301–302).

According to Saunders *et al.* (2016, p. 202), validity assesses the appropriateness of measures (measurement validity), accuracy of the analysis driven by the results (internal validity), and generalizability of the results (external validity). The measurement validity is divided into content validity, criterion-related validity, and construct validity. For content validity to be achieved, the questions in a questionnaire have to cover the studied phenomenon. (Saunders *et al.* 2016, p. 450) The content validity is taken into account by building the questionnaire in connection with the theoretical background and earlier research of the subject and by testing and assessing the questionnaire multiple times. Criterion-related validity means that the questions are able to make accurate predictions (Saunders *et al.* 2016, p. 450). This is both difficult to assess in a cross-sectional study that is meant to explore the current state of affairs and non-essential since the aim of the questionnaire is not to predict behavior. Construct validity assesses how the questions measure the presence of the intended construct (Saunders *et al.* 2016, p. 450). This is considered in the study by using the Likert-scale that is explicit and well-known, asking concise questions, and offering necessary theoretical information in the questionnaire.

Internal validity means that the results are analyzed and the relationships are developed accurately. Statistically, it is established if a causal relationship can be demonstrated between two variables. (Saunders *et al.* 2016, p. 203) In this research, causal relationships were not studied but the relationship between the company industry and the resulting answers were studied and found. Internal validity was considered by discussing the results in the in-depth interviews to make sure of the findings. External validity is achieved if the research findings can be generalized to other settings and groups (Saunders *et al.* 2016, p. 204). The objective of the study is to make conclusions and gain findings related to the observed industry at a specific time. Therefore, the findings cannot be generalized into other industries or contexts. However, the findings

gained from this sample are believed to be generalized to the whole population, i.e., the value chain in question.

Validity can also be assessed through the most common threats, which are the effects of past events changing participants' perceptions, testing participants' views, change in a research instrument, participants withdrawing, change in participants' attitudes by an outside event, and ambiguity in causal direction (Saunders *et al.* 2016, p. 204). The presence of these threats is presumed minimal since the questionnaire was anonymous, instruments were not altered, causal relationships were not searched, and no one withdrew from the study. However, the ongoing project might have affected the participants' perceptions. In addition, outside events changing participants' attitudes cannot be ruled out, although the effect of these on the results is presumed minor.

The four criteria for addressing qualitative research are credibility, transferability, dependability, and confirmability (Eskola and Suoranta 1998). Credibility describes how congruent the results are with reality. Transferability means that the results can be applied in another context, although this is somewhat contradictory given that qualitative findings depend on the context and individual. Dependability means that if the work is repeated with the same methods, sample, and context, similar results are found. Confirmability relates to objectivity, meaning that the results reflect the ideas of the sample instead of the researcher. (Shenton 2004) From the provisions suggested by Shenton (2004) to improve the four criteria, the measures used in this thesis are triangulation, outside feedback, diagrams, thorough description of the phenomenon, in-depth methodological description, examining previous research, and evaluating the possible limitations and their effects. Furthermore, all questions during the interviews were asked neutrally to avoid any leading questions.

6.3 Future research

This thesis has contributed to the industry research by offering a preliminary investigation regarding the possibilities of platforms. However, it has also shed light to many new research possibilities and gaps. For instance, more theoretical research is needed regarding platform ecosystems to build a comprehensive understanding of the phenomenon and to be utilized in practical contexts. There is also a research gap regarding how a monopoly position affects the formation of a platform ecosystem. In-depth case studies are needed from these aspects. Additionally, similar investigations of platform possibilities could be used in other industries and contexts.

The network service business also has many further research possibilities. As mentioned, the platform in question has many open questions regarding the practical implementation that should be investigated in the near future. An interesting topic which was not further explored in this thesis is how the complex and problematic competitive situation in the industry has come to existence and developed. More possibilities to improve the functioning of the industry could be searched, especially if the platform is not constructed for some reason. If a platform is built, a follow-up research on the practical outcomes is essential to find out how the platform actually functioned in this context. However, to bring practical value for the research findings, the most important thing is to focus on the actual development of the industry.

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APPENDIX A: QUESTIONNAIRE

Osio 1

Yrityksellemme on tärkeää, että alustan avulla voi... (LIKERT)

1. Säästää aikaa asiakkaiden hankinnassa.
2. Yhdistää tuottajia ja asiakkaita kustannustehokkaammin
3. Rajoittaa osallistujien pääsyä alustaan ja toimintaa alustassa.
4. Kasvattaa kysynnän ja tarjonnan monipuolisuutta.
5. Tehostaa palvelumarkkinoiden toimintaa.
6. Vähentää kriittisten tietovirtojen katkeamisen riskiä.
7. Vähentää tarvetta uudistaa suljetuilla rajapinnoilla toimivia tietojärjestelmiä.
8. Päästä lähemmäksi asiakkaitamme.
9. Keskittyä enemmän ydinliiketoimintaamme.
10. Vapauttaa resursseja kilpailijoista erottautumiseen.
11. Auttaa organisoimaan monimutkaisen systeemin lukuisat toimijat.
12. Löytää täydentävää osaamista ja resursseja.
13. Tarjota uusia mahdollisuuksia tuotteille ja palveluille, jotka ylittävät tavalliset liiketoiminnan rajat.
14. Mahdollistaa toisistaan riippuvaisten yritysten koordinoinnin säilyttäen korkean autonomian.
15. Mahdollistaa joustavan päätöksenteon.

Osio 2

Yrityksellemme on tärkeää, että alustaan osallistuminen... (LIKERT)

1. Ei edellytä yritykseltämme hyvin erilaisia johtamistaitoja kuin sisäinen resurssienhallinta.
2. Ei sisällä riskiä, että yksi alustaa tehokkaasti hyödyntävä yritys kasvattaa valtaansa alustassa ja vähentää toisten saamaa arvoa.
3. Ei merkitse yrityksemme kilpailuedun muodostumista tuottajien ja kuluttajien muodostaman yhteisön tavoittamisesta.
4. Ei kasvata yrityksemme riippuvuutta muiden yritysten innovoimisesta.
5. Ei tee yrityksemme perinteisistä riskienarviointiprosesseista riittämättömiä.
6. Ei vaadi yritykseltämme jatkuvaa varautumista viivytyksiin ja kompromisseihin, jotka eivät ole omassa hallinnassa.
7. Ei edellytä yhteistyökumppaneiden roolien ja aseman huomioimista tai ohjailemista suhteessa omaan strategiaan.
8. Ei anna muille yrityksille merkittävää roolia arvonluonnissa, vaikka ne eivät olisi suorassa yhteydessä yrityksemme.
9. Ei tee yrityksellemme kilpailusta monimutkaisempaa ja dynaamisempaa.

Osio 3

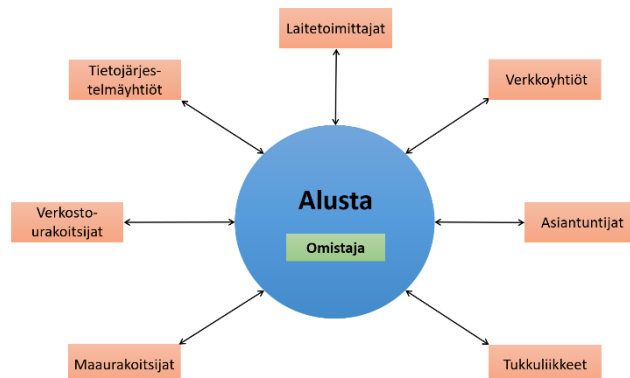
1. Kuinka montaa alustaa yrityksenne käyttää tällä hetkellä? *
 - 0
 - 1–2
 - 3–4
 - 5+
2. Kuinka paljon hyödynätte eniten käyttämääne alustaa? (JOS 1. kysymys ≠ 0)
 - 1=erittäin vähän
 - 2=vähän
 - 3=jonkin verran
 - 4=paljon
 - 5=erittäin paljon
 - Ei vastausta
3. Kuinka kauan olette olleet eniten käyttämänne alustan toiminnassa mukana? (JOS 1. kysymys ≠ 0)
 1. kysymys ≠ 0)
 - Alle vuoden
 - 1–2 vuotta
 - 3–4 vuotta
 - Yli 5 vuotta
 - Ei vastausta
4. Miksi olette lähteneet mukaan alustaan/alustoihin? (JOS 1. kysymys ≠ 0)

avoin
5. Mitä olemassa olevissa alustoissa pitäisi kehittää tai laajentaa?

avoin
6. Miten kiinnostuneita olisitte laajentamaan jotakin nykyistä alustaa, jotta se voisi tuoda yhteen enemmän arvoketjun eri toimijoita? *
 - 1=ei lainkaan
 - 2=erittäin vähän
 - 3=jonkin verran
 - 4=paljon
 - 5=erittäin paljon
7. Miksi?

avoin
8. Miten kiinnostuneita olisitte lähtemään mukaan tässä kyselyssä esitellyn alustan (kuva alla) toimintaan? *
 - 1=ei lainkaan
 - 2=erittäin vähän
 - 3=jonkin verran
 - 4=paljon
 - 5=erittäin paljon
9. Miksi?

Avoin
10. Olisiko yrityksenne valmis operoimaan alustaa johtavana toimijana?*



Osio 4

1. Yrityksen toimiala*
 - Sähköverkkoyhtiö
 - Verkostourakointi
 - Maaurakointi
 - Laitetoimittaja
 - Tukkuliike
 - Tietojärjestelmäyhtiö
 - Muu: _____
2. Yrityksen liikevaihto*
 - Alle 2 milj. €
 - 2–10 milj. €
 - 10–50 milj. €
 - 50–250 milj. €
 - Yli 250 milj. €
3. Yrityksen henkilöstömäärä*
 - Alle 10
 - 10–49
 - 50–250
 - Yli 250
4. Vastaajan rooli yrityksessä*
 - Avoin