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International Marketing Management

Master's thesis

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How to create new business opportunities in data sharing ecosystems with collaborative relationship between a large company and a SME

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ABSTRACT

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This master thesis is aiming to find out why large companies should share data and collaborate with smaller companies in business ecosystems. The data sharing business ecosystems are expected to become more common in the future, but they still lack research knowledge. To gain more understanding, this cross-sectional research is done by using qualitative research methods and utilizing abductive approach. The theoretical base for the research is built from collaboration, business ecosystem and intercorporate data sharing studies.

Empirical study consists of six case interviews, and four expert interviews that are done with semi-structural interview methods. In addition to this, two informal expert interviews are utilized. Data is analysed with using qualitative content analysis and comparing cases with each other's. The results of the research are showing that large companies should collaborate with smaller partners because it gives them both, operational and strategic benefits, such as more satisfied customers and new revenue streams. In addition to his, it is found out that with collaboration company can gain more positive brand image and it bring many new business opportunities, such as monetization of data.

TIIVISTELMÄ

Tekijä:	Pinja Lyytikäinen
Tutkielman nimi:	Kuinka luoda uusia liiketoimintamahdollisuuksia datan jakamisen liiketoimintaekosysteemeissä pk-yritysten sekä isojen yritysten välillä
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Tämän Pro Gradu -tutkielman tavoitteena on selvittää miksi isojen yritysten tulisi jakaa dataansa sekä tehdä yhteistyötä pienempien yritysten kanssa liiketoimintaekosysteemeissä. Datan jakamisen mahdollistavien liiketoimintaekosysteemien oletetaan yleistyvän lähitulevaisuudessa, mutta niistä ei ole vielä paljon tutkimustietoa. Tiedon lisäämiseksi on tämä poikittaistutkimus tehty kvalitatiivisia tutkimusmenetelmiä käyttäen, hyödyntämällä abduktiivista lähestymistapaa. Työn teoreettinen pohja rakentuu yhteistyötä, liiketaloudellisia ekosysteemeitä sekä yritysten välistä datanjakamiseen käsitteleviin tutkimustietoihin.

Empiirinen tutkimus käsittää kuusi tapaushaastattelua, sekä neljä asiantuntijahaastattelua joissa on käytetty puolistrukturoitua haastattelumenetelmää. Lisäksi työssä hyödynnetään kaksi epämuodollista asiantuntijakeskustelua. Dataa analysoidaan hyödyntäen laadullista sisältöanalyysiä sekä vertailemalla tutkimustapauksia keskenään. Tutkimustulokset näyttävät että isojen yritysten kannattaa tehdä yhteistyötä ja jakaa dataa pienempien yritysten kanssa, sillä se tuo sekä operatiivisia että strategisia hyötyjä, kuten tyytyväisempiä asiakkaita ja uutta tulovirtaa yrityksille. Lisäksi yhteistyöllä on positiivinen vaikutus yrityksen brändikuvaan, ja se mahdollistaa paljon uusia liiketoimintamahdollisuuksia, esimerkiksi datan kaupallistamisen.

ACKNOWLEDGEMENT

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1 INTRODUCTION

1.1 Background of the study

The study was done as part of the project organized by Sitra, the Finnish Innovation Fund. The project is called "IHAN". The aim of the project is to build foundation for fair data economy, where digital services can be build based on trust, which creates value for everybody (Sitra, 2020). One part of the project is to help Finnish small and medium sized companies (SMEs) to utilize data in their business. The aim of this master thesis is to study data sharing ecosystems and why large companies should form collaborative relationships with SMEs, and why large companies should share their data with smaller companies. Also, one aim of this research is to find out what kind of new business opportunities can be created with shared data.

The study consists of multiple larger subjects that needs to be studied in order for the researcher to be able reach the main goal, which is to gain understanding of the benefits why larger company should collaborate with smaller partners in data sharing ecosystems. This also helps Sitra to communicate this value in their project to companies that are considering this business model. These subjects are such as different collaborative models, business ecosystems, data, and data sharing theories and the benefits and challenges in them.

Also, the reason why this subject needed to be studied, was because European economy is largely composed by small and medium-sized (SMEs) companies. Their innovativeness is important key driver for economies' sustainable competitive advantage, and it is seen to be highly important that the innovativeness gap between SMEs and large companies should be binged (Nieto & Santamaria 2006, p. 2.) Also, both large companies and SMEs have their own strengths and weaknesses in innovating (Jang et al, 2016; Nieto & Santamaria, 2006). In collaborative relationship, companies can utilize each other's strengths, and therefore, they should form collaborative ecosystems and share data.

Even though this master thesis was done as a commission for the Finnish Innovation Fund Sitra, it also served academic purpose. The rising trend is that companies are sharing more data with other companies and forming more collaborative relationships with each other's (Arnaut et al., 2018). Part of the reason are the benefits that are believed to be gained from it and partly because of legislative sanctions. However, collaborative relationships that are

based on data sharing between asymmetric partners have not been studied a lot in academic literature yet, at least not according to findings. Therefore, it was seen to be highly important to study this subject.

As this thesis is written by international marketing management student, it is important to state the marketing perspective of this work. Marketing and new business development are closely connected together, as identifying new business opportunities is a marketing related task (Williams & Kurtis, 2007), and therefore this thesis also brings new knowledge for marketing industry as well.

1.2   Preliminary literature review

In this literature review there have been collected about collaboration, data and analytics, since specific articles about the research topic could not be found. There can be found some repeating themes in existing literature about collaboration and data. For example, there are many studies done about benefits and challenges of collaboration or articles about collaborating with different types of partners. Data as a topic is usually combined with other themes, but there are also studies that concentrate on different data types or the features of the data. First is introduced collaboration literature, and after that literature about data is introduced. The articles have been divided based on the themes identified from articles. From the Appendices 1 and 2 can be found summaries of the articles presented at the next chapter.

1.2.1   Collaboration in literature

Collaboration has been studied from multiple different viewpoints. One of them is the physical distance between companies collaborating. Inoue, Nakajima & Saito (2018, 199) studied localization of collaboration and suggested that companies favour physically close companies, when they look for potential partners, and the reason for it is because collaboration includes risks and costs and close physical distance can prevent these. Kamenskikh (2018) also studied close physical distance in collaboration and found out that network collaboration and clusters are bringing benefits for society, since it positively influences regional economic development. Collaboration in longer physical distance has also been studied. Braccini, Spagnoletti and D'Atri (2012) studied international collaboration. They studied the definition process of a cooperative business model, involving that partners are from different countries, and have different levels of technology and different regulators.

Collaboration has also been studied from the viewpoint of different types of partners, such as between start-ups or SMEs and large companies (e.g. Jang, Lee & Yoon 2016; Nieto & Santamaria 2006; Minshall et al., 2010; Allmendinger et al., 2019, Singh et al., 2018), between competitors (Bengtsson & Kock, 2000; Maroofi, 2015) and between non-profit organization (Shawyun, 2010) and also collaboration between high reliability organizations (Rice, 2018).

There are studies where writers argue that successful partnership begins with the partner selection (e.g. Holmberg & Cummings, 2009; Ireland et al 2002, p. 413). According to Holmberg and Cumming (2009), almost all the researchers who have discussed about partner selection in their studies have been focusing on the generic motivations behind the alliance (see e.g. Park & Zhou 2005; Koza & Lewin 1998, p. 256), rather than the tools and specific selection process (Holmberg & Cummings, 2009, p. 167). Therefore, Holmberg and Cummings (2009) decided to focus on the developing a process for partner selection and an forming an analytical tool for final partner selection.

The benefits of collaborating have been discussed in many articles. Dyer and Singh (1998) introduced four sources of competitive advantages gained from interorganizational collaboration: relation-specific assets, knowledge-sharing routines, complementary resources/capabilities and effective governance. Jang, Lee & Yoon (2016) stated that large firms and SMES should collaborate, because it benefits both since different company sizes and structures are creating advantages for innovating. Agarwal and Selen (2006) claimed that companies can develop higher-order capabilities as a result of collaboration. Bengttson and Kock (2000), also believe that companies can gain many benefits from collaboration, such as access to other firm's unique resources and reduced costs.

The challenges and risks of collaboration are common topics in collaboration literature because successful collaboration relationships are difficult to form. According to Dogson (1994) challenge lies if a company has not previously included the possibility of collaboration in its strategy. Dyer & Singh (1998) believe that challenge for a company is to identify suitable partners. Das & Teng (2000) formed so called "internal tension framework" to explain collaborations instabilities and they also discussed about the termination of collaborative relationships. Some early studies of strategic alliances showed that most of the partnerships are failures rather than successes (e.g. Harrigan 1988, p. 53).

Some other topics have also been discussed in the literature, such as innovativeness in collaboration (e.g. Maroofi, 2015; Agarwak & Selen, 2009; Jang, Lee & Yoon, 2016). Wehmeyer, Riemer & Schneider, (2001) did their paper about the trust and its different dimensions in interorganizational systems. The importance of trust and trustworthiness are also subjects that are highlighted in many articles (see e.g. Dogson, 1994; Inoue et all, 2018; Chi & Holsapple, 2005; Dyer & Singh, 1998; Smith, Carroll & Ashford, 1995; Shawyun, 2010; Najjar & Kettinger, 2013).

There are also articles written about the process view (Pekas & Allio, 1994) and the performance and measuring (Christoffersen, Plenborg & Robson, 2014; Arino, 2003) of collaboration. Ragman and Korn (2014) studied the longevity of collaboration and its effects on performance. According to them, performance and longevity do not always go hand in hand. There are also some more general papers, such as Smith, Carroll & Ashford (1995) wrote a comprehensive literature review about cooperation and pointed out potential study subjects about it. The technologies that enable collaboration have also been studied (see Kumar & Van Diessel, 1996; Chi & Holsapple, 2005).

Different types of collaborative relationships have also been discussed, such as business ecosystems and co-branding. Ecosystem is a concept that has many viewpoints. In the business related academic literature ecosystems have been introduced as industrial ecosystems (see e.g. Frosch & Gallopoulos, 1989; Korhonen 2001), digital business ecosystems (Razavi et al., 2010) or business ecosystems (see e.g. Moore, 1995; Moore 1993, Moore 2006; Iansiti and Levien, 2004). Co-branding has also been studied from many viewpoints, such as co-created brands in multi-stakeholder ecosystems (Gyrd-Jones and Kornum, 2013), the local and global company co-branding (Mohan, Brown, Sichtmann & Schoefer, 2018), brand equity and trial effects of co-branding (Washburn, Till & Priluck, 2000), and the customer attitudes for co-branding versus brand extension (Besharat, 2010).

1.2.2   Data and analytics in literature

Different data types have been discussed in literature. Chen, Chiang & Storey (2012) wrote an article about big data, and how analytics and business intelligence can be harnessed to use it. Woerner & Wixom (2015) also wrote about big data, and how it can extend business strategy toolbox. Data has been studied from the viewpoint of it being a resource for a company, such as Seppälä, Hakanen, Lähteenmäki, Mattila & Niemi (2019) have done. According to them data can be seen as a similar resource as capital or labour. Levitin &

Redman (1998) have also written about data as a resource. In their article they are addressing the properties, implications of data and prescriptions for issues that companies are usually facing.

Information and data sharing have also been a common topic for academic literature. Especially data sharing in in supply chain (e.g. Seppälä, Hakanen, Lähteenmäki, Mattila & Niemi, 2019; Du, Lai, Cheung & Cui 2011) has been studied a lot. Also, information and data sharing in public sector has also been a topic that has been studied a lot. Dawes' (1996) article discusses the information sharing among government agencies, and the benefits and risks that information sharing includes. Gil-Garcia, Chengalur-Smith and Duchessi's (2007) paper discusses the perceived impediments affect the expected results of information sharing projects. Bidgeli, Kamal and De Cesare (2012) formed a socio-technical framework for inter-departmental electronic information sharing in government agencies. There are also some other articles written about data sharing in public sector (see e.g. Higgins, Taylor, Lisboa and Arshad, 2014). In addition, data sharing as general has also been studied, for example Swarup, Seligman and Rosenthal (2006) wrote about data sharing agreements.

The technology for data sharing has also been studied for a long time. Mukhopadhyay, Kekre, & Kalathur (1995) studied the value of electronic data interchange (EDI) to business. Walton and Gupta (1999), wrote about EDI in supply chain, and they are discussing why companies might have dissatisfaction with electronic data interchange. Wang and Seidmann (1995) studied how EDI affects the competitive position of suppliers.

Commercialization of data has also been studied. Thomas and Leiponen (2016) did a literature review of multiple different papers about the commercialization of big data and found six data-based business models. Najjar & Kettinger (2013) wrote an article about data monetization. According to them data monetization means when intangible value of data is converted into real value by selling it, converting it into other tangible benefits or by avoiding costs with it. (p. 213-214). Woener and Wixom (2015) have also discussed data monetization, according to them, there are two ways to gain revenue from big data: data monetization and digital transformation. In addition to data monetization, data can also be turned into a product. In Davenport's and Kudyba's (2016) article, they talk about the designing and developing data products. Davenport and Kudyba use Mayer's and Zack's (1996) article as a base for their own theory of developing data products.

Even though collaboration and data has been studied from many viewpoints, there was not found studies about data-based collaboration between SMEs and large companies in business ecosystems, and the benefits that large companies can gain from it. Academic literature also lacks studies about the new business opportunities that can be formed because of data. These topics are important, for example because of already mentioned rising trends. There are also some commercial articles that encourage companies to share their data with other companies (see e.g. D'Addario, 2020; Chen, 2019). This means that there is research gap. This kind of literature is needed, as there is obvious managerial need for it, due to for example open banking system that increases formation of data-based collaboration between SMEs and large companies now and in the future. Open banking is system that is enabling banks to share their customer data with third parties so that they can create new services with that data (see e.g. Passi, 2018; Xu et al., 2020; Nicholls, 2019; Badour and Domenic, n.a.). See more about open banking in Appendix 3.

1.3   Research question and objectives

As mentioned before, there are many larger themes in this thesis that needed to be studied in order to answer the main question concerning collaborative relationship, data sharing and business ecosystems. Most studies about collaboration between large companies and SMEs are focusing on management relationship e.g. trust between partners and their capabilities (Jang et al. 2016, 2). There are some studies done of the benefits that can be gained, such as a research done by Jang et al., (2016), as they studied how collaboration between large company and SMEs are affecting the innovativeness of partners. There are also studies done of the reasons why asymmetric partners should collaborate, as for example Nieto and Santamaria (2006) pointed out that collaboration can binge innovation gap between different sized partners. However, it is assumed that innovativeness is only one type of possible benefit and reason why asymmetric partners should collaborate. In addition to this, studies have not been concentrating on the larger partners point of view. Therefore, it was found out that there is lack of research of other types of benefits, especially what benefits the larger company can gain when asymmetric partners are collaborating, and this research aims to answers to that question. Also, as mentioned in preliminary literature review, data sharing in public sector has been studied a lot (e.g. Dawes, 1996, Higgins et al., 2014), but there could not be found many articles of data sharing between private companies, and especially between asymmetric partners. This study also aims to fill this gap. Therefore, the main research question of this thesis would be to find out:

RQ1. *"Why large companies should share their data and collaborate with SMEs and what kind of new business opportunities shared data offers for both parties."*

However, this question is very complex, and it holds many smaller questions inside of it. Therefore, some other research questions were formed to help answer the main question. First, to answer the main question, it was necessary to understand the data based collaborative relationship and how it has been formed in first place. One part of the given commission was to study if asymmetric partners had some linkage over data sharing ecosystems.

RQ2 "Is the company part of some data sharing business ecosystem?"

Then to understand the relationship between the case companies, the type of their relationship was asked. From the study, it was limited out that partners would have some ownership relations to each other. It was wanted to find out that partners are truly independent, and do not share some ownership over another, as it was seen to be one factor that could affect the relationship and willingness to collaborate and share data between the case companies. Therefore, it was asked:

RQ3 "What kind of collaborative relationship the case companies share."

As mentioned in preliminary literature review, data sharing (e.g. Seppälä et al, 2019; Dawes, 1996) and commercialization of data (e.g. Thomas and Leiponen, 2016; Najjar and Kettinger, 2013) has been studied. However, there was not found studies of what kind of data collaborative companies are sharing to one another and if there are some limitations for it. Also, it could not be found out what business opportunities data sharing could bring to companies that are collaborating. This research aims to answers to these questions, but also this information was seen important as it clarifies what kind of relationship the partners share and the business opportunities the collaboration can bring. Also, it was needed to understand the benefits and pitfalls that companies have noticed that comes along with data sharing, to understand if it the data sharing has been beneficial.

RQ4: "What data is shared and why? Are there some limitations?"
and
RQ 5: "What are the benefits and pitfalls that case companies have faced because of the data sharing for their partners."

There are studies done, where asymmetric partners have been seen to form successful collaborative relationships (e.g. Nieto and Santamaria 2006; Jang et al., 2016). However, there have also been some articles, where these relationships have been seen to have negative effects to partners (e.g. Harrigan, 1988). As previous study results are varying, it was seen to be important to give also answers to this question, and to find out if SMEs and large companies can build successful collaborative relationships. It was also needed to find out the reasons what are the factors that interviewed people believed the collaborative relationship required in order for it to be successful. Therefore, two research questions were added:

RG6: *"Has the collaboration been successful and what have been the success factors?*

From asking these questions, the answer to main research question could be answered, which helped to reach the main goal of this study, which was to gain understanding of the benefits why a large company should collaborate and share data with smaller company. Also, the aim of the study was to gain understanding of how data-based business collaborations can be formed, what are the benefits, the pitfalls, and how the data exchange can happen between these companies. It also shows what is the "price" for data, what kind of data companies are willing to offer and what they are not. It was also found out what new business opportunities companies can create with shared data.

As data sharing in business ecosystems is still quite a fresh topic, it was noticed that there are also some other questions that should be answered. There could not be found any mapping of existing business ecosystems or the current state of Finland when it comes to utilizing this business model. However, it was seen to be important matter to study also, as theory background could not offer good base to see if these asymmetric collaborative relationships have some connection to data sharing ecosystems. Therefore, this study also includes investigative questions that were answered. These questions are:

IQ1 "What ecosystems already exists in Finland?",
and
IQ2 "What is the data-sharing ecosystem situation in Finland?"

As there is no existing academic literature about this precis case, therefore it was chosen to use a multiple case study method to see how large companies and SMEs have formed their

data-sharing collaborative relationships in action in B2B sector and B2C sector. The case companies have been chosen from the appearance gained from secondary sources, where it seems that their business model fits with the hoped set-up, where larger company is collaborating with smaller one, by sharing data with them. However, as only a little public information could be found from the secondary sources beforehand, and therefore it was only an assumption that these companies suit the case.

1.4   Theoretical framework

As mentioned before, the case companies have given only a little information to public about their relationship and the data sharing. As there was not existing theories or frameworks found about the precise phenomenon, it was chosen to use abductive approach for this study. The reason why this approach was chosen, is because it makes it possible to collect the data to explore the unknown phenomenon, identify the themes and explain the pattern to generate new theory, it also allows to edit the question form for later interviews if it was needed (Saunders et al., 2016, p. 144.) In other words, the data collection was started without existing theory base, and afterwards there were possibility to made changes to the questions after more information was found from the first interviews. However, the business ecosystem, collaboration and data sharing literature were used as a base knowledge for forming some research questions.

The theories that were seen to be important background for the study, were ecosystem roles. In the base of the interviews and analysis of results were used Iansiti and Levien (2004) ecosystem role theory and Lindman et al (2014; 2016) theory. However, Iansiti and Levien (2004) model has been adapted as companies were only asked to describe whether they were orchestrator or participants within the ecosystem. The niche players and dominator roles were chosen to be left out, as it was seen that it would have needed a deeper level of analysis to see the true roles, as companies would probably not be willing to reveal if their role in the ecosystem would have negative impact on ecosystem. Also, it was seen to be more important to see which partner is acting as an orchestrator, and which as a participant in this work.

In the thesis, collaboration model theories were used, when the type of collaborative relationships of case companies were identified. In addition to this, the data sharing theories were used as a base knowledge for the interviews, such as knowledge about data sharing technology. From the background of benefits of collaboration, some benefits were raised separately in the interviews to gain more precis understanding of the benefits that companies

gained, such as whether or not they gained new revenue, satisfied customer, reduced risks or saved costs.

1.5   Key concepts of the study

Important key concepts and terms have been defined below. The aim of this part is to familiarize the reader with the key concepts, so that thesis can be analysed. Some of the terms can be understand in multiple ways, and therefore it is important to ensure how the terms should be understood in this work.

"**Application programming interface**" or "**API**" are technology that is used for transferring data between two parties. APIs have been found out to be the most reliable and tested technology to facilitate secure and reliable access to customers' accounts (Zachariadis & Ocean, 2016, 4).

"**Asymmetric alliance**" or "**Asymmetric collaboration**" means that two companies that have differences with their resource portfolios and market positions are co-operating (Chtourou and Laviolette in Barbel, et al., 2000).

"**Collaboration between companies**" or "**Intercorporate collaboration**" means that two companies are setting mutual goal, that they are aiming to reach together, but still maintain their independency (Cambridge Dictionary, 2020).

"**Data**" is information such as numbers and facts, that are collected for examination and considered and used in decision making. The information can also be in electronic form that can be stored and used by a computer. (Cambridge Dictionary, 2020).

"**Business ecosystems**" means dynamic structure that consists of interconnected population of organizations (Peltoniemi & Vuori, 2008). Business ecosystems are networks of organizations, including government agencies, distributors, suppliers, customers and competitors, that are involved in delivering a specific product or a service through competition and cooperation. The main idea is, that parties in ecosystems are affecting each other's constantly, creating evolving relationship, where each party must be flexible and adaptable in order to survive. (Hayes, 2019.)

"**Hierarchical integration**" means, that two or more companies at the same level of supply chain, that are producing similar products (or services) or different components of one product, are forming cooperative association, to share resources. Companies in horizontal relationship can be unrelated or they can be competing companies. (Barrat 2004, p. 32)

"**Interorganizational system**" or "**IOS**" can be defined to be computer and communication infrastructures that are allowing the management of interdependencies between companies. Interorganizational systems are allowing knowledge flows among firms, and therefore enables that companies in collaborative relationship can gain the needed information to perform their collaborative work. (Chi & Holsapple, 2005, p. 55.)

"**Platform**" is a group of technologies that are used for developing other applications, processes, or technologies (Technopedia, 2020).

"**Service level agreement**" or "SLA" means the agreement that is made between service provider and customer, that is quantifying the minimum quality for service that meets the needs of business (Hiles, 1994).

"**Strategic alliance**" is collaborative model where two companies make an arrangement to undertake mutually beneficial project while maintaining their independence. (Kenton, 2018). In other words, it means that companies share mutual goal and aim to reach it together, but do not merge into one while doing so.

"**Vertical integration**" means that companies from different levels of supply chain are forming cooperative relationships, where the aim is to make for example, information flowing better between partners, and other vice improve supply chain process. (Caputo and Mininno, in Prakash & Deshmukh, 2010, p. 55).

1.6 Research methodology

As mentioned before, there was not found existing framework or academic articles about the precise research subject. Therefore, it was chosen to use qualitative research method. Qualitative research method can be used, when the aim of a study is to form a theory based on study results. (Bell, Bryman, Harley, 2019, p. 357).

The phenomenon of the research was data sharing, in the context of intercorporate collaboration between SMEs and large companies in business ecosystems. The relevant concepts for the research were business ecosystems and strategic alliances partnerships, and new business opportunities created with data. It was chosen to use multiple case study, as five companies were interviewed for this thesis. It was seen that the study method is valid to this research, because according to Farquhar (2012), when the lines between the phenomenon and context were not yet clear before the study, which is a sign that case study is suitable research method for the research. The other reason, why case study is suitable method for this research is because it is a method to be used, when a real-life company is the subject of the study (Farquhar, 2012, p. 5)

Exploratory study is used to ask open questions in order for researcher to find insights about topic of interest. When exploratory study is the research method used, then the research questions and the questions presented at the interviews are most likely starting with "*how*" and "*what*". The advantage of exploratory study is that it gives flexibility that researcher can change the direction of research as a result when new data appears. (Saunders et al., 2016, p. 175.) Even though all the question in this research do not start with the most common question types, still many research questions in this thesis starts with "what". Also, a lot of open-ended questions were used during the interviews. At the beginning the focus was broad, that usually is the case with exploratory studies (Saunders, et al., 2016, p. 175). As the study progressed it became clearer how the larger themes were related to each other's. There were also included new questions to this research as the study progressed, which suits with exploratory study as well.

1.7   Delimitations of this thesis

Collaborative relationship can be formed with various types of organizations, such as firm to firm, firm to non-profit organization/association, non-profit to non-profit and firm to government and so on (Holmberg & Cummings, 2009, p. 166). However, this master thesis it was chosen only to concentrate on firm to firm perspective, so called intercorporate collaboration and therefore, other perspectives are limited out from this paper.

Also, it was chosen to concentrate only on SME collaborating with larger company, since one part of the IHAN-project is to find ways for larger companies to share their data with smaller partners. The collaboration between smaller and larger companies is different than for example two large companies or two small companies collaborating. Also, it was chosen to

concentrate on horizontal collaborations, which means that companies collaborating are operating at the same level of supply chain (Barrat 2004). From the study was left out other collaborative relationships than those that are based on data and data sharing.

In this thesis, it was chosen not to be focusing on the technical systems of collaboration or data sharing, since the topic has already been studied, for example in Henri Huttunen (2019) master's thesis. However, the most common technical systems were still briefly explained, as it is also essential part of company collaboration and data sharing and therefore important to know in order for the reader to understand the big picture.

1.8   Structure of the study

The study consists of five larger entities, introduction, theory background, research design, results, and discussion parts. The next part is theory background that has been divided within two sections, Chapter 2 that deals with collaboration topic, and Chapter 3 which introduces data related subjects. The Chapter 2 and 3, have been written by using secondary sources as a background. Most of the secondary sources used are academic articles.

Chapter 2 introduces what intercorporate collaboration means, why it is important, and what benefits and challenges it is including. Different collaborative models, such as strategic alliances are also introduced. Ecosystem busines models have been written as their own chapter, as the topic was seen to be too large and important to be discussed any more narrowly.

Chapter 3 introduces what is data, and why it is important. The benefits and challenges of data sharing are introduced. The technical side of data sharing and open banking system are also shortly discussed, as they were seen to be important matters to know in order to understand the larger picture of data sharing in general. Also, the legislation of data, data driven business models and new data related business opportunities are introduced.

In Chapter 4 is introduced the research design and research methods that were used to perform this study. In this chapter, also the data collection and analysis methods are introduced, as well as the case companies and experts that were interviewed. Lastly the reliability and validity of the research are discussed.

In Chapter 5 are presented the results of the interviews. The chapter has been divided in two sections, results from expert interviews and results from case interviews. In Chapter 6 is the discussion part of this paper, where the most important results are summarized, the theoretical contributions discussed, practical and managerial implications analysed, and limitations and future research topics introduced.

2   COLLABORATION BETWEEN COMPANIES

In this chapter, intercorporate collaboration subject is introduced. The chapter includes different levels of collaborative relationships and partnerships, the benefits why companies should collaborate, and the challenges they might face. Also, it is discussed how and why collaborations are ending. A few collaborative models and business ecosystems are introduced.

2.1   Intercorporate collaboration

Intercorporate collaboration can be defined to mean that two or more organizations are working together to achieve mutual goal (Cambridge Dictionary, 2020). It is also seen to be any activity that includes two or more partners contributing with different resources and know-how to agreed complementary aims (Dogson, 1994). On the other hand, it can be seen as a process where organizations are exchanging information, sharing resources, altering activities, and enhancing each other's capacity, sharing risks, gaining mutual benefits and reaching common rewards (Prakash & Deshmukh, 2010, 54-55). There are multiple types of possibilities for collaboration, it can include for example collaborative advertising, R&D contracts, or technology exchange. (Pekar & Allio, 1994; Dogson, 1994).

The reason why intercorporate collaboration is needed, is because customer demands are changing all the time, and companies need tools to survive the constantly increasing aggressive competition (Prakas & Deshmukh, 2010, 55). Therefore, companies must be innovative, agile, and responsive for these needs. Companies must expand and develop capabilities and skills, and these higher-order capabilities can be produced as a result of collaboration between partners. (Agarwal & Selen, 2006, p. 432.) In other words, companies do not have all the needed resources and knowledge to answer these changed needs by themselves (Moore, 2006) and therefore they must expand their resources beyond their own boundaries.

There are many things that company must consider before entering a collaborative relationship, because it always includes its own risks and challenges. One important thing that a company manager should consider is how change in one relationship will affect its other relationships. (Bengtsson & Kock, 2000, p. 422). For example, if a company is going to form

collaboration relationship with its competitor, then managers need to pay a lot of attention on to the question how collaboration with firm's competitors affect the result of product innovations. (Maroofi, 2015, p. 102). Also, they need to think about other potential risks that forming a collaborative relationship includes, such as conflicts between partners (Kumar & van Diessel, 1996), unwanted knowledge transfer and additional costs (Inoue et all, 2018).

In business to business collaboration, there has been done many studies of collaboration in supply chains (see e.g. Prakash and Deshmukh, 2010; Bratt, 2004), but this matter is important also to other types of business relationships. Agarwal and Selen (2006, p. 432) are encouraging that not only product, but also service organization managers should acknowledge potential of capabilities that can be gained from partnership, since it can lead to gained strategic and operational benefits.

2.1.1 The depth and levels of collaboration

Partnership has different levels, depending on the depth of relationship between partners. The more companies are relying on each other's in collaborative relationship, the more likely they are to face conflicts, as tighter relationship require increased need for coordination (Kumar & van Diessel, 1996, p. 283). Partnership can be scaled into five levels depending on the depth of relationship. These levels are networking, cooperation, coordination, coalition, and collaboration. In networking level, the relationship is the lightest and in collaboration the deepest (Fret et al., 2006.)

In networking level, the relationship is loose. Parties are aware of each other, they communicate a bit, but the decisions are made independently. In cooperation level, information is provided to partners, roles are somewhat defined, and communication is formal, but decisions are still made independently. In coordination relationship, companies share resources and information, and decision making is partly shared. Coalition level means that companies share their ideas and resources, all the partners can tell their opinions in decision making. The collaboration level means that relationship is deep, decision making is mutual, and communication is frequent. (Frey et al. 2006, p. 387.) More detailed descriptions of different levels of partnerships can be found from Table 1 below.

Table 1 Collection of Frey et al. (2006) depth of partnership

Networking	Cooperation	Coordination	Coalition	Collaboration
• Aware of Organization • Loosely defined roles • Little communication • All decisions are made independently	• Provide information to each other • Somewhat defined roles • Formal Communication • All decisions are made independently	• Share information and resources • Defined roles • Frequent Communication • Some shared decision making	• Share ideas • Share resources • Frequent and Prioritized Communication • All members have a vote in decision making	• Partners belong to one system • Frequent communication is characterized by mutual trust • Consensus is reached on all decisions

Partnership is either horizontal or vertical. Horizontal integration means that two or more companies at the same level of supply chain, that are producing similar products (or services) or different components of one product, are forming cooperative association, to share resources. Companies in horizontal relationship can be unrelated or they can be competing companies. (Barrat 2004, p. 32.) Some researchers are encouraging companies to form collaborative relationships with their competitors, since they might gain some benefits from it (e.g. see Maroofi 2015, p. 102), such as creating new markets and complementing each other (Bengtsson & Kock, 2000, p. 415). However, society has set some anti-trust laws to control collaboration between competitors, in order for competition to stay healthy (Bengtsson & Kock, 2000, p. 414), and to avoid economic collusions (Smith, Carroll & Ashford, 1995 p. 17).

Vertical integration means that companies from different levels of supply chain are forming cooperative relationships, where the aim is to make for example, information flowing better between partners, and otherwise improve supply chain process (Caputo and Mininno, in Prakash & Deshmukh, 2010, p. 55). One way that horizontal and vertical relationships differ, is because the level of interdependence in them is different. In vertical relationship, the interdependence is usually clearer than in horizontal relationships. (Smith, Carroll & Ashford, 1995 p. 10).

Horizontal and vertical relationships are completely different types of relationships, and therefore they need to be managed and formed differently. Horizontal relationships are usually not as visible to others than vertical relationship, and companies in them normally focuses on information and social exchanges rather than economic exchange. Usually horizontal

relationships are somewhat complicated, and therefore traditionally companies have been trying to avoid getting into those, whereas vertical relationships have been very wanted. (Bengtsson & Kock, 2000, p. 412-414.) In this thesis, it was chosen to concentrate on horizontal collaboration, which means that companies collaborating are operating at the same level of supply chain.

2.1.2 Collaboration formation processes

Not all companies are suitable for collaborative relationships and it is a challenge for firms to identify suitable partners. Company's ability to identify potential partners is depend on their previous partnering experiences, differences in their internal search and evaluation capabilities and differences in their ability to get information about potential partners from their network. One sign that a potential partner is trustworthy, is their willingness to combine company's strategic resources with the other partner. This shows that partner is not attempting to duplicate those same resources, and therefore becoming a competitor in the future. (Dyer and Singh, 1998.)

Next, two different frameworks for partner formation process are described. The reason why both frameworks are presented, is because they both offer a different viewpoint for partner selection. Those both viewpoints are important because they construct a more comprehensive picture of the process than what they would provide if presented individually. Pekas and Allio (1994) presented a simple partner formation process for strategic alliances, that offers overall picture of the whole process. There is also more complex process map presented that was created by Holmberg & Cummings (2009). Their process map gives the details for the steps that a company needs to take during the process. Both process maps can be seen in the Figure 1 below.

Pekas and Allio (1994) divided the process into four stages. These stages are strategy development, partner assessment, contract negotiations and alliance operations. In strategy development stage, companies need to form a strategy according their resources, and it is also important to align partnership objectives with the corporate strategy. Next, in partner assessment step, potential partner is analysed, and selection criteria is set. In the third stage, contract negotiations companies can see if all the parties have realistic objectives and partner negotiations are taken place. In alliance operations stage, plan is put to action, and partnership performance is measured and possibly rewarded. (Pekar & Allio, 1994, p. 55.)

Holmberg & Cummings, (2009) also divided the process of partner selection into four steps:

1. aligning corporate strategy and alliance objectives,

2. developing critical success factors for the alliance activities,

3. mapping potential partner industries, segments, and companies, and

4. using dynamic partner selection analysis tool to analyze potential targets.

In the first step, company needs to consider how the possible alliance could create value and if the alliance objectives can be linked with the company's own strategy. Forming an alliance will only give benefits if it can support company's overall objectives and strategies and for that reason company needs to consider this beforehand, so that partner will fit a company's situation.

The next step, developing critical success factors, consists of setting the most important activities that a company needs to perform well in order to be able to compete with the competitors. A company also needs to determine how each of these critical factors will fit with each potential partner. In the third step, a company should not only limit its analysis on the potential partners, but instead it should start with analysing macro level and thinking of potential industries. A company might find potential partner from another industry, that can help it to achieve its broader goals and objectives. A company can use some framework in this step, for example in Holmberg and Cummings' process (2009) they are adapting Brandeburger and Nalebuff's "value net" framework.

In the last step, "using the dynamic congruence analysis tool for partner selection" a company can use Holmberg and Cummings' own developed framework which includes eight steps where potential partners are evaluated mathematically and the partner which gets the best rating is most suitable for a company. See more in Holmberg & Cummings, 2009, p. 171-181.) Pekar and Allio (1994) and Holmberg and Cummings (2009) models are pictured in the Figure 1 below.

Pekar & Allio (1994) model	Holmberg & Cummings (2009) model
Step 1: Strategy development	Step 1: Align Corporate with Strategic Alliance Objectives
Step 2: Partner assessment	Step 2: Develop Critical Success Factors (CSFs)
Step 3: Contract negotiations	Step 3: Mapping potential partner industries, segments and companies
Step 4: Alliance operations	Step 4: Analyze Targets Using Dynamic Partner Selection Analysis Tool

Figure 1 Pekar and Allio (1994) and Holmberg and Cumming (2009) models

2.1.3   Benefits and challenges of collaboration

Collaboration is believed to bring many benefits for companies, such as complementary resources, information exchange, increased sales and scope activities, shared costs, benefits from economics of scale, shared risks, improved ability to deal with complexity, enhanced learning abilities and assistance with environmental uncertainty (Shawyun, 2010; Dogson, 1994, p. 2-3, 5). It can also increase profit margins and improve service offerings (Choi, 2012, p. 138).

Some benefit can be so called noneconomic, such as faster cycle time of product to market, improved quality, or improved competitiveness (Smith, Carroll & Ashford, 1995 p. 17) or increased customer satisfaction (Choi, 2012, p. 138) or enhanced reputation (Stuart, 2000, p. 792). Collaboration can form an access to other firm's unique resources or make for example research and developing process cheaper, because of shared costs (Bengtsson & Kock, 2000, p. 421).

Both large companies and SMEs can gain benefits from collaborating (Sing, Braid, Mathiassen, 2018). Large firms have opportunities to use economy of scale, since they have better resources and networks, but their weakness is that they usually lack organizational flexibility. SMEs usually have high specificity in technical skills, organizational flexibility, and capability for fast market reaction, but they might not have necessarily skills to manage

innovation processes and they lack resources (Jang et al, 2016, 2-3.) Therefore, both company types can gain benefits from working together to reach mutual goals.

Sometimes, companies' ability to generate results from their resources are requiring for another company to utilize them with their complementary resources. Therefore, it can be beneficial to combine resources with other companies because this can allow companies to build unique resources, which can lead to competitive advantage in the market. Partners can be a huge source of performance-enhancing technologies and innovations. (Dyer and Singh, 1998, p. 661, 666.)

Even though collaboration brings many benefits, it is not always successful. There are many reasons why this can happen, but the most common reasons are poor alliance management and that lack of effort in partner selection process. (Holmberg & Cummings, 2009, p. 165.) One huge challenge in collaboration is, how to form trust between partners. Here management has a huge role (Dogson, 1994, p, 5). Also, collaboration brings additional management costs, consists risk of unwanted knowledge transfer and organizational secret leakage. It has been noticed that companies are more willing to form relationship with geographically close companies because it brings trust between partners and reduces costs. Especially small firms are being affected on geographic proximity when it comes to forming collaborations (Inoue et all, 2018, p. 122, 135, 199.)

Also, formation of collaborative relationship is not easy, and it also requires resources and brings additional costs. Selecting suitable partner is difficult process, which many companies fail to do correctly (Pekar and Allio, 1994) or as mentioned before, are not putting enough effort into (Holmberg & Cummings, 2009). A challenge also is that collaboration should be included in company strategy before the plan is executed (Dogson, 1994, p. 5). This can be a challenge for a company if they have not been thinking long-termly when forming their strategic plan. Also, collaboration cannot continue if the benefits gained do not equal or exceed the costs it brings (Smith, Carroll & Ashford, 1995).

It is also important to remember, that not all companies are gaining any benefits from collaborative relationships. The type of the company has a huge effect on, whether or not it can gain any benefits from it. For example, small local companies with weak technological capacity might be having difficulties to collaborate with larger companies, since they do not have much to offer for their partners. Also, it has been found out that unnecessary collaborations might have negative influence for example, on innovation performance,

because it might lead to opportunistic exploitation and increased rigidity and innovation process inefficiency (Maroofi, 2015).

Intercorporate collaborations can cause macro-economic problems. The reason for this is because collaboration between companies can affect those markets where companies are operating at. Sometimes collaboration is used as a tool to isolate competitors or make it more difficult for new entrants to enter the market. It can also be used by large corporation to gain government assistance for R&D and therefore it distorts the competition (Dogson, 1994, p, 3). Therefore, anti-trust laws have been set for this purpose, to ensure that competition stays healthy (Bengtsson & Kock, 2000, p. 414). In Finland competition legislation states that "mutual agreements and practices between competing undertakings to limit competition (cartels)" are prohibited (Ministry of Economic Affairs and Employment of Finland, 2020).

2.1.4   Ending a collaboration

Collaboration may end for multiple reasons. Sometimes market situations are changing, and collaboration relationship cannot adapt to the new situation (Das & Teng 2000), and sometimes collaboration is only meant to last for a short period of time, for example because it has been some mutual project of two or more companies. Sometimes collaboration cannot achieve the objectives set to it, partner strategies may change, or regulatory authorities might demand the termination of it. (Government of South Australia, 2012, p. 16).

Collaboration relationships can be formed either with long termly or short termly. Long-term and short-term partnerships have a completely different starting position as partners have different expectations and attitudes towards the collaboration. Sometimes short-term partnership might grow to become long-term partnership, since one of the reasons why companies are forming short-term partnerships is because collaboration always holds many risks, and after companies have gained more information, the risks becomes smaller. (Das & Teng 2000, p. 85-87.)

According to the company collaboration guidebook provided by Government of South Australia (2012, p. 16.) partners should plan the termination strategy of their collaboration from the very beginning of their partnership, which states what happens to assets, customers, and existing contracts. It is highly valuable for companies to know that there is a clear way out from partnership if it is needed. It is also good to know beforehand what happens to shared assets if partner exits. Even if collaboration ends because it has succeeded to fulfil its purpose, there

is still many things to be considered, such as insurance matters, intellectual property rights, maintenance, support and some liability matters that might need to be managed after the collaboration has ended. (Government of South Australia, 2012.)

The termination of partnership depends on the nature of it. Different types of partnerships end in different ways. For example, if collaboration is formed via licensing, then the level of connection is low, and partnership can be terminated easily by dissolution. However, if the partners are connected more tightly together then it is more usual that partnership ends in merger or acquisition (Das & Teng, 2000, p. 90).

2.1.5 Collaboration models

In this thesis it was chosen to focus on the collaborative model that enables partners to stay independent while collaborating. In other words, those collaborative models, that do not include some kind of company mergers. This definition is met with strategic alliance collaborative model.

Strategic alliance can be defined to mean a formal agreement between two or more businesses to pursue a set of own and common goals through sharing resources with the risk of uncertainty over the outcome. Strategic alliances can be divided into two: equity and contractual based strategic alliances. It can take longer time to finish negotiations when it comes to equity based strategic alliance and they offer less flexibility, but on the other hand, they give more control and they give more open knowledge transfer. However, they can also involve higher exit costs. (Arino et al. 2001) One contract that can be used to create collaborative relationships is service level agreements (SLA). SLA is the agreement that is made between service provider and customer, that is quantifying the minimum quality for service that meets the needs of the business (Hiles, 1994).

The type of strategic alliance is defined by their structural arrangements. The types are joint ventures, equity swap, minority equity alliances, joint production, joint marketing, joint bidding, joint R&D, product bundling, shared distribution, and licensing. Some of these types are more ideal for long-term collaboration than other, for example joint marketing is short-term collaboration model, and joint venture long-term collaboration model. (Das & Teng, 2000, p. 92-93.) Strategic alliance can help companies in many ways, but forming a successful strategic alliance is not easy (Bengtsson & Kock, 2000, p. 414). As any other collaborative relationship, strategic alliance includes many risks and challenges.

2.2 Ecosystems and business networks

The major changes in business landscape has led to the situation where companies have been starting to offer more novel solutions and services. Therefore, companies have been turning to new business models and replaced hierarchically managed value chains within business ecosystem models, that are more modular and decentralized by their architecture. (Still, Lähteenmäki & Seppänen, 2019.) Data sharing between companies is one reason why companies are forming business ecosystems, and these two topics are closely related to each other. Also, business ecosystems are seen to be one of the main topics of this thesis. There are multiple names and types of ecosystems presented in academic literature, such as data sharing ecosystem, business ecosystems and innovation ecosystems. However, in this thesis the concentration is on ecosystems that enable data sharing between business partners, and these are referred as business or data sharing ecosystems in this paper.

Next ecosystems, networks, and the differences between these two concepts are discussed. Also, ecosystem strategies, roles in them and lifecycles of them are introduced. For this thesis, there was also made a small study of existing business ecosystems in Finland using secondary sources and expert interviews, these are introduced in more detail in Chapter 4 and Chapter 5.

2.2.1 What are business ecosystems?

Business ecosystem is not old concept yet. The concept was first introduced by James Moore in 1993 in his article "Predators and Prey: A New Ecology of Competition" published in Harvard Business Review. According to Bosch-Sijtsema's et al. (2015) literature review, business ecosystems are economic communities that are supported by foundation of interacting organizations and individuals that are usually build around platforms. Ecosystems often consist of customers, suppliers, and competitors (Bosch-Sijtsema & Bosch, 2015). The main idea is, that parties in ecosystems are affecting each other's constantly, creating evolving relationship, where each party must be flexible and adaptable in order to survive (Hayes, 2019). In this thesis the business ecosystems have been defined as "the communities build by companies and other stakeholders around to some platform, where companies are sharing data to each other's. Inside of an ecosystem, companies are collaborating somehow and usually ecosystem has at least one common goal". Companies can operate in multiple ecosystems at the same time and have different roles in them. In ecosystems, companies

must find balance between power and symbiosis and apply collaborative approach for innovating and competitive approach for complement building. (Bosch-Sijtsema & Bosch, 2015.)

There are many reasons why ecosystems are established. One reason is, because many companies from most sectors have moved from competing on efficiency and effectiveness to competing on continuous innovation, and they have noticed that they cannot do it alone. Instead, companies must co-evolve over company boundaries, because no single company has all the needed knowledge and resources that are necessary for this change. (Moore, 2006, p. 32-33.) There are also other reasons, depending on the size and industry of a company. For example, sometimes heterogeneity due to unique resources can be at least partly explaining why business ecosystems are born (Bengtsson & Kock, 2000, p. 420). SMEs are encouraged to join business ecosystems, since it allows them to gain and decode flows of information that they would not be able to do without the ecosystem (Nieto & Santamaria, 2006, p. 8).

Business ecosystems are also giving companies a chance to gain external strategic opportunities. External strategic opportunities mean that companies can exploit business opportunities beyond its own boundaries, usually with the help of a third party. Strategic opportunities are increasingly attracting companies, but now only a few have the capabilities and knowledge what is needed to integrate it into a company's strategy. (Huttunen et al., 2019B, p. 6.) At the moment, external strategic opportunities are still on very theoretical and superficial level, since not many companies have done it in action. Also, this subject has not been studied a lot yet, even though there are a lot of literature about the collaboration between companies. The principle is that external strategic opportunities are born from the possibility of product or service modularity, that happens through software because of complementary innovations. (Huttunen et al., 2019B, p. 6.)

Business ecosystems consists of several elements according to literature review of Rabelo & Bernus, (2015). These elements are actors, capital, infrastructure, regulations, knowledge, and ideas. There are also three additional elements, such as interface, culture, and architecture principles. By interface is meant that ecosystem should have a channel where actors (parties) can interact with each other's, including their customers, stakeholders and civil society. Culture is one of the most important elements for successful ecosystem. The culture defines how actors in the ecosystem are performing and innovating, how they solve conflicts and set rules. In other words, culture is the mindset of the ecosystem. Architectural principles

are referring to the way all the mentioned elements are combined and orchestrated. (Rabelo & Bernus, 2015, p. 2252)

2.2.2   What are business networks?

Networks are one structural entity within a broader business ecosystem, which means that business ecosystems usually consist of several different network structures (Wult & Butel, 2017, p. 1417). One basic characteristic of network interactions is exchange between parties. Exchange can be for example joint R&D, or commercialization of new knowledge and innovations. Network participants have common goals, they share and recombine resources and still have their own purposes for the collaboration. The benefit of network collaboration is that it helps parties to access necessary information and improve using of it. (Kamenskikh, 2018, 2.) In other words, attending a network helps companies to reach some resources that they would not be able to gain otherwise. Sometimes uncertainty and instability in networks bring benefits for its members. This is because they can form a suitable environment for creating innovations, because sometimes knowledge diversity is needed. However, collaboration and cooperation are seen as a key factor to all connections (Wulf et al., 2017, p. 1412, 1417.). In other words, without collaboration or cooperation, there cannot be working networks.

In academic literature, the exact relation and interdependence between networks and business ecosystems have not been officially stated yet. This means that it is still unclear where business ecosystem begins and network ends, and if networks are a structural components of a business ecosystems. (Wulf et al., 2017, p. 1414). However, according to literature review of Wulf et al., (2017, p. 1416) there can be seen clear differences between these two concepts. The results of Wulf et al., (2017) literature review have been summarized on the Table 2 below.

	Business ecosystems	Business networks
The size	Large, can consist of many networks	Smaller than ecosystems
Connection between parties	Loose	Close
Structure	Formal or informal	Formal or informal
Closeness/openness	Open	Open, half-open or closed
Innovation potential	High	Depends on the purpose of network

Business ecosystems are larger than networks, but they are not as close entities. A business ecosystem consists of several different network structures, some of them might be formal as others informal. Business ecosystems are usually more open and the connection between partners are loose, when networks can be either open, half-open or close and all the partners are connected to each other. (Wulf et al, 2017, p. 1417). However, even though ecosystems are usually more open than networks, in some cases they can also be closed systems if ecosystem members decide so (Jacobides, 2019).

According to Wulf and Butel (2017) literature review, networks can have multiple structures. Some networks are more tightly embedded when some are more open. Networks can be formal or informal. The number of formal and informal relationships inside a network are affecting how much influence network partners have to each other. This also affects the type of knowledge that is shared inside a network. The innovation potential of business ecosystem is high, but with business network's case it depends on the purpose of the network. (Wulf & Butel, 2017, p. 1410-1411).

2.2.3   Roles in ecosystems

It is important not only to be aware of different roles in ecosystems, but also to know what role each company is playing in the ecosystem, since the it effects on the innovation process of a company (Iansiti and Levien, 2004). According to Moore (1993) ecosystems usually have one

member that has the leading position. The leader is highly valued among the ecosystem members because leaders are helping ecosystem members to invest to a shared future, where they are anticipating profiting together (Moore, 1993). Next, two different viewpoints for the roles in business ecosystems are introduced. One presented by Iansiti and Levien in 2004 and one presented by Lindman et al., in 2014.

Ecosystem roles by Iansiti and Levien (2004)

Iansiti and Levien (2004) have identified different actor roles within an ecosystem. In their framework it has been pictured what kind of value actors are bringing and how each actors' role is affecting the entire ecosystem. Therefore, it is important to discuss in this paper.

Iansiti and Levien (2004) framework consists of three roles: niche players, keystones (orchestrators) and dominators. Most companies in ecosystems are following niche strategies, which means that a company aims to develop some specialized capabilities that are differing from other companies inside an ecosystem. By specializing, niche companies can concentrate on enhancing its narrow expertise, but they are depending on other companies. They are usually responsible for most of the value creation and innovations in ecosystems. Therefore, they also have very important role in them. (Iansiti & Levien, 2004.)

Other role in ecosystem is keystone, or orchestrator as they have also been called in academic literature (Bosch-Sijtsema et al, 2015). Keystones are actors that are both creating and redistributing the value in ecosystems (Iansiti & Levien, 2004). Therefore, they have crucial roles in them. Keystone companies are increasing productivity of networks and offering innovative technologies for others use and aiming to improve the ecosystems as a whole. However, they do not do it for others sake, but instead because it ensures their own survival. Many times, if an ecosystem loses its keystone actor, the whole ecosystem collapses. (Iansiti & Levien, 2004.)

Dominators have dangerous effect on the ecosystem. Dominators are exploiting critical position from the ecosystems or they are draining value from it. Physical dominators are aiming to be solely responsible over the value creation and capture and after that no meaningful ecosystem can emerge. Value dominators have only a little control over ecosystems they are operating at, but they also create only a little value to it. Sometimes value dominators are draining so much value, that the entire ecosystem collapses. (Iansiti & Levien,

2004.) The roles presented by Iansiti and Levien (2004) have been summarized in the Figure 2 below.
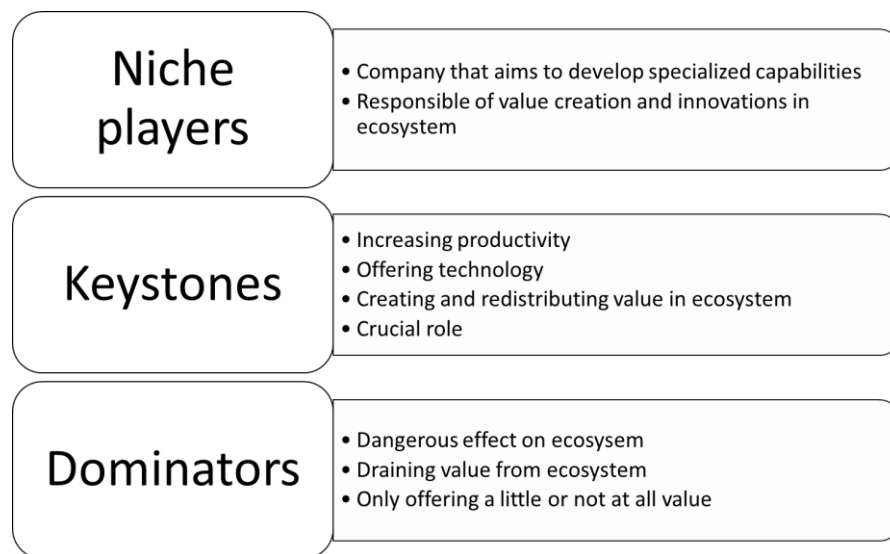
Figure 2 Iansiti and Levien (2004) framework for ecosystem roles

Ecosystem roles by Lindman, (2014;2016)

Another viewpoint to the roles in ecosystems has been presented by Lindman (2014;2016). Lindman's framework is more concrete than Iansiti and Leviens' (2004) and therefore, it is also important to discuss in this paper. It gives a good picture of the actual tasks that different roles have in the ecosystems.

Lindman et al., (2014) framework consists of five data related roles in an ecosystem. These roles are open data publisher, data extractor and transformer, data analyser, user-experience provided, and support-service provider. Open-data providers are making data available for others to use. Many times, these are some public organizations, such as state or federal governments. Open-data providers poses the data storages and the APIs for developers and their revenue model from data sharing comes from saved costs, since they do not need to offer as many services for customers when they give data for others. The other reasons why companies are taking this role is to show publicly that they are innovative and transparent. (Lindman et al., 2014; Lindman et al, 2016).

Data extractor and transformers are organizations that clean, normalize, and prepare data for reuse. These activities are very time-consuming, and they require a lot of resources (Lindman

et al., 2016). According to Lindman et al., (2016) there are not many companies performing this kind of service yet, so there could be commercial opportunities, but it has its own challenges, for example because it would require many diverse datasets. There is no existing revenue model for data extractors at the moment, and the managerial idea behind this role is to provide tools for easier data utilization. (Lindman et al., 2016.)

Data analysers are companies that gather and analyse data. Often these companies are gathering data from multiple sources, so that they can form comprehensive analysis. The revenue model for this role is to gain income from project work, product-based transaction pricing and modular ecosystems. (Lindman, et al., 2014; Lindman et al., 2016)

User-experience providers are companies that are gathering and combining data sources and offering user interfaces or mashups to manipulate the data via mobile app or web browser. One example of this kind of companies, are those websites that are showing job advertisement and enriching them with additional information from other sources, e.g. social media, or financial data. Revenues are coming from selling apps, website subscriptions or advertisement. (Lindman et al, 2016)

Support-service providers are companies that are helping other companies in the network with their open-data related tasks. They might offer data storage services or host websites. They also consult clients with open-data related procedures or user-experience enhancements. The revenue model includes incomes from project related work and service-based pricing (Lindman et al., 2014; Lindman et al., 2016). The roles presented by Lindman et al., (2014) are shown in more detailed in Table 3 below.

Table 3 Different roles in data ecosystems (Lindman et al., 2014).

Role	Offerings	Resources	Revenue model	Other benefits
Open-data publisher	Offers data	Data storage, API for developers	Cost savings	Shows innovative and transparent for others
Data extractor and transformer	Cleaning, normalizing, and preparing data	Maintaining the code base and documentation	No revenue model	Offerts tools for easier data utilization
Data analyzer	Visualization and insights by combining and analyzing data from many sources	Analyzing data from multiple sources	Income from project work, product-based transactions pricing and modular ecosystem	Add value by exacting meaning from raw data and presenting it with simple format
User-experience provider	User interfaces for mobile applications or web browser	Programming and providing user interface expertise	Advertising, product sales, freemiums, licensing	Focus on effectiveness and usability issues
Support-service provider	Storage capacity, website hosting	Programming, providing user interface expertise	Project related work, consulting, programming	Helping customers with their problems

2.2.4 Ecosystem strategies

Ecosystems require new strategic frameworks. In this part, there are factors introduced that needs to be considered when a company is thinking about entering or establishing a new ecosystem.

In ecosystem, a company can no longer concentrate only on innovating by itself, but is should also consider how to help others to create value. Many times, successful ecosystems have done it by broadening their own value proposition by combining their core offering with some previously unrelated product or service. (Jacobides, 2019.) This can mean for example, that two or more companies starts to collaborate and offer some mutually produced services for both of their customers.

As mentioned before, in ecosystems, companies have different roles, some more central than others. Sometimes it is better to be a complementor or share the role of orchestrator with another company. According to Jacobides (2019) being the orchestrator of a ecosystems requires superior product or service, that is difficult to replicate. This can mean for example, large networks of users or strong brand. Even though, a company has a great product or a service, it might be beneficial to orchestrate in partnership with another company, in order to

reach critical mass. Critical mass means the point where company, becomes self-sustainable, and does not need additional investment from outside to remain viable (Kenton, 2019). And even if a company is planning to establish its own ecosystem, it is beneficial to participate in another ecosystem, to gain experience, to learn about the needs of customer and complementors and build skills that are required. (Jacobides, 2019.)

A company needs to make governance choices about the access and the attachment of its ecosystem. Access in this context means that, a company needs to consider whether the system is open, managed or closed. In open ecosystem, the threshold to participate is low, companies only need to meet some basic standards to be able to participate. In managed ecosystems, criteria are clearer, and there might be some limitations, for example of their numbers or functionalities. In closed ecosystems, complementors have strict rules and participations are very tightly controlled. Attachment means that a company also needs to consider how much it wants complementary parties to be exclusive to its own ecosystems. By this is meant, that a company can build a system that forbids app developers from porting their programs to other systems. However, this can form barriers that some developers are not willing to overcome, and they might decide to join elsewhere. On the other hand, if a company does not impose such barriers, it might be easier to recruit complementors, but then orchestrator does not have influence over their actions. (Jacobides, 2019.)

Organizations in ecosystems also needs to be able to adapt into changing market situations. The reason for this is since the needs of final customer and the desire and ability to collaborate with complementors might shift fast and dramatically. In ecosystems, companies need to attend with outward-attitude and be able to manage relationship with other companies in the ecosystem. This can be a challenge for companies. One risk is that some parties might fail to engage with others, but this risk can be managed for example with some impetus or incentive from the ecosystem host. (Jaconides, 2019.)

One strategic decision that company also needs to make concerning the ecosystems is, that to how many ecosystems it will participate itself. Some companies are orchestrators of many ecosystems, such as tech giant Alibaba, that started from wholesale marketplace and currently is taking part in a C2C marketplace (1688.com), a third-party-seller B2C ecosystem (Taobao) and also in sales and marketing platform (Juhuasuan). Many times, these kinds of large successful companies are starting from one market and then sifting or expanding to others. Many complementary companies are choosing to "multihome", which means that they

are participating in many ecosystems, to gain benefits of cross-ecosystem customer reach. (Jaconides, 2019.)

Ecosystem-based competition requires new strategic frameworks, organization models and changes in policy and regulation. One challenge that policymakers are facing with business ecosystems are that they must ensure that competition stays healthy. (Jaconides, 2019.) The other challenge is also to ensure that European Economic Area stays competitive against other market areas. This is a huge challenge, for example, because in China data laws are much looser than in Europe, which gives them a competitive advantage over Europeans (Jaconides, 2019). The strategy factors have been summarized in the Figure 3 below.
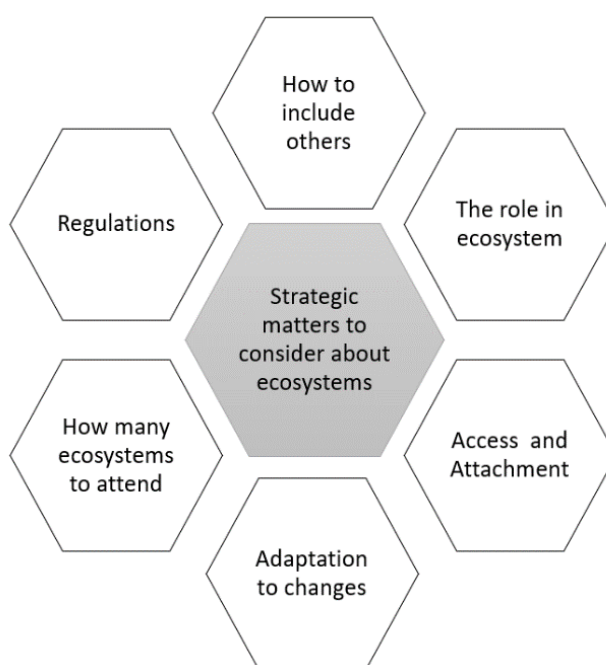
Figure 3 Jaconides (2019) ecosystem strategy factors summarized

2.2.5 Lifecycles and paths of ecosystems

Ecosystem strategies must be constantly revaluated and adapted as ecosystems are evolving, since even successful ecosystems do not often last (Reeves et al., 2018). Ecosystem lifecycle consists of three larger phases: seed, cultivate and nourish according to Rabelo's et al., (2015) literature review. Seed phase means the starting phase where all the general preparations needs to be made, concerning actors, infrastructures etc. In cultivate phase organizations should support the formation of innovations, by creating suitable environment for it. In nourish

phase, organizations need to keep the conditions of the ecosystem environment sustainable to operate and evolve. (Rabelo et al., 2015, p. 2252).

However, the lifecycle of business ecosystems can be also thought as a process. The process view for the lifecycle of ecosystem allows to break the lifecycle into multiple different and more concrete phases. The process starts with analysis of what kind of ecosystem a company wants to build. After when this is clear a company should also consider the design of the ecosystem and take into account the partners. The next step is project and deployment phase, where the planned actions are transformed into real infrastructures and populated with real actors. (Rabelo et al., 2015, p. 2252)

If initial conditions of an ecosystem have been established during the earlies phases, initiatives can start to take their own planned places within the ecosystem. This phase is named execution. After execution phase starts the sustenance phase, where the ecosystem and the evolution of it is managed. The last phase called conclusion consists that ecosystem can either end its activities or it can change its mission, which requires that it returns to some of the earlier phases of the process. (Rabelo et al., 2015, p. 2252)

Each of the phase is taken as a process that consists of subprocesses. Phases are executed by some actors and managed by stakeholders, such as universities, local governments, and civil associations. The success and pace of the activities within the process are impacted due to different maturity levels of involved parties, insufficient infrastructures, resources, and ecosystem strategies and many other factors. The process has been pictured in the Figure 4 below. The arrows are presenting typical information flow among the process phases. (Rabelo et al., 2015, p. 2253.) As it can be seen from the Figure 4, the lifecycle of ecosystem is circular process.
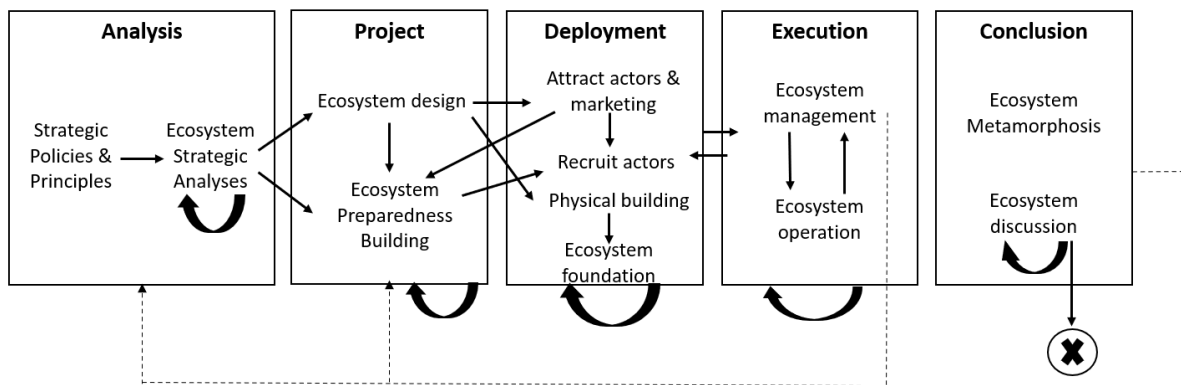
Figure 4 Lifecycle of ecosystem (Rabelo et al., 2015)

There are also academic articles written about the ecosystem paths. According to Reeves et al., (2019) there can be seen to be four typical business ecosystem paths that companies take. These paths are "Never took off", "Won it all – temporarily", "Fork in the road" and "Became sustainable". These paths have been summarized in the Table 4 below.

Table 4 Reeves et al., (2018) ecosystem paths

"Never took off"	"Won it all - temporarily"	"Fork in the road"	"Became sustainable"
• Fails to get off the groung • E.g. Blackberry's operating system	• Started successfully • Failed to keep their place • E.g. Netscape's web browser	• First conquers the whole market • Looses foothold to competitors • E.g. Uber	• Ecosystem became sustainable • E.g. Amazon

The "Never took off" is the most typical ecosystem path, where ecosystem simply fails to get off the ground. Example of such ecosystem is BlackBerry's operating system. This path is defined that ecosystem never reaches at least 50% of market share. "Won it all – temporarily" -path means that ecosystem started successfully and managed to conquer significant market share at first but eventually failed to keep their place. Example of this path is Netscape's web browser. (Reeves et al., 2018, p. 2-3.)

"Fork in the road" -path means those ecosystems that first had the whole market, but during the recent years have started to lose their foothold to their competitors, such as Uber. "Became sustainable" ecosystems are those rare ecosystems that managed to keep their winning

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position to date, such as Amazon. (Reeves et al., 2018, p. 2-3.) From these path-types it can be concluded that establishing ecosystem does not just happen, but it requires time and resources from the companies in it.

3   DATA SHARING BETWEEN COMPANIES

In the past few decades, there has been huge enhancement in computer processing, storage capabilities, software development, technology development, evolution of wireless broadband and development in mobile computing. These enhancements have led to the current situation where information and technology are one of the dominant features in our economy. (Davenport & Kudyba, 2016, p. 84). These enhancements have also made it possible to turn data into business. For example, using data can increase company's new product and business model development (Broadsky & Oakes, 2017, p. 1). Also, data sharing is integral part of effective intercorporate collaboration (Marcus et al., 2020), that creates many new business opportunities for companies. In next chapter it is explained what data is, why it is important for business, how it can be used to build new business opportunities.

3.1   Data and why it is important in business?

Data is information such as numbers and facts, that are collected for examination and considered and used in decision making. The information can also be in electronic form that can be stored and used by a computer. (Cambridge Dictionary, 2020). In this thesis data means electronical information, and if the term information is used, it is seen as a synonym to the term data.

Data can be seen to be a similar resource as capital or labour. The difference between these resources is that data cannot be handled without the investments of other resources. (Seppälä, et al., 2019.) In 2019, about 49% of Finnish companies considered data as a resource. The number of companies using new technologies and models enabling data sharing is estimated to grow 2,4% annually. (Huttunen et al., 2019B, p. 4.)

Data is important because it can help companies to move on to new industries or ecosystems and find alternative choices for traditional competitive landscapes (Woerner & Wixom, 2015, p. 62). If company wants to take advantage of the data it holds, they need to make a strategic decision, whether to own or share the data that they are holding, since the data that company is not using might be valuable for other companies. Data that is not interesting to a company in economic perspective is called waste, this kind of data company might be willing to give away for free of charge (Seppälä et al., 2019.)

Data can also bring many benefits for a company. Benefits gained from data can be categorized into two dimensions: operational efficiencies and strategic opportunities (Huttunen, 2019). Operational efficiencies include for example cost savings, and reduced manual work (Mukhopadhyay, Kekre, & Kalathur,1995, p. 141). Strategic opportunities refer to for example incremental innovations or better customer targeting, and other opportunities that will generate more revenue for a company. (Davenport & Kudyba, 2016; McAfee & Brynjolfsson, 2012.)

Companies are facing many issues when using data in their business. For example, how to connect data to company's strategy, understanding on what data is needed, and how to find the accurate data. Also, the amount of data can cause problems, especially if the data is unmanaged. Issues are drawn also because data can easily become outdated or it can be inconsistent. Companies might also have trouble using data effectively or they cannot gather data in a timely manner. Security and privacy are also important issues, and data needs to be managed carefully, so it is recommended that companies take these into account when forming organizational structures. (Levitin & Redman, 1998).

Data cannot be talked about without mentioning of analytics. Reason for this is because analytics has a huge role when using data, as without it, data would not be understandable or easy to apply into use. In the other words, analytics are making data more useful and valuable. Therefore, a company needs both technical and analytical skills in order to utilize data. If both of these capabilities are low, then it can start to develop both skills at the same time, or it can decide which one of these skills it focuses at first. Technical capability means those technical and network capabilities that are enabling company to collect, store and retrieve its data. Analytical capabilities are those mathematical and analytical skills of the employees that are needed for transforming data into usable form. (Najjar & Kettinger, 2013, p. 214-215.) However, this requires a lot of resources and time from the company.

3.2 Intercorporate data sharing

Information sharing is quite a new type of IT motion. It includes companies forming mutual systems, formatting standards and changing processes in order for companies to be able to share data with each other's (Caffrey in Gil-Garcia et al, 2007, p. 121). However, data sharing can be beneficial, and companies might have different motivations for why they are sharing it. For example, companies can be aiming to gain efficiency, save costs, improve productivity or

their product or market strategies (Du et al. 2011, p. 90; Seppälä et all, 2019). The motivation to share data is also depending on the data type. (Seppälä et al., 2019).

Seppälä et al (2019) divide service process data into five categories: primary flow, secondary (re-use) flow, secondary (sold) flow, waste flow and hazardous flow. Primary flow is information that is part of service provider's core business. Secondary (re-use) flow is information that is from some other streams than primary flow, but it could be used in primary flow. Secondary process (sold) flow is information that originates from the primary processes, waste flow is information that do not have any positive value for focal company and hazardous flow is some information that should not be given to any outsiders, such as business-sensitive information. Hazardous data needs to be controlled closely. (Seppälä et al., 2019.) The data flows have been summarized in the Table 5 below.

Table 5 Seppälä et al., (2019) data flow types

Primary flow	Secondary flow (re-use)	Secondary flow (sold)	Waste flow	Hazardous flow
• Data is part of core business	• Data from other streams than primary • Could be used as primary data	• Data originates from primary processes	• Do not have value	• Data that should not be given to outsiders • Business-sensitive information

The other factor that affects the willingness to share data to other companies is the level of relationship between partners. The deeper the strategic partnership is, the greater the degree of information sharing is since it enables companies to perform real-time, integrated business operations. Willingness to data sharing also depends on the quality of the information, which includes timeliness, accuracy, adequacy, completeness, and reliability of the information shared. Successful collaboration involves trust, commitment, clear communication, participation, joint problem solving and willingness to share information with partner. (Du et al. 2011, p. 89, 91.)

3.3   The benefits and challenges of data sharing

Information sharing can increase productivity, increase problem solving and help build business relationships. It can help make better decisions, help design better products and

allow a company to gain more revenue (Dawes, 1996, 377, 384; Huttunen et al., 2019B, p. 5.) Technical benefits of information sharing are that it helps to avoid duplicate data collection, processing, and storage. Therefore, it saves resources, increases productivity, and it can reduce overall costs. It also helps to build and update information infrastructures (Dawes, 1996, 378). Information is a tool for solving problems, and therefore more data may equal better quality, quantity, and availability of data. Therefore, the organizational benefits for information sharing includes that it helps to make more comprehensive problem solving with more accurate information. Companies can compare and augment their internal data with external information, which leads to more accurate and better validity of the data. (Dawes, 1996, 378-379).

However, information sharing also holds its own risks and challenges. Data sharing between companies can seem like a huge risk for a company, because when company is sharing their data, they are releasing their information to a party that might someday become their competitor. (Du et al. 2011, p. 89, 91.) Also, companies are not willing to share their information, if they do not get any benefit from it, such as improved public image or expanded influence over other companies (Dawes, 1996, p. 380). Information sharing is hard to initiate and sustain, and the discussion of it almost always includes themes such as bureaucracy and power, which reduces the willingness to start this arrangement. Also, information sharing can prevent some overall costs, but it also brings additional costs (Dawes, 1996, p. 378, 384).

Information sharing is often limited because of technical, organizational, and political barriers. Technical barriers for information sharing are for example technological incompatibility, which means that partners' computer systems, networks, and software's are not capable of "talking to each other". One reason why this problem is faced, is because the computer manufactures have traditionally tried to differentiate themselves from the other manufactures to attract customers (Dawes, 1996, p. 380).

Even if the technology does not cause any problems for data sharing, the problem can be with the mismatching data structures. Usually the problem in this case is conflicting data definitions. (Dawes, 1996, p. 380). This means that companies are using different "names" in their data and therefore data is hard to process. Also, companies' own self-interest can be a barrier for information sharing. Even though data sharing can bring many benefits, companies can be afraid of losing their autonomy and independence in the process (Pfeffer and Salancik, in Dawes, 1996, p. 380.) Companies can also be afraid that data is misused and misinterpreted (Dawes, 1996, p. 384). Therefore, it is recommended to use contracts to ensure that data is

not used in unwanted way by partner. (Du et al. 2011, p. 90). Also, when a company shares customers personal data with another organization, privacy obligations are arising (Swarup, Seligman and Rosenthal, 2006) and they should be carefully considered.

Even though there are many risks, information sharing policies helps to create safe environment where data sharing is effective. The most critical data sharing issues are legal context, technical infrastructure and standards, and administrative structure for organizing sharing efforts and developing information policy (Dawes, 1996, p. 392).

3.4   Technical systems of data sharing

Data sharing requires technological systems. In this thesis, it was chosen not to focusing on the technological systems of data sharing, but it is shortly discussed next, in order to help reader to understand the larger picture. Therefore, interorganizational systems and application programming interfaces are introduced.

Data can be shared using interorganizational systems (IOS). IOS can be defined to be computer and communication infrastructures that are allowing the management of interdependencies between companies. Interorganizational systems are allowing knowledge flows among firms, and therefore enables that companies in collaborative relationship can gain the needed information to perform their collaborative work. In other words, IOS is making it possible for companies to collaborate. (Chi & Holsapple, 2005, p. 55.)

Interorganizational systems can be divided into three categories: pooled information resource IOSs, value/supply-chain IOSs, and networked IOSs. Pooled information resource IOSs means that companies are sharing some IT resources, for example, they have common database. Value/supply-chain IOS is used to support customer-supplier relationships and the aim of this IOS is for reducing the uncertainties between partners. The networked IOS are meant for reciprocal interdependencies between companies. Example of this kind of arrangement is typically joint ventures. (Kumar & van Diessel, 1996, p. 287-288.) These categories are summarized in the Table 6 below.

Pooled Information Resource IOS	Value/Supply-Chain IOS	Networked IOS
• Companies sharing some IT resource • E.g. shared database	• Used to support customer-supplier relationship • Reduces uncertainties between partners	• Reciprocal interdependencies between companies • E.g. joint venture

Even though, data sharing brings many benefits, it is also important to remember that when companies are using IOS, there are always some risks. Companies can unintentionally or intentionally infest systems with viruses, or some partner might be finding data of other company's customers and therefore do not need the partner anymore (Kumar & van Diessel, 1996, p. 290). These risks have to be considered when a company decides to use IOS.

As already mentioned before, Application Programming Interfaces (APIs) are technology that is used for transferring data between two parties. These days it is believed that APIs are the best choice of technology for giving access to customer accounts (Zachariadis & Ocean, 2016, p. 4). APIs can be either private or open. Private APIs can only be exclusively used internally by the company or it can be open for third parties with contractual agreements. These private APIs are commonly used by banks. Public or open APIs can be accessed by almost anyone. Usually these types of APIs are available without contractual arrangements or with little contractual arrangements. Companies have to decide the level of openness with which they wish to engage with their community. (Zachariadis & Ocean, 2016, p, 6. 11).

3.5   Legislation of information

In legislative sense, information and data cannot be owned. They may belong to various actors, and the actor who possesses the data in their devices may have ownership-like abilities, since they can prevent others from gaining the data, but still they do not have the actual ownership of it. However, the legislation of information and data are not this simple, as intellectual property rights might still protect the data in some cases, for example when data is being used for specific purpose such as part of a new product or service. Also, when the amount of data is huge (big data), the data set might be protected, but in this case only the

information entity and the data contained in it is protected, not the individual information elements. (Ailisto et al., 2015, p. 16.)

Agreements are one way to protect the data. Within the freedom of contract, it is possible to specify to who data belongs to, and who has the access to the data. However, contract cannot be binding to the third party that has not been part of making the contract. (Ailisto et al., 2015, p. 17.) By this is meant that company cannot fully secure their data with contracts, if some other parties than the ones that have signed the agreement, have access to it.

There is also other legislation concerning the possession of data, such as GDPR (General Data protection Regulation), that has set some detailed requirements for companies about collecting, storing, and managing personal data (European Union, 2020). When a company holds personal data, which means of data about individual persons that might be identified from the data, it holds some obligations for the company. Such obligation is to safeguard the data as is necessitated by data protection. (Ailisto et al., 2015, p. 16-17) These obligations have to be considered carefully, as company might be facing some serious issues if it chooses to ignore these obligations, such as administrative fine of 10-20 million or 2-4% of company's yearly turnover depending on which one is larger amount of money (Office of the data protection ombudsman, 2020). Other legislation that has affected data sharing between companies is PSD (Payment Services Directive), which has caused open banking system that means banks have to open their databases to third parties. About PSD2 and open banking system can be further read from the Appendix 3.

3.6 New business opportunities created with data

At first data and analytics were just tools to help companies improve their internal decision making. This field was even called "decision support" because of that. However, technical development and big data revolution made it possible for companies to use data and analytics to build new business opportunities. (Davenport & Kudyba, 2016.) Even though, a company does not use the data by themselves to create new business, the redundant data could be potentially very valuable for some other company. (Huttunen et al., 2019B p. 4.) In the following sections the different ways that companies can utilize data are introduced.

3.6.1 Data monetization

Data monetization means when intangible value of data is converted into real value by selling it or converting it into other tangible benefits or by avoiding costs. (Najjar & Kettinger, 2013, p. 213-214). Data monetization can be done by wrapping, selling, or bartering. Wrapping means that information is wrapped around some product or service. Selling this situation refers to company giving information in exchange for money and bartering occurs when company is exchanging its information for other valuable assets, such as new services, tools, or deals. (Woerner & Wixom, 2015, p. 61)

Benefit of data monetization is that it helps to create new business model for a company, where it gains new revenue streams. Also, it can help company to save some costs, as company might be able to share costs with partners or utilize, for example, partners' analytical capabilities. Data monetization also helps for example a company to avoid asymmetric information between the company and its supplier, which can give the supplier competitive advantage against other suppliers (Najjar & Kettinger, 2013, p. 214, 223, 225.)

Data monetization also holds risks. Companies' privacy and security might be at risk if contracts are not carefully made. Also, companies need to consider what data it is willing to offer, in what format and at what price. It is also important to analyse how it will affect the relationships and business model of a company (Najjar & Kettinger, 2013, p. 214, 223)

Najjar and Kettinger (2013, p. 223-224) have listed four key success factors about data monetization. First, company should think it through how data monetization will affect its relationships and its business model before it executes this strategy. Company might lose its information advantages over competitors or customers. Also, it should be kept in mind that by monetizing its data, a firm is creating a new product that generates revenue but also uses resources.

Company should also identify, where it currently is at its data monetization stage, and where it wants to aim. There are many things that should be considered when it comes to commercialization of data, such as infrastructures, cost analysis and ensuring that data sharing is safe. Company should prepare its data for sale, by integrating additional, relevant data sets into its own data and it could also try to get value-adding third parties to join its ecosystem. Therefore, company will be able to increase the value of its data. There should

also be marketing strategy formed for the data, in order for company to be able to communicate the value of its data to potential buyers. (Najjar and Kettinger (2013, p. 224.)

Company should also always develop contracts when it starts to sell its data to outside parties, to ensure that no one is using the data for some unwanted purposes. For example, in the case of company and its partner, it can be terminated that data can only be used for growing the mutual business. Another important matter is the trust issues between parties involved that should be taken care of. Trust is highly important matter, because it can for example lower the possibilities for conflicts or lower the contracting costs. The trust between partners, are built with open communication, clear coordination of governance mechanisms, and transparent collaboration portal (Najjar and Kettinger (2013, p. 224.)

It is recommended that company should start its own organizational group or business unit to handle data monetization, since it helps to manage the business model better, even though it is completely dissimilar than other ventures of the company. (Woerner & Wixom, 2015, p. 61).

3.6.2 Data products

As mentioned before, the technical revolution has made it possible to use data in different ways. It has also made it possible to create data products. Data product means that data has been formed into information product offering by using analytical capabilities that makes data valuable. (Davenport & Kudyba, 2016, p. 84).

Data products are including range of different types of offerings such as financial returns, data, skills, process execution and analytics (Woerner & Wixom, 2015, p. 61). Even though the term refers to physical products, a data product can also be service. Usually data product is used to attract customers for example towards the unknown products in large product pools or for advertisement, and therefore it is more uncommon that they are sold separately to customers. They are way for companies to create different offerings from competitors and be able to reach larger user base (Davenport & Kudyba, 2016, p. 84-85).

Davenport & Kudyba used Meyer's and Zacks five-steps information product development model that was created in 1996, and added two additional steps into it, as the original model did not match with the modern information product development process. According to Davenport and Kudyba (2016), there are seven steps in developing data products:

1. Creating conceptual product
2. Acquisition
3. Refinements
4. Storage/retrieval
5. Distribution
6. Presentation
7. Collecting market feedback

At first, company needs to identify what kind of information product would meet the needs of the market, before data acquisition, since otherwise it is difficult to identify required data resources. Only after product is conceptualized, then company can start data acquisition part. Also, in conceptualizing step, company should have three different experts involved in conceptualizing: existing/complementary information product managers to help avoid cannibalization, marketing people to help assessing the nature of consumer demand and subject matter experts to determine the feasibility of the product design. (Davenport & Kudyba, 2016, p. 88.)

When companies move on to data acquisition step, they should consider using outside systems along with internal systems for data acquisition, as they might add value. Companies should also consider taking advantage of advanced analytics methods in refinement step, since much can be achieved with automated tools today. (Davenport & Kudyba, 2016, p. 87.) Machine learning and algorithms can be used for data processing, for example personalizing, profiling, categorizing information, and for creating significant value for users. (Kiron, Prentice & Ferguson, in Davenport & Kudyba, 2016, p. 87).

Data storage is increasingly taking place in the cloud, when before it usually happened mostly on company's own premises. It is common, that companies are storing data in unstructured formats, and then refine it over time. These factors give companies more flexibility to handle data and it makes it easier to combine data from both external and internal sources. (Davenport & Kudyba, 2016, p. 87.)

Presentation step used to mean that information product gains value from their usability. The easier the product were to use the more valuable they were. In their model, Davenport & Kudyba (2016) are also adding more advanced analytics-based products into this step, such as forecasts or predictions calculated through real-time machine learning, since they can lead to differentiation and competitive advantage. The last step, market feedback, means that

information product needs ongoing innovation and monitoring of usage of product, because market is very competitive in its nature and there is constant availability of new data sources. (Davenport & Kudyba, 2016, p. 88). In other words, company will soon lose the competition, if it does not constantly develop its data product.

3.7 Theory conclusion

In this part the theory background is concluded for the empirical part of this research. Firstly, the most important parts of the theory base for the research are collaborative models, the benefits of collaboration and data sharing and different roles that companies take in business ecosystems.

According to Woerner and Wixom (2015) data monetization theory which is used as a background for the empirical part of this thesis, it can be seen that all these studied companies have monetized their data somehow. The collaboration models that were presented in this thesis are different types of strategic alliances. Strategic alliance means a formal agreement between two or more businesses to pursue a set of own and common goals through sharing resources with the risk of uncertainty over the outcome. (Arino et al. 2001). There are multiple types of strategic alliance types, such as joint ventures, equity swap, minority equity alliances, joint production, joint marketing, joint bidding, joint R&D, product bundling, shared distribution, and licensing. Some of these types are more ideal for long-term collaboration than other, for example joint marketing is short-term collaboration model, and joint venture long-term collaboration model. (Das & Teng, 2000, p. 92-93.)

Collaboration between companies is seen to bring many benefits. Some of the benefits are economic, such as shared costs, shared risks, increased sales (Shawyun, 2010; Dogson, 1994, p. 2-3, 5), and some noneconomic such as improved customer satisfaction (Choi, 2012, p. 138). These benefits were risen in the interviews and analysed in the results as they were seen to be highly important for companies considering entering into collaborative relationship, as they directly affect the company's profitability.

Ecosystem roles were also seen as an important theory background for this research. Iansiti and Levien (2004) ecosystem role theory and Lindman et al (2014; 2016) theory were used. As mentioned in the Chapter 1.4, Iansiti and Levien (2004) model was adapted. The companies were asked to describe whether they were orchestrator or participants within the ecosystem and the niche players and dominator roles were chose to left out, as it was seen

that it would have been needing more deeper level of analysis to see the true roles, and it was seen to be more important to see which partner is acting as an orchestrator, and which as an participant in this work. Also, data and data sharing theories were used as a background for study. The superficial understanding of data sharing technology was used for forming research questions and analysing the results.

4 RESEARCH DESIGN & METHODS

In this chapter the research design is described. Also, the description of research context, the data collection and analysis methods are introduced. The interviewed case companies and experts are presented, and the validity and reliability of the research is analysed.

4.1 Research design

Research design is a general plan of how the research question or questions are answered. It should contain objectives that can be delivered from research questions, it should specify the sources that are used to collect data and clear out how data is collected and analysed. (Saunders et al, 2016, p. 164). This research design is pictured in the Figure 5 below.
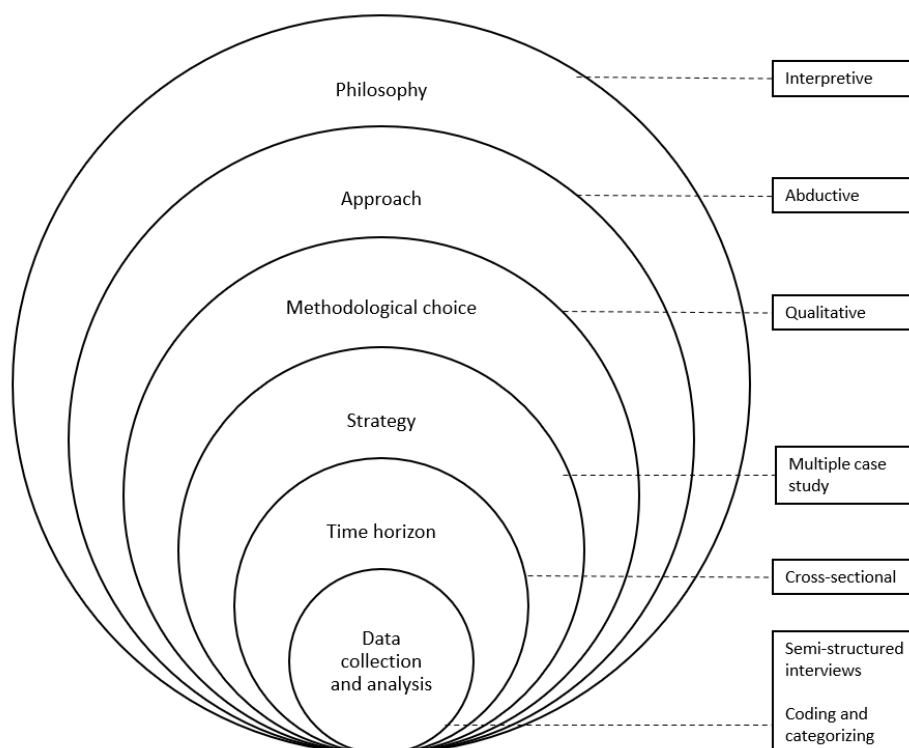
Figure 5 The research design onion adapted from Saunders et al. (2016).

The first choice to make is, whether to perform quantitative, qualitative or mixed research (Saunders et al, 2016). As mentioned before, this study is done by using qualitative research design, because there is no existing theory for specific research subject, which is larger companies collaborating with smaller partners in data sharing business ecosystems.

Qualitative research design can be used, when the aim of a study is to form a theory based on study results, and usually quantitative research method is used only when the theory is formed before the study (Bell, Bryman, Harley, 2019, 357). The philosophy behind the study means to beliefs and assumptions about the development of knowledge. The philosophy in this study is interpretive like in qualitative studies it usually is (Saunders et al, 2016 p. 168).

The research was done with abductive approach, as it made possible to collect data to explore the unknown phenomenon, identify the themes and explain the pattern to generate new theory (Saunders et al., 2016, p. 144). Also, it allowed to edit the question form for later interviews as more understanding was gained of the topic from previous interviews (Saunders et al., 2016, p. 144). In other words, the data collection could be started without clear theory base in mind and it was possible to make changes to the questions after more information was found from the first interviews.

At the beginning of the study the phenomenon was not clear, and therefore it was chosen to use multiple case study method. Case study method is used when researcher wants to present complex issues in an accessible format (Eriksson & Kovalainen 2008) and the lines between the phenomenon and context are not clear yet (Farquhar, 2012). The other reason, why case study is suitable method for this research is because it can be used when a phenomenon is studied in its natural environment (Farquhar, 2012) and in this research real companies were studied to gather real-life knowledge. The time horizon for this study was cross-sectional, as a particular phenomenon was studied in its particular time, rather than the change or development of the phenomenon (Saunderts, et al, 2016, p. 200). The data was collected from secondary sources and from primary sources. The secondary data was collected from academic literature and from internet. The primary data was collected using semi-structured interviews. The data was analysed using coding and categorizing as tools. These are opened up more in the coming Chapter 4.3 "Data collection and analysis methods".

4.2   Description of research context

Two types of interviews were done for this study, three case interviews and six expert interviews. All the case interviews have been anonymized to allow interviewed person to speak freely without the hesitation of breaching any contracts between the partners. Therefore, detailed descriptions of the companies are also not provided, and companies are only talked about at their industry level. Experts were also chosen to keep anonymous, to enable the

minimum collection of personal data, as it was seen that the identity of the expert would not be necessary to tell if their backgrounds are shortly described.

There are three cases that include five companies in total. One B2B case where bank is collaborating with smaller financial management company (Case 1), B2C case where larger transportation company is collaborating with smaller business service company that sells mobility services (Case 2). These two cases are already working data ecosystems, where these companies are sharing data with each other. The third case interview is about an ecosystem, that is still at its establishment face (Case 3). This case gives B2B viewpoint from industrial ecosystem from the perspective of a bank that is included within the ecosystem.

The Case 1 and Case 2 companies were chosen on the base that it was known in advance that a larger company had some data-based collaboration with smaller company. The cases were found from the tips of the acquaintances. Also, the companies were investigated in advance from secondary sources, mostly from internet. The criteria set for Case 1 and Case 2 were that the companies collaborating had to have significant size difference, to be able to give answers to the research questions that has been limited with collaborative relationship between large company and SMEs. It was also checked that with some measure's companies were meeting the criteria set for SMEs and for large company. The case 3 did not have the same criteria, as the viewpoint with that was to gain more understanding of establishing the ecosystem and therefore it was seen that the criteria was not necessary, as the interview was seen to be giving general knowledge about the topic.

One of the case companies is part of the larger company family, but in the studied case it is operating alone in the partnership, and therefore it met the size criteria given for SMEs category. Also, there is a huge size difference among these partner companies, and therefore it was seen to fit to this study. In another case, the larger company's business in Finland is quite small-scaled, but it is global brand and in Finland it is a daughter company of a large company, which are both influencing the relationship with the partner companies and therefore it was seen to meet the given criteria for larger company. According to European Comission (2020) the small and medium-sized enterprises (SMEs) are defined with three factors: staff headcount or with turnover or balance sheet total. The criteria can be seen on the Table 7 below. The large company has been included to the table by the author.

Table 7 European Comission (2020) criteria for company categories.

Company category	Staff headcount	Turnover	Balance sheet total
Large	> 250	> €50 m	> €43
Medium-sized	< 250	≤ € 50 m	≤ € 43 m
Small	< 50	≤ € 10 m	≤ € 10 m
Micro	< 10	≤ € 2 m	≤ € 2 m

It is common that the researcher starts with one or multiple preliminary topics, questions, or problems, but during the study new questions may arise, and case study method enables refocusing the case (Eriksson & Kovalainen, 2008, p. 128). As the thesis progressed, it became clear that there are other questions that also needs to be answered in order to gain better understanding of the studied phenomenon, and therefore six experts were interviewed as well. Firstly, it was noticed that there could not be found mapping about existing ecosystems in Finland. This knowledge was seen to be important for IHAN -project, and also for this thesis as the study also aimed to answer if these asymmetrical partnerships have some linkage to data sharing ecosystems. It was also seen as an important subject to study to help any possible future studies about ecosystems. It was also noticed that only by using secondary sources, this knowledge could not be gained, as all the existing ecosystems are not openly communicating that they are ecosystems. Therefore, it was seen important to get interviews from different experts that could name ecosystems that they knew existed. It was also asked from most of these experts what are their opinion of the current state of Finland compared to other countries when it comes to data sharing ecosystems, as it gives international perspective for this topic. Also, it was asked how they saw business ecosystems will shape the future Finnish market. The interview types are summarized based on the type at the Table 8 below.

Interview type	Company / Experts	Viewpoint	Interviews	Aim
Case interviews	Bank A	B2B, Operating ecosystem	2	Answer research questions
	Finance management company		1	Answer research questions
	Transportation company	B2C, Operating ecosystem	1	Answer research questions
	Business services		1	Answer research questions
	Bank B	B2B, Ecosystem still being established	1	Gain understanding of establishing an ecosystem
Expert interviews	Experts		6	Mapping existing ecosystems Situation in Finland Future scenarios

4.3   Case companies and experts

From Case 1 the company "Bank A" represents the larger partner in the collaborative relationship in this case. There were two interviews from the company, one is a person that was working at the "Bank A" when the collaborative relationship with partner started, and the person was part of establishing the relationship and making the decision on which partner to choose. The other interviewed person from the company is still working there as a digital product manager. The smaller partner from Case 1 is also from financial industry, offering financial management features and it is called as "Finance management company" in this thesis. The interviewed person is CEO of the company. These partners are offering a mutual service for their customers and they must share data in order to be able to deliver the service. Partners are communicating openly for their customers that the service is provided by the Finance management company for both of their customers.

The Case 2 larger partner is globally known "Transportation company", that in Finland operates as part of another large company family. The interviewed person from the company is revenue and sales channel manager. The partner "Business Service" company is a medium-sized enterprise that has been growing aggressively during the past few years. The interviewed person from the company is acting as manager to the ecosystem. These partners are sharing data, to provide B2C digital services for the customers of Transportation company

that is offering physical services. The "Business service" company is also providing digital access to these physical services.

The Case 3 is from the perspective of a bank (called in this work "Bank B") that is included with industrial ecosystem that is currently being established. In this ecosystem the aim is to automate data sharing between necessary partners to improve trade finance process between partners. The partners in the ecosystem are including all the parties that are needed for trading and for the delivery of the product, such as the "Bank B", its customer, and the customers own customers and their banks, and also chartering company that delivers the product. In addition to this the ecosystem includes a company that provides the platform for data sharing, and security system provider company, and project leader company. The interviewed person from the "Bank B" is working at the banks as business developer and the person has been one of the initiators of the ecosystem being established. All the cases are pictured on the Table 9 below, where can be seen the companies, their industries, and the relationships between partners.

Table 9 The interviewed cases introduced (Author, 2020).

Cases	Company	Industry	Relationship
Case 1	Bank A	Financial	Mutual service that includes data sharing between partners
	Finance management company	Financial	
Case 2	Transportation company	Rental	The Business Service company uses Transportation company's data for producing a digital service
	Business Service	Booking Services / mobility	
Case 3	Bank B	Financial	Part of establishing data sharing ecosystem

Experts that were interviewed for this thesis have different backgrounds, but they were chosen on the basis that it was beforehand known that they have some background with ecosystems. The experts have been anonymized, to give them opportunity to speak freely and more importantly, to ensure that no unnecessary personal data was collected, as it was seen that the names of the interviewed persons would not give any additional value for this thesis, if their backgrounds are introduced. The background and the perspective of an interview are summarized on the Table 10 below.

Table 10 Interviewed experts introduced (Author, 2020).

Expert	Background	Interview perspective
Expert A	• Working as program manager in public organization that helps new business ecosystems for example by funding them	Ecosystem mapping
Expert B	• Working as program director in public organization that helps new ecosystems for example by funding them	Ecosystem mapping
Expert C	• Research fellow in university, have done research about business ecosystems and data-sharing platforms • A lot of experience from digital financial service development	Ecosystem mapping Expert interview
Expert D	• CEO of data sharing and data economy start-up • Professor at university, researching and teaching about data sharing and data sharing ecosystems • Has been building personal data movement	Ecosystem mapping Expert interview
Expert E	• Works in data sharing ecosystem. • Also works in a university in a role, where the expert is in charge of internet ecosystem models. • Has also been involved in building and facilitated many ecosystems in the past.	Ecosystem mapping Expert interview
Expert F	• Currently partner in a company that offers strategy and business model (including ecosystems) consulting • Worked as CTO in a company that is operating as an ecosystem in its own field • Was working over ten years in a company that provides expert services as a strategy consult	Ecosystem mapping Expert interview

4.4   Data collection and analysis methods

The research interviews mean that interviewer asks unambiguous questions to which the one who is being interviewed is willing to answer, and listens carefully to the answers (Saunders et al., 2016). In this research semi-structured interviews were performed since they can be used for gaining in depth knowledge. Key questions were prepared for the interview, but these questions were adapted depending on the person that was interviewed. Also, the interviewed persons were allowed to speak quite freely. The order of questions could also change during the interview, depending on the flow of conversation. This type of interview also required for researcher to record the interview and take notes. (Saunders et al., 2016.) The questions can be found from the Appendices 4-6. When case study method is used, the data can be gathered from multiple sources and it can be combined (Farquhar, 2012). Semi structured interviews

were used as primary source, and academic literature and internet sources as secondary sources.

In this thesis, the study unit were managers and developers from the case companies, since they have all the needed knowledge for this research, for example about the contracts that these business relationships have required. Also, as mentioned before, different experts were interviewed to collect information about existing ecosystems in Finland. They were chosen as it was beforehand known they have some expertise about ecosystems. The interviewed people's backgrounds are briefly described in the next section.

The interviews were held over Microsoft Teams, and audio-recorded with the permission of the interviewees. All of the interviews were held in Finnish, and they lasted from about 40 minutes to a bit over 60 minutes. At the beginning of the case interviews, the background of the study and key-concept (data sharing business ecosystem) were explained for the interviewed person to ensure that no misunderstandings happen. The questions were sent to interviewed persons beforehand, to ensure that conversation stays effective, as it did not affect the research that interviewed persons knew the questions before the actual interview. The audio-records were transcribed afterwards, which means that record is "reproduced verbatim as a word-processed account" (Saunders et al, 2016, 527). This is used to help with data coding and categorizing process. With the transcription filler words and vocalizations were left out, as they did not give any input for the research. The case interviews have been summarized in the Table 11 below and the expert interviews have been summarized in the Table 12 below, where can be seen the number of interviews, the data collection method and time and duration of the interviews.

Table 11 Interview types and times of case interviews (Author, 2020).

	Company	Interviews	Data collection method	Time and duration
Case 1	Bank A	2	Semi-structured interviews via MS Teams.	11.06.2020 / 38:08 min 24.06.2020 / 38:38 min
	Finance management company	1	Semi-structured interviews via MS Teams.	25.06.2020 / 47:44 min
Case 2	Transportation company	1	Semi-structured interviews via MS Teams.	06.07.2020 / 53:42 min
	Business Service	1	Semi-structured interviews via MS Teams.	07.07.2020 / 48:21 min
Case 3	Bank B	1	Semi-structured interviews via MS Teams.	10.06.2020 / 41:01 min

Table 12 Interview types and times of expert interviews (Author, 2020).

	Expert	Data collection method	Time and duration
Expert interviews	Expert A & Expert B	Free-form discussion via MS Teams with both experts at the same time.	20.05.2020 / About 30 min
	Expert C	Semi-structured interviews via MS Teams.	29.05.2020 / About 60 min
	Expert D	Semi-structured interviews via MS Teams.	03.06.2020 / 41:53 min
	Expert E	Semi-structured interviews via MS Teams.	09.06.2020 / 61:01 min
	Expert F	Semi-structured interviews via MS Teams.	24.06.2020 / 38:38 min

The approach chosen for analysing the data was abductive perspective. This means that deductive (moving from theory to data) and inductive (moving from data to theory) methods are combined and moving happens back and forth with data and theory. The method was chosen, as it enables interactive nature of the case study. (Saunders, et al, 2016, p. 566.) This means the formation of theory background was started before the interviews in order to gain some base knowledge and to help form research questions. Still after the interviews the theory background was re-checked, edited and some new information was added as it became clear that there were still some gaps between theory and empirical parts of the research.

The thematic analysis method was chosen for data analysing, which means that researcher searches for themes and patterns that occurs from the data. This method includes that data is coded, to be able to identify the themes for further analysis. Coding is a method that is used for categorizing similar meanings from the data. It involves labelling units with code that summarizes tor symbolizes the extract meaning (Saunders, et al, 2016, p. 579, 580). There were seen to be four main themes with the case interviews: the ecosystems, data sharing, collaborative relationship, and new business opportunities. In expert interviews a few main questions were seen to be main topics, such as ecosystems in different sectors, the current situation in Finland, future scenarios, and future research topics. The themes were divided into multiple smaller topics that were coded with words (repeating themes) and colours that were red (negative), yellow (neutral) and green (positive) comments. The answers were classified based on themes, such as the similarities and differences that could be found from the replies. The tool used for coding and categorizing was Excel. Example pictures of used coding method can be found from Appendix 8. Also, secondary sources were used to collect information about different forms of company collaborations, success factors and possible challenges. In addition to this data, and data sharing literature was used to gain knowledge of how data can be shared, what are the benefits and what are the risks. The secondary source information was compared to the primary data results, which can be found from Chapter 5.

4.5   Validity and reliability

Validity means the appropriateness of the measures used, how accurate is the analysis and how findings can be generalised (Saunders et al, 2016, p. 202). Three questions can be asked to analyse validity of the research:

1. *"Do the measures being used in the research to assess the phenomenon being studied actually measure what they intended to – are they appropriate for their intended purpose?" (Saunders et al., 2016, p. 202)*

As the research is done with qualitative research design, also the measures are qualitative. Therefore, there have not been any numerically measured factors. The research questions were used as a base for forming questions to interviews, and therefore they have been aligned. It can be said that the measured used for assessing the research phenomenon are suitable, as all the research questions were answered. Also, it can be said that used measures

were appropriate for the purpose, as the aim of the research was to gain more knowledge of the topic that was not very well understood before the study was done.

"Are the analysis of the results and the relationships being advanced accurate?" (Saunders et al, 2016, p. 202)

It can be seen that results and relationships of the interviews have been advanced accurately, as the questions have been formed to be clear and unambiguous. However, the questions were left purposely open ended to give interview persons the freedom to take the conversation in their wanted direction. The answers to research questions were also seen to be unambiguous, and no need for further analysis whether the given answers were true or nor were necessary to perform, as the nature of the study does not require sceptical attitude. In addition to this, the answers given by the interviewed persons where mostly consistent, that gives the clue the relationships have been pictured accurately.

"What do the research findings represent: does the claim about how generalisable they are stand up?" (Saunders et al, 2016, p. 2020)

Sample is small, it consists only three perspectives for the topic. Therefore, it could be seen that it only represents these particular cases and studying other cases could bring another kind of answers. Many of the data sharing ecosystems are still on their early steps, which means that there are not offering real services yet to customers, and therefore companies in them could not really give the answers if the collaboration and data sharing has been beneficial or not. Instead most of the data sharing ecosystems are still being developed. Also, the limitations for asymmetrical partnership also ruled out many potential cases. In additional to this, another reason why there are only so few cases, is because it is most likely that many of the companies in the collaborative partnerships do not communicate it openly into public, and they are hard to be found. Therefore, this subject should be further studied in the future, when there can be found more actively working ecosystems that has asymmetrical partners. However, it can be seen that this research still gives a good starting point for the future studies of the topic.

Reliability means the replication and the consistency of the research. If the study could be replicated with the same research design and the same findings could be found, then the research could be seen as reliable (Saunders et al, 2016, p. 202). The study is consistent, the chosen research design is logical with the research phenomenon and cases chosen. There are clear criteria presented for every decision that was made.

According to Saunders et al., (2016, p. 365) the relationship between researcher and interviewed person might affect the results given in interviews, which affects the reliability and validity of a study. The researcher did not know the interviewed persons beforehand and therefore it can be seen that the personal relationships have not affected the study results. Also, the primary data was mostly seemed consistent and reliable, but few inconsistencies existed with answers from different interviews. However, the interviewed persons position and the time they have been working in the company might have affected their knowledge and therefore their answers. It could have also been beneficial to gain more interviews from each case companies to gather more information and therefore gain better reliability for the answers. These were not possible to gain for this research because of limitations in time for this study.

The data collection method was strict and logical, that left only a little possibility to errors, as the interviews were audio-recorded and then transcribed. However, the interviews were held in Finnish and afterwards translated into English, so the possibility exist that there might be some errors in translation, but the risks is seen to be minor as only a few direct quotations have been used and otherwise the main ideas are easier to capture from the original answers than translating direct quotations. However, it can be stated that cross-sectional qualitative research method and the exploratory approach that was taken with using multiple case study method along with abductive approach were providing a good study method for reliable and valid findings. In addition to this the chosen data and data analysis methods were also suitable for this type of study.

5 RESULTS

In this chapter the results of interviews are presented and analysed. The chapter starts with the results from ecosystem mapping, and after the expert interview results are presented. The last part of the chapter focuses on the results of case interviews.

5.1 Business ecosystems in Finland

In this chapter the results of the ecosystem mapping are presents. Also, results of the expert interviews are introduced, that includes their answers to their view for business ecosystem situation in Finland, the opinions about how business ecosystems will shape the future and in what sectors companies are currently using ecosystems as their business model. Experts also gave their answers of what should be further studied about business ecosystems. This chapter also answers to two investigating questions: "*What ecosystems already exists in Finland?*" and "*What is the data-sharing ecosystem situation in Finland?*".

5.1.1 What ecosystems already exists in Finland

As the theory base for this thesis was collected, it was noticed that there have not been made any collection or mapping about the existing business ecosystems in Finland. However, this knowledge was seen to be highly important for any studies about business ecosystems, as the current situation cannot be analysed if there is no knowledge of the ecosystems that already exists at the market.

Therefore, it was decided to do light mapping about the existing ecosystems. Mostly secondary sources were used, but also experts were interviewed to collect the needed information, as it was noticed that using only secondary sources all the ecosystems could not be found as some of them are not openly referring themselves as ecosystems. The summary of existing ecosystems can be found from Appendix 7. However, it is important to keep in mind that the list is not comprehensive, and there can be a lot of existing ecosystems that have not been listed. Also, from the list was left out the ecosystems that did not have Finnish companies included, as the purpose of it was to gain understanding of the situation in Finland. It can be concluded that there are dozens of ecosystems that are either operating in Finland, or internationally operating ecosystems where Finnish companies are included.

In Appendix 7 are listed all the mapped 32 ecosystems that were found through secondary sources and from expert interviews. It was found out that the ecosystems have different structures. Some of them has only company partners, some of them has also some research institutions like universities, some has also individual people (developers). Most of the ecosystems were seen to be having mostly large partners, but about half of them also had at least one smaller partner included. From this it can be concluded that asymmetrical partnerships are linked with business ecosystems. None of the ecosystem were consisting only of smaller companies, but some of them were consisting only of large companies. The ecosystems did not speak openly about each partners role in the ecosystem. Also, it is most likely that there are some other parties included within the ecosystems that those that are mentioned in the Appendix 7, such as investors, customers, and possibly some other companies.

"Ecosystem is real word and network is a real word, but how data centric

they are. It varies a lot." (Expert D)

The types and structures of the ecosystems are varying a lot. Some ecosystems are foundations, some companies and some of them are projects. The ecosystems had different purposes. Some of the ecosystems are offering services for mutual customers, some have some ideological purposes (such as creating more sustainable environment), some of them are only aiming to help partners with their development processes (e.g. including artificial intelligence and machine learning into their business) or by offering some assets (data) or some services or solutions to partners included. Some of them were still developing their services and solutions, so it was not spoken publicly what the service or solution is exactly. Some ecosystems did not even recognise themselves as ecosystems, but instead they spoke about themselves as platforms or networks. However, the reason behind it might be that companies might not fully understand what the difference between platform and ecosystems is.

"Ecosystem is different kind of animal than platform, structurally."

(Expert F)

Industries where ecosystems were found are build-up environment, construction, energy, environment, finance, health, housing market, HVAC, logistics, manufacturing, maritime,

maritime logistics, metallurgical, mobility, teaching, technology, and travel. Also, few cross-industry ecosystems were found. The experts identified that there were some industries were ecosystems were more common than in other. The industries where business ecosystems already exist are media and marketing, information technology, telecom operators, manufacturing, build-up environment, finance, logistics, mobility, health, energy, agricultural sector. Also, the experts saw that in energy sector the ecosystems are divided with energy efficiency and sustainability sections. As it can be seen from the results of ecosystem mapping and expert interviews (Table 13 below) that there are some similarities between the answers, from where it can be concluded that ecosystems are focusing on particular sectors. Also, from ecosystem mapping only a few cross sectoral ecosystems were found.

Table 13 Industries where ecosystems have been established (Author, 2020).

Ecosystem mapping		Expert interviews

• Build-up environment
• Construction
• Cross industry
• Energy
• Environment
• Finance
• Health
• Housing market
• HVAC
	• Logistics
	• Manufacturing
	• Maritime logistics
	• Metallurgical
	• Mobility
	• Recycling
	• Teaching
	• Technology
		• Agricultural sector
		• Build-up environment
		• Energy
		    ○ Efficiency
		    ○ Sustainability
		• Finance
		• Health
		• Information technology
		• Logistics
		• Manufacturing
		• Media and marketing
		• Mobility
		• Telecom operators

Most of the ecosystems were established within the past few years, the oldest was founded in 2015, from which it can be concluded that this kind of platform or data-based ecosystems are relatively new business models. With some ecosystems, the age could not be found and therefore there might be some older ones that are not known of. The size of the ecosystems varied from about ten to hundreds of partners and almost all of the ecosystems spoke publicly about their partners with the names of the partners that were included. From this it can be concluded that ecosystems' size varies a lot and companies within the ecosystems found it to bring value to ecosystem to speak about the partners with their names. Most of the ecosystems did not tell whether they are open or not, but only one spoke publicly that they are closed ecosystem and sixteen ecosystems said they are open ecosystems. The most important findings have been summarized in the Figure 6 below.

Figure 6 Ecosystem mapping findings summarized (Author, 2020).

5.1.2   Ecosystems in Finland compared to international markets

All the experts had different opinions of where we are in Finland with utilizing ecosystem business model compared to other countries. One expert said Finland is not exceptionally above the others in ecosystem matters. According to experts, the attitudes towards the benefits over risks needs to change for change to happen. It also requires a lot of practical work. It requires clear rules and example cases to show that some network developed for the reason that it was able to utilize data in their use.

The other expert said that ecosystems have always existed, they have had just different names in the past. Sometimes these have been called ecosystems, sometime clusters sometimes something else. In Finland we have had these kinds of projects regularly in the past, for example Nokia which aimed to form its own cluster in the past.

The third expert did not have clear opinion about this, but the expert believes that in Finland we could be a bit more above the other countries in utilizing ecosystem business model in companies, as ecosystems are relying heavily on digitalization, data sharing and platform solutions and in these factors Finland has strong position compared to many other countries. Therefore, the expert's opinion was that if we are not above the others, then at least we would have needed starting point for it.

From these answers it can be concluded that it is not clear, how Finnish companies are utilizing the ecosystem business model compared to other counties. However, the rising theme from the interviews were that almost all the interviewed experts said that ecosystems should not be considered in nation level at all, but instead in international level, as the digitalization has made the competition international. It was also mentioned that Finnish companies should collaborate more with companies from other Nordic countries, as we have similar roots, cultures, and common language (with Sweden), and therefore we would have a good starting point for collaborative relationship with them. It would also help us in global level, as the market size of Nordic countries is larger than in nation level and therefore, we would have more bargaining power in international level.

5.1.3 How does the business ecosystems affect the future in Finnish market

The experts were also asked about their opinion of how the future of Finnish companies could look like when it comes to utilizing business ecosystems and how it could affect the market. The rising themes from expert interviews were that change will happen, some companies can adapt when other will fall behind. Another rising theme that was found, was that change will need changes in the attitudes and also actions from the companies. Also, it was seen to be important to utilize already existing ecosystems and networks.

Expert C said that ecosystems business models are replacing the traditional business models in the future and only the time will show what will happen to the companies that are not changing their business models into ecosystems. The expert believes that some companies are not ready to utilize ecosystem business models as they have been operating a long time with the old business model that has been working. Also, the expert was concerned that there might not be enough customers for both types of businesses, traditional ones, and companies in ecosystems.

"We don't dare to take that risk, as we don't have the know-how. We think that two hundred years we have been managing so why not next hundred years, but what if it doesn't go like that." (Expert C)

Expert E was more positive and did not believe that we have "lost the game" in Finland in ecosystem competition. According to expert, this kind of negative thinking is not fruitful but

many times ecosystems here in Finland, but also in other countries, are falling flat, as many parties in them are only observing, but not actively participating. Also, according to Expert E, one of the greatest benefits here in Finland has been, that we are including the whole nation in development. Expert sees that including multiple perspectives into conversation could result better than having just narrow view. From multiple interviews it appeared that change requires actions and ways to communicate the value.

> *"In Finland one way to take this matter forward would be to find ways to communicate what would be the benefits. Remove obstacles and go to networks that already exists. This is only one view, my view, that has been learned through the hard way. It can be better than knocking at the door and say, "Do you want to share data?" (Expert D)*

From the answers it can be concluded that all the experts that answered the question, saw that change is coming and companies are utilizing more ecosystem business model. It also became clear that the experts believe that challenges lie within the passive attitudes and challenges to communicate the value. These challenges need to be overcome to make the change happen.

5.1.4   What should be studied more about the business ecosystems?

When experts were asked of what should be further studied in the future about the business ecosystems, the experts' answers differed from each other's greatly. The knowledge was seen to be lacking the capabilities needed for ecosystem business model, the value of data, privacy and regulation issues, already existing ecosystems, and the maturity of companies. From the answers it can be concluded that business ecosystem still has a lot of study subjects that require answers.

Expert C said that more knowledge would be required from the critical capabilities that are needed if company wants to take ecosystems as their business model, such as technology, leading, mental capacity, attitude, know-how etc. Also, the criticality of ecosystems would also be important to understand.

"One is the criticality of ecosystems… Maybe simply said, if it is only one option within many, that some will take as their business model."

(Expert C)

According to Expert D It would be important to study the value of data sharing. Also, there is still a lot of unanswered questions concerning privacy issues, fairness, and incentives. The third matter to study concerns regulation issues around data sharing and ecosystems, for example if bringing the current competition viewpoint to data sharing conversation is right ankle or not.

Expert E thinks that mapping already existing ecosystems would be important, as many times new ecosystems are built before checking what is already existing. The other thing to study how to communicate the impact in understandable way. According to Expert F, it would be beneficial to study, in what level of maturity companies are in ecosystem thinking, how many of them even know what it means. Also, the expert thinks it would be beneficial to study what kind of products and services could be provided within the ecosystems.

5.2   The case interviews

In this section the results from case interviews are presented. First all the cases, the ecosystems and their members are briefly introduced in Chapter 5.2.1, then the collaborative models and the establishment phases of the ecosystems are gone through in Chapter 5.2.2. After the data sharing models (Chapter 5.2.3), benefits and successfulness (Chapter 5.2.4) of the relationships are analysed. In Chapter 5.3.5 the measuring of the relationship and the challenges are introduced. Lastly in the Chapter 5.2.6 the new business opportunities are analysed.

5.2.1   Ecosystems introduced

In this research are studied three cases. Each of these cases represents their own ecosystems. This section introduces all the cases and answers to question "*Is the company part of some data sharing ecosystem?*", for which the answer is yes, all the case companies are included at least in one data sharing ecosystem.

Case 1 ecosystem and members

In Case 1, ecosystem consists of Finance management company, Bank A and it also includes a third partner company that is not introduced in this paper. The ecosystem offers services in B2B sector for mutual customers of the ecosystem members. The aim of the ecosystem is to make it easier for business customers to access the services offered by the partners.

According to adapted model of Iansiti and Levien (2004) Finance management company is the orchestrator, but all the members are included into developing the ecosystem. Bank A has not taken the role of an orchestrator, but instead they are only participating in it. However, Bank A has in this case some of the benefits that usually orchestrator possess, related to the branding of a service. Finance management company's role, according to model of Lindman et al, (2014;2016) is to provide services to the ecosystem's customers. However, they are also sharing some data with other ecosystem members. The Bank A's role in the ecosystem is to provide the data to Financial management company.

"First we have started to build that partnership, after the ecosystem and
data sharing will become its by-product or something like that that enables
or realizes that partnership."
(Bank A)

In addition to the presented ecosystem, the "Bank A" is also part of multiple other data sharing ecosystems. Most of them are local level ecosystems and they are also part of at least one Nordic ecosystems. The Financial management company is only included within this one ecosystem at the moment.

Case 2 ecosystem and members

The Case 2 ecosystem consists of "Business service" company, "Transportation company" and many other companies that are not introduced in this paper. Some of the companies within the ecosystem are each other's competitors. However, each of these companies are only collaborating and sharing data with Business service company. In other words, each of the companies included in this ecosystem have two-way relationship with the Business service company. The ecosystem also consists of investors, cities, and customers. The aim of the ecosystem is to provide B2C digital services for the customers of companies that are offering

some physical service or products. The ecosystem is also aiming to provide digital access to these physical products or services. The ecosystem is at the core of the business idea of Business service company.

"Without data and sharing of data we would not have service at all."

(Business service company).

The role of the Business service company is both, orchestrator, and participant in the ecosystem. The Transportation company is participant in the ecosystem. According to Lindman et el (2014: 2016) roles, Business service company has all the data related roles and service provider role within the ecosystem, which means they act as data sharer, extractor, analyser, and service provider. Both of the companies have also monetized their data, for the same reasons as Case 1 companies.

In addition to this ecosystem the Transportation company is included with many ecosystems, some of them are from the international chain that it belongs to or otherwise related to the company families that Transportation company is included. Actually, the Case 2 ecosystem described in this paper truly consist of many smaller ecosystems, and Business service company is included with all of them, but in this case, they are all seen as one large ecosystem.

Case 3 ecosystem and members

The Case 3 has a bit different perspective, as ecosystem is still at its establishment phase. The Case 3 ecosystem includes "Bank B", its customer company, and also organization that is offering the technical platform, security system provider company and project leader company, but these are not further introduced in this paper. The aim of the ecosystem is to automate data sharing between trading partners and distributors in manufacturing sector, that are included within the ecosystem.

Bank B joined this project, because it wishes to move industry forward with payment versus delivery model, where payment is not done with billing, but instead financial products are included within the process. Bank B is also aiming to stay up with the current development called "Business 4.0" which includes that data and information is within the business model.

5.2.2 The collaborative model and establishment phase

This section introduces the collaborative models that case companies have with their partners and therefore answers research question: "*What kind of collaborative relationship the case companies share.*" Also, in this section is introduced how long the collaborative relationship has existed, when they are planning to end, how the collaborative relationship started and what preparations they needed to perform for collaboration and data sharing to be possible.

The relationship between all the case companies is based on the agreements such as service level agreements and supplier agreements made between the partners. With one of the cases it only appeared during the interview that companies had some tighter relations behind the collaboration, as both of them are at least partly owned by the same larger third company. However, it also appeared that the between these two case companies there were no ownerships to one another, and the third owner company did not have other links with the case partners relationship, and therefore case was still accepted with this research. It can be concluded that relationships between partners are seen to be strategic alliances, as it has been defined in this work as "two companies arrange to undertake mutually beneficial project while maintaining their independence. (Kenton, 2018)."

With the answers it appeared that some companies had a bit different opinion of when the collaborative relationship has started. All the cases have been lasting from six months to three years so far. Some companies have had some kind of relationship already before the collaborative relationship, some did not. Two out of three cases said that the relationship is planned to last until further notice. With one case interview this was not received. From the answers it can be deduced that ecosystems are still young, and most of them have been established for long term purposes or otherwise they would have set the ending date. The establishment phase of the ecosystem had lasted about six months in two of the cases. One interviewed said that it only took few months to prepare, one month to make decisions and to create agreements, the actual making took few months. From where can be concluded that establishing an ecosystem requires at least several months' time.

It was also clarified which partner had approach to whom, in order to gain understanding of how this kind of relationships usually start. With one of the cases it was clear that smaller partner had approached to larger company first and the relationship has started from there. With another case it appeared that larger company had noticed customer need they could not fulfil by themselves and they started to look for a partner. With this case larger company has

done some kind of bidding between different options before they chose which partner suited the best their situation. The price, mutual main competitor and capabilities of the smaller partner were the factors why larger company chose with this particular partner.

One partnership started because of few individuals from different companies met at some event and noticed they could help each other reach their mutual goals. However, the challenges they saw that they are aiming to overcome with the ecosystem, had already been known before they met, which means that the ecosystem was a result of a long thought process. The decision to create an ecosystem was influenced by the pressure from outside to become more digital and also the corona crisis made it more concrete to parties and they saw that this change needed to be done. In addition to this, the current technology made this possible, as only a few years ago it would not have been so. It was also seen in multiple interviews that individuals have a strong role in establishing ecosystems.

"Actually, companies do not exist. There are a group of people, that are forming a way that a company is operating and through the culture they are forming the context that is called a company. At the end, these are always condensed with some people and those drivers inside a company that are excited to take things forward." (Bank B)

The companies were also asked what preparations they needed to perform that collaboration and data sharing was possible. At least one company from each partnership have had to invest in new technology, some have needed to change their processes to be able to collaborate with partner and all the relationships have required agreements. Some said that at the beginning there have been some additional costs as the building phase has needed more human resources and learning. This gives a clue that most often at collaborative relationships require some extra work, investments and agreements have important role in them.

From the interview it can be concluded that there are multiple ways how and why partnerships are formed, and ecosystems are being established. It can also be concluded from the interviews that decision to form collaborative relationships is affected by the outside factors such as customers and changing market situations and they are also affected by internal factors such as capabilities and experienced benefits gained with the collaboration. The most important findings are summarised in the Figure 7 below.
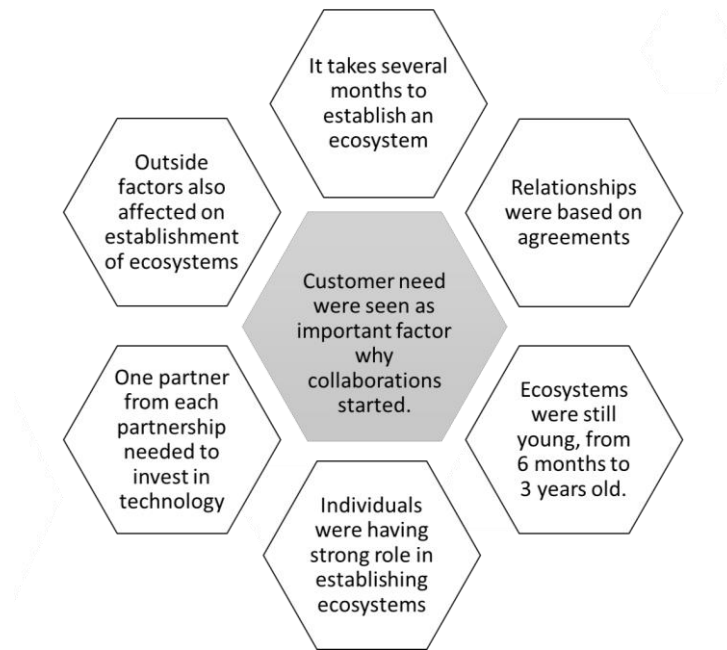
Figure 7 The most important findings from establishing ecosystems (Author, 2020)

5.2.3 Data sharing between partners

This section introduces from where the companies have gained the data sharing model they are using, what data is shared, what technologies they are using for data sharing and what rules and limitations they have set for data sharing and handling. This section also answers research question: "*What data is shared and why? Are there some limitations?*"

From the interviews it appeared that the case companies are not using any given model on the base of their data sharing, as it would be difficult for agile growth companies to do so. Instead the nature of the service was seen to set the rules for what data is shared, where it is shared and how it is handled. Also, the industry of the companies also affected the type of data that was shared. Some companies shared both raw data and qualitative data. With Case 1 and Case 2 it appeared that mostly the larger company was sharing data to smaller company within the ecosystem, but smaller company also shared some data with larger partner. Also, it appeared that data did not cost anything for the partners, but instead the costs were covered with for example service fees that customer or investors were paying. From this it can be concluded that the data sharing model in the ecosystem is not defined by any existing frameworks but instead the purpose for what reason the data is collected and used for is setting the rules of what data is shared, how and how often. It can also be reasoned from the answers that data does not cost for partners, as the price can be attached to the production of service.

Both Case 1 and Case 2 companies shared some customer data that included data from customer behaviour, as it was used to improve customer experience. In addition to customer data, some companies have shared some business-related data. One smaller case company also shared some reports from its own data set to its larger partners, to help partner improve their own services and adapt into changing market situations as it would benefit their both. Data was also shared to improve business processes. According to one company, basically any data could be shared, it would just require some business or customer related justifications. From this it can be reasoned that companies are sharing data that is either necessary or seen as beneficial to share with partner. Also, it appeared that these days customers are more willing to share their data than they were before, as they gain services in return.

"Banking is more and more creating, sharing, and gaining data. That is the idea. Data is a raw material that can be produced into services that are offered to customers that are willing to pay for them. And what they need and so on, so they are also willing to give access to their data. That is the motivation." (Bank A)

It appeared that one of the case partners used older file sharing technology for data sharing, and another used API technology. The reasons why older technology was chosen on the first base, was because it is widely used in the industry where companies are operating at, and it enabled fast market entry. Also, with one case the email was also used for sharing data, as one company shared some reports using that channel. From this it can be deduced that there are still multiple types of technologies used for data sharing, even though the case ecosystems are still quite young.

It also came up during the interviews that GDPR (General Data Protection Regulation) affected the most of what data was shared and how it is used. All the case companies found following the rules of GDPR to be highly important and at least one company found it to have positive influence as it sets clear rules and limitations to handling of data. Industry where the companies were operating at also set some limitations for data usage and handling. Otherwise most of the companies had not set many additional strict rules for each other for what the data can be used for, but with one company it appeared that the partner cannot share the other partners detailed data to other companies within the ecosystem. From this it can be concluded

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that mostly the rules and limitations for data sharing and handling are coming from the GDPR, and industry related regulations. The finding about the data sharing between partners have been summarized in the Figure 8 below.
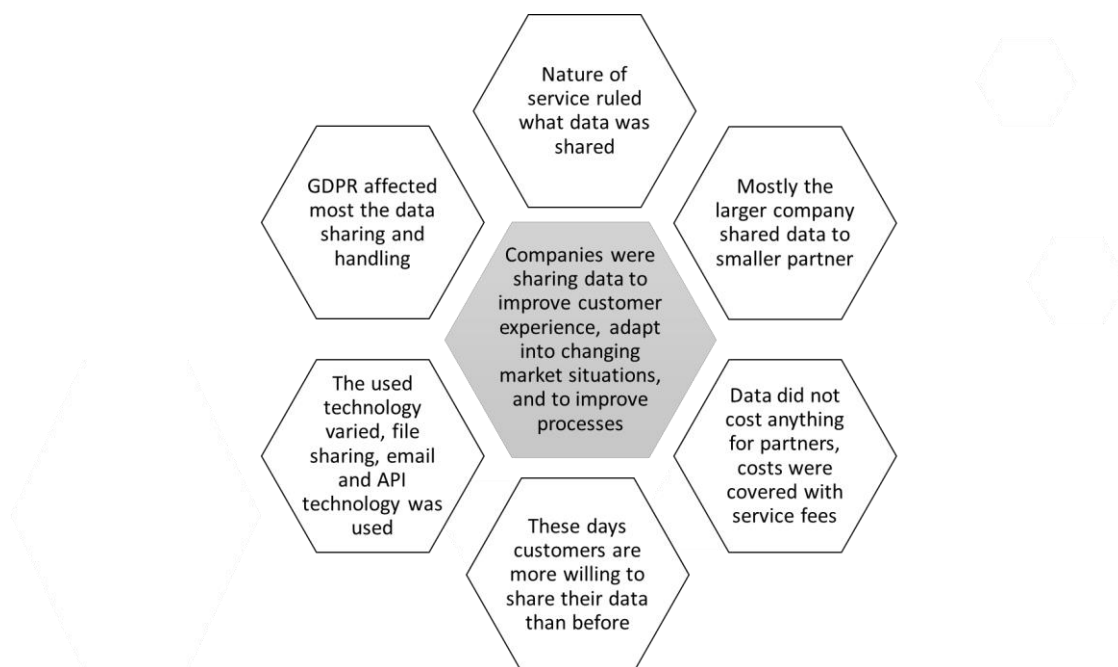
Figure 8 Summary of findings about data sharing between case partners (Author, 2020).

5.2.4 Benefits and the successfulness of the relationship

In this section the benefits of the data sharing collaborative relationships are introduced. Also, the successfulness of the relationships and the reasons behind it is analysed. This section also answers to research questions: *"What are the benefits that case companies have faced because of the data sharing for their partners"* and *"Has the collaboration been successful and what have been the success factors".*

Data sharing was seen to give both operational and strategic benefits for companies. Both companies from one case said they gained new revenue streams and more satisfied customers, and reduced risks were something they believed they could possibly gain in the future, but saved costs were something they did not believe to be able to achieve with the current relationship. With another case both of the companies believed to gain all these benefits from the relationship. New revenue streams they saw to be gaining from new customers that both of the partners brought to one another. Companies highlighted the importance of better understanding of the customers that they gained because of shared data, and also the ability to adapt into changing market situations. For example, one of the

companies said they would not have survived the COVID-19 crisis as well as they have now, without the existing ecosystem and data sharing. In additional to this, the benefits were seen that close collaboration enables companies to understand each other's better.

Companies saw that collaboration brought benefits. Some benefits that larger companies saw coming from the collaboration was that they were able to build softer brand image, and this kind of collaboration could bring more these types of collaborative relationships in the future with smaller partners. Other large company also said to be gaining visibility from the collaboration and it also helps them keep up with the industry development. Some of the benefits that other smaller company said that collaboration with larger partner brought to them was that large partners strong brand also affected their own brand and made it stronger. From this it can be analysed that collaborative relationships and business ecosystem also have marketing perspective, as they are affecting company brands and images.

> *"Why larger company should collaborate [with smaller company]...It is making it possible for banks and other larger companies to stay visible and to offer better products than large company could do with the given time. Specially there is one of the main points of what is important with this kind of collaboration, is the speed of development. This kind of growth company as we are, can make rapidly new services, be innovative, and to advantage all different solutions much more agile than this kind of giant can do in the market."*
>
> *(Financial management company)*

All the case companies said that collaboration itself has been successful, but one case had not yet reached its financial targets for the relationship. However, both companies in the relationship believed to know the reasons behind why objectives have not been reached and believed to be able to still reach them. Also, the relationship was still quite young which can also affect the situation. With another case the relationship has been successful, and this relationship has been the longest of all the cases presented in this paper. From this it can be concluded that collaboration can require longevity in order to be successful.

"Collaboration is strength and above all, in collaboration is future."

(Transportation company)

The reasons behind the successful collaboration, were seen to be the individuals that have been pushing the change through, working personal chemistry between people within the companies and the tight discussions between partners. Also, it was mentioned that mutual owner has had some positive influence over the success within the partnership. In addition to this it was said that the most important things to consider when establishing an ecosystem, is to get right team, set clear common meaning for the ecosystem, keep technical tools as open as possible and to have some standards. Also, it is important to stay open in collaboration, to be honest of what can be done and what cannot be done. To have visionary thinking about the future and to try out things, was also seen important, as only guessing does not tell what works and what does not. From this it can be concluded that individuals have a huge role in establishing ecosystems and collaborative relationships between companies. Open communication and forward-looking attitude are also possessing important roles in the ability to be successful. The results have been summarized on the Figure 9 below.
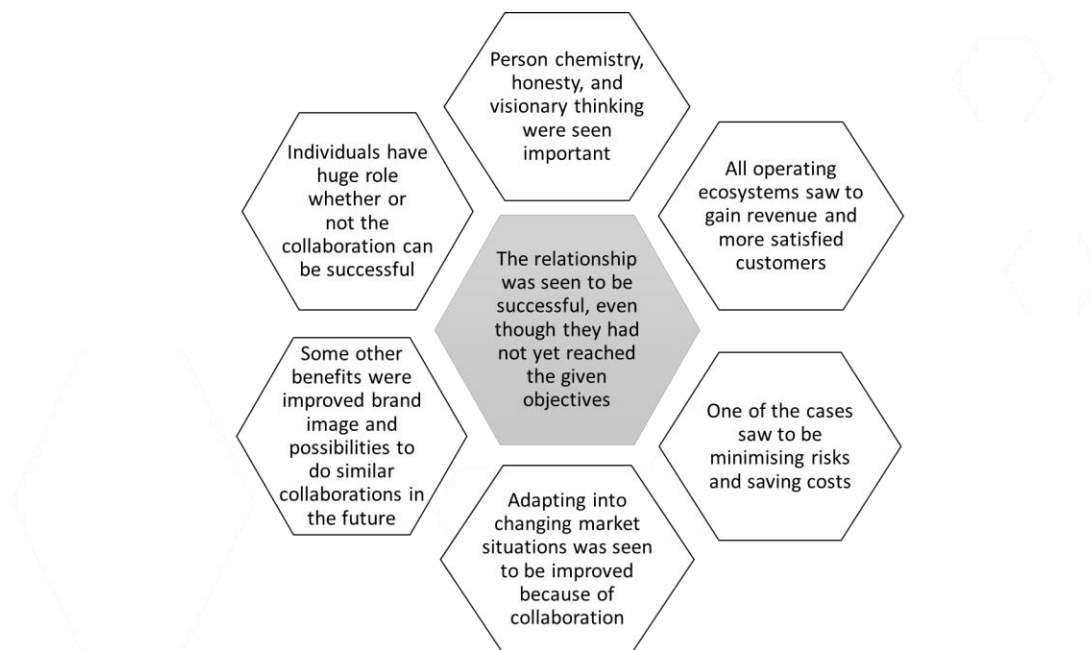
Figure 9 Findings of benefits of collaboration between case companies (Author, 2020).

5.2.5   Measuring and Challenges of collaboration and data sharing

In this section the challenges of the collaborative relationship and data sharing are introduced. This section answers to research question: "*What are the pitfalls that case companies have faced because of the data sharing for their partners.*"

All the companies saw the challenges to be mostly on operational side of the relationship rather than the problems with the relationship itself, for example some progress phases have been taking longer than expected, sales have not been on the expected level, and it has been challenging to keep the prices of production in the wanted level and still produce quality services. Also, with one larger company, the challenge has been getting the management to agree that this collaboration would be as beneficial as it seemed at first. However, there were also mentioned some other challenges, such as different organization sizes and structures have been causing its own challenges as companies have been used to operate in their own ways and partnership has forced them to change their processes. Nevertheless, with another case the size of the company did not cause any problems between partners. From this it can be analysed that size differences might not cause any challenges in the collaboration. One reason why they might be an issue is for example the industry where the companies are operating at, as some industries are still more traditional than others.

"There cannot be budget free ecosystem..." (Bank B)

"Every collaboration has challenges." (Bank A)

Sometimes miscommunication has led to its challenges. Also, with one case the challenge has been that larger international partner has different structures in different markets that has made it difficult to made international contracts and to offer local level service. One challenge has also been that establishing an ecosystem requires funding and it is highly important that when somebody is paying for the costs, it needs to be agreed how the payment happens and what are expected in return. From these answers it can be deduced that communication is highly important in collaborative relationship, and the international aspects and funding of the ecosystem might be challenges for companies.

All the companies said that collaboration objectives and goals are aligned with their own company strategies. However, only one company said that business ecosystems have been really included with the company's own strategy. Three of the four companies interviewed said

they measure collaboration somehow. One interviewee was not sure, as the person is not working in the operational side. With one case the metrics and reporting were regular as it happened once a month and the measured factors had been written in partnership agreement. These partners had their own metrics and also some mutual metrics. Mutual metrics were customer acquisition and number of customers, but also there are some other indicators concerning conversions and website visitors. With another case they did not have regular reporting, but instead the reporting happened always when partners asked it. Otherwise, the discussion between partners were so constant that it kept both partners aware of the situation. With this case the tracked meter concerned volumes as well. From this it can be seen that with both cases there were some kind of measuring of effectiveness of collaboration, that mostly concerned the volumes of mutual business and all the companies had formed the collaborative relationships on the base of their own larger company strategies. The most important findings have been summarized in the Figure 10 below.

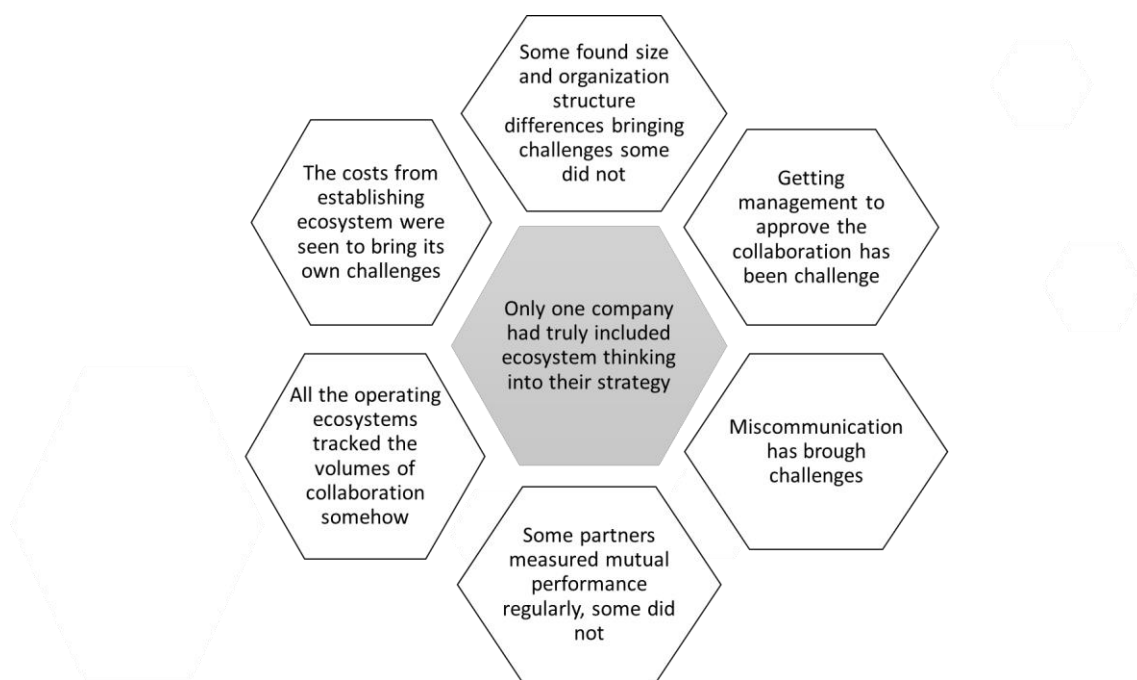*Figure 10 Summary of measuring and challenges of case companies (Author, 2020).*

5.2.6 New business opportunities from business ecosystems

In this section the new business opportunities that companies have already gained within the collaborative relationship with partner are discussed. Also, the possible future business opportunities are analysed. In addition to this, the section answers to research question: *"Why*

large companies should share their data and collaborate with SMEs and what kind of new business opportunities shared data offers for both parties."

One of the larger companies said that the business opportunities they have gained from collaborating with smaller partner have been the ability to develop new services. They have also gained cost efficiency and working business model that can be scaled with different customer segments locally and globally. Also, they have gained new channel to customer acquisition and they have gained a new way to include strategic partnership within the ecosystem, where they can indirectly sell and help their partner with their sales. The other larger company also said they have gained new business opportunities as they have learned about new customer segments. From the interview results it can be concluded that there are many benefits for larger company to collaborate and share data with smaller partners, and therefore it can be seen to be beneficial for larger company to collaborate with smaller company.

Both of the smaller companies within the relationship said the new business opportunities they have gained from collaborating with larger company is the ability to provide the mutual service. Also, there were some other benefits mentioned such as data sharing enables companies to offer better customer service, and to engage customers. The results indicate that for smaller partners the collaboration is highly important. For the Business service company, it is actually vital, as without the data they would not have service.

> *"Without data and sharing of data we would not have service at all."*
> *(Business service company).*

Companies were also asked what they believe in the future this kind of relationship could provide. From the answers it appeared that this kind of collaborative relationship could bring new revenue streams in the future, as for example there could be some new partners included within the ecosystem. However, this would require that the current ecosystem would gain more volume, as it would make it more attractive to new partners. In addition to this, the collaboration can bring inspiration and it can help companies integrating into other ecosystems or other sectors as well. All the companies said it can also bring some new service innovations in the future. It was also said that in the future data could be utilized better with different services, that would enable more better upselling, targeting and help to identify potential customers. Also, data can help bank to see how customer behaviour is changing in the future, and to

adapt on that change better. These answers indicate that all the companies interviewed see that this kind of collaboration and business ecosystems has a lot of potential for the future, such as possibilities to grow existing ecosystems, integrating into other ecosystems, or spreading into other industries and innovating new services. From marketing point of view, it can be also said that data sharing business ecosystem are offering new ways to target and identify customers better. The results from this section have been summarized in the Figure 11 below.
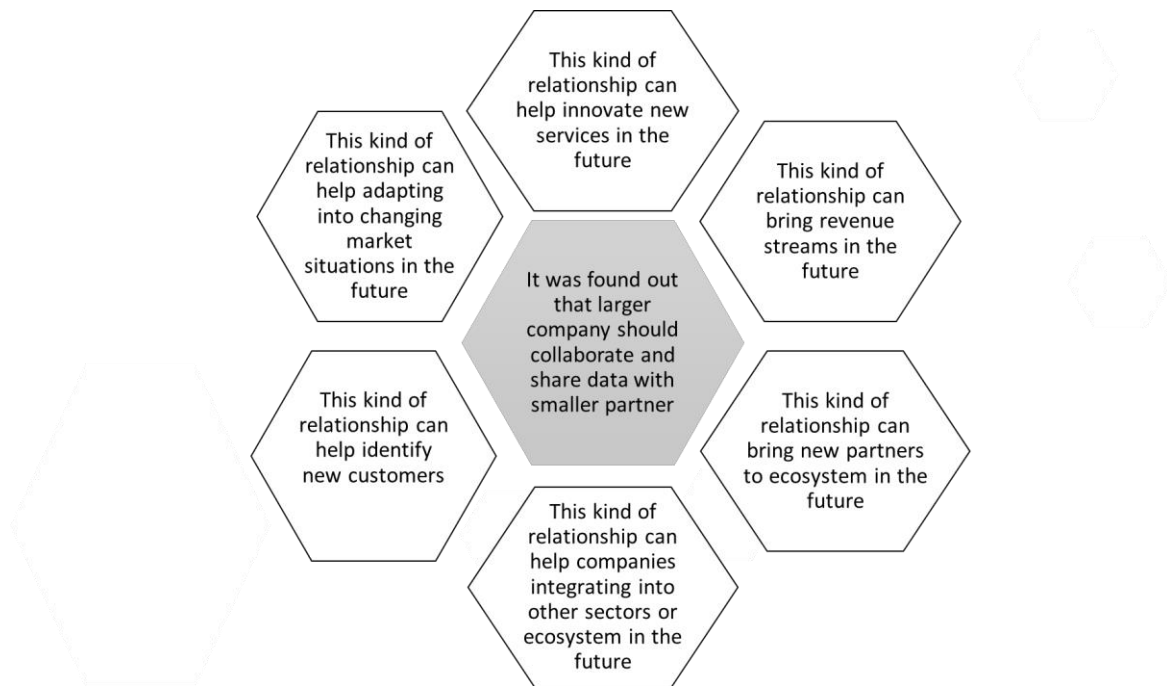
Figure 11 New business opportunities identified from interviews (Author, 2020).

6 DISCUSSION & CONCLUSION

In this chapter the results have been summarized. Also, the theoretical contributions and practical implications are introduced. At the last section of this chapter, the limitations and future research topics are discussed.

The studied topics are relevant in modern world, and it is believed this research gives valuable contributions to both theory and for practical implication. The study consists of two types of interviews, expert interviews and three case interviews. The expert interviews were made to gain knowledge of existing business ecosystems, the current state of Finland concerning ecosystems, the future perspectives, and the possible future research topics. The case interviews were made to gain understanding to the research questions.

IQ1 *"What ecosystems already exists in Finland?",* was answered as there found out to be at least 32 business ecosystems in Finnish market. The ecosystems have different purposes and structures. Some of them have only company participants, some have also individual people or some institutions. It was also found out that asymmetrical partnerships have some linkage over business ecosystems, as about half of the ecosystems had both, large companies and SMEs included. Interesting finding was that none of the found ecosystems had only SMEs in them, but there were some ecosystems where the participants were only large companies. Some ecosystems are offering services for mutual customers of the partners, some are offering some services for the partners themselves. The sizes of the ecosystems varied from about ten to hundreds of members. There was seen to be industry relation, as most of the ecosystems were operating in their particular industry. Some industries found where for example marketing, energy, finance, mobility, and build-up environment. Only a few cross-sectional ecosystems were found.

IQ2 *"What is the data-sharing ecosystem situation in Finland?"* question did not give any clear answer, as the answers from expert interviews varied. However, the experts highlighted that business ecosystems should be viewed in international level, as focusing only on nation level is not enough as the competition is global. The future perspectives were also asked, and it became clear that all the experts saw that change is happening and companies are utilizing more business ecosystems as their business models in the future. It was also seen to be important that companies would take active attitude for the change to happen, and the communication of value is a challenge that has to be overcome. There were also seen to be many unsewered questions about the business ecosystems, such as the maturity of

companies, capabilities needed for taking business ecosystems as business models and matters concerning privacy and regulations.

The research introduces three cases. Two of the cases main point was to find out why larger company should participate in data sharing business ecosystem and collaborate with smaller company, one case is from the B2B market, another from B2C market. The third is giving the perspective from ecosystem that is still in establishment phase to find out the good practices and challenges of it. It was found out that the answer for *RQ2 "Is the company part of some data sharing ecosystem?"* is yes, as all the companies interviewed for this research are part of some data sharing ecosystems. The aim of the ecosystems was either to improve the existing processes or to offer some service for mutual customers. It was found out that with both operating ecosystems, the smaller company's role is to act as orchestrator and offer some service where then larger company is acting as participant and mostly sharing data. *RQ3 "What kind of collaborative relationship the case companies share"* was answered as well. The collaborative relationship between partners were based on agreements, and no straight ownership relations were existing, and according to the definition given in this paper, the relationships were seen to be strategic alliances.

The data was shared between the partners according to need for it, such as the data was needed in order to offer the service, or to improve customer experience. No existing frameworks were used, but instead the companies had formed the data sharing models by themselves. The GDPR (General Data Protection Regulation) was mostly giving the limitations and rules for data sharing and handling and it was seen to be highly important to follow this regulation. Otherwise the industry of the companies was affecting on the limitations and rules set for data sharing, and companies might have set some additional rules such as that data cannot be shared to any third parties. Otherwise no additional strict rules were given to data sharing or handling or how it can be used. This answers to the *RQ4: "What data is shared and why? Are there some limitations?".*

The questions *RQ5: "What are the benefits and pitfalls that case companies have faced because of the data sharing for their partners"* and **RG6:** *"Has the collaboration been successful and what have been the success factors?"* were also answered. It was found out that with all the cases, the relationship has been working and therefore it has been successful, and the challenges that companies have faced have been mostly operational ones, such as sale targets have not been met yet. Some other challenges were also mentioned such as challenges that different organization sizes, structures and cultures have brought. One of the

cases have been successful, the other one not yet as successful as the partners hoped for. However, the interviewees were very positive that the challenges can be overcome. Also, it was analysed that most likely the longevity of relationship has affected the successfulness of the relationship. The factors behind the success of the relationship were seen to be individual people within the companies that are pushing the change through. Also, the personal chemistry and open communication between individuals within the collaborative companies were seen to be important, as well as the visionary attitude and courage to try new things.

RQ1. "*Why large companies should share their data and collaborate with SMEs and what kind of new business opportunities shared data offers for both parties.*" was also answered. Both large companies said they gained benefits from collaborating with smaller partner, such as new revenue streams and more satisfied customers, other of the large companies also gained reduced risks and saved costs because of collaboration.

It was also concluded that business ecosystem has marketing perspective as they can affect brand images of all the companies included within the ecosystem. New business opportunities were also identified. The companies said the new business opportunities they saw were coming from collaborating and sharing data with partners were ability to develop new services, learn about new customer segments and ability to adapt into changing market situations. It was concluded that is beneficial for both, larger companies, and smaller companies to participate in data sharing ecosystems and collaborate with each other. Therefore, it can be seen that business ecosystems, data sharing and intercorporate collaboration are important topics in marketing as well, as they are enabling better marketing actions now and in the future.

6.1   Theoretical contributions

The study gives notable contributions to existing theory about collaboration, business ecosystems and data sharing between companies about the establishment of ecosystem, the success factors, the benefits and challenges of it and new business opportunities this kind of collaborative relationship and business model can offer for both parties. Collaboration, and data sharing has been studied a lot, but there was not found any literature about the collaborative relationship that bases on data sharing between asymmetrical partners in business ecosystems, and therefore this research gives new insight into topic that has not been studied a lot.

Questions *IQ1 "What ecosystems already exists in Finland?"* and *IQ2 "What is the data-sharing ecosystem situation in Finland?"* are giving valuable base information for any future studies of business ecosystems, as it was found out that these kind of mapping or situation analysis have not been made previously. However, the results cannot be taken as holistic picture of the situation, as it is highly possible that many ecosystems have not been found during the research. Also, the situation is all the time changing, as new ecosystems are being established, and already existing ecosystems are changing their forms.

RQ2 "Is the company part of some data sharing business ecosystem" was one of the main research questions, as it was part of the given commission to study business ecosystems. In addition to this, results are giving valuable information to existing theory, as it has not been previously studied a lot whether or not asymmetric partnerships have linkage over business ecosystems. This study shows that some collaborations between SMEs and large companies have been formed through ecosystems, which gives a good starting point for possible future studies of asymmetric partnerships.

Results from *RQ3 "What kind of collaborative relationship the case companies share"* and *RG6: "Has the collaboration been successful and what have been the success factors?* shows that SMEs and large companies can form mutually beneficial business relationships without companies having straight ownership relationships to one another. This also gives inputs to theory, as it has not been clear in previous literature, whether or not the relationship between asymmetric partners can be successful (e.g. Nieto and Santamaria 2006; Jang et al.,2016) or not (Harrigan, 1988).

Data sharing has been studied before, and for example Seppälä et al., (2019) identified different types of data flows, meaning there are some data companies are willing to share and some data is highly valuable to their business and therefore this data is not shared. However, there was not found previous studies of what precise data companies are sharing and what data is not shared with their partners. Also, it has not been studied a lot if data sharing has been actually beneficial, or if it has caused some problems. Therefore *RQ4: "What data is shared and why? Are there some limitations?"* and *RQ5: "What are the benefits and pitfalls that case companies have faced because of the data sharing for their partners"* are giving good contributions to theory about these subjects that have been lacking knowledge.

The results of the **RQ1** "*Why large companies should share their data and collaborate with SMEs and what kind of new business opportunities shared data offers for both parties*" gives

valuable contributions to theory base, as previous studies of SMEs and large companies collaborating has not given inputs of what different types of benefits and reasons there are, why different sized companies should collaborate. Previous studies have presented innovativeness (Jang et al., 2016; Nieto & Santamaria, 2006) as the benefit gained when SMEs and large companies are collaborating, but there was not found researches where other possible benefits are studied. In this research it was found out that collaboration between SMEs and large companies can bring many strategic opportunities and operational benefits as well, not just innovativeness. In addition to this, even though data sharing has been studied a lot concerning public sector (e.g. Dawes, 1996, Higgins et al., 2014) it has not been studied so much on private sector, and therefore this research gives valuable information from this area that has been lacking of research.

6.2 Practical and managerial implications

This research offers valuable practical and managerial implications. It gives indications that companies should already start forming business ecosystems, as it can be seen that change has already started to happen as there were found many existing ecosystems and experts interviewed also agreed this. It can also be seen that business ecosystem models are affecting many industries if not all of them. This thesis also shows some of already existing ecosystems, that companies can contact if they wish to join some already existing ecosystem, instead of starting a new one.

This thesis also shows concrete examples of how business ecosystems have been established. It shows what benefits companies can expect from collaborating with asymmetrical partners in data sharing business ecosystems. It also shows possible obstacles that companies should consider if they decide to enter into this kind of partnerships. This thesis also gives inspiration of what kind of new business opportunities business ecosystems model can offer for companies. Also, this thesis gives concrete examples of what kind of partners ecosystems require, what kind of roles companies can take within the ecosystem and it shows that these practices have already been taken into action, as the studied cases are real-life companies.

However, as previously mentioned the sample of the research is small and the relationships between people and companies are very complex entities, and therefore the results of this research are highly dependent on its context. Therefore, the findings should not be

generalized to apply all the similar situation. Consequently, managers should use the practices of this study judiciously.

6.3   Limitations and future research

All studies have their own limitations, and next the most prominent ones are introduced. First of all, as mentioned before there could have been more interviews taken from the case companies to gain more comprehensive picture. Also, it would have been beneficial to gain more cases than just two operational cases and one case that is still in its establishment phase. Therefore, the topic should also be further studied.

Also, even though both B2B sector and B2C sector perspectives were included, there cannot really be done any conclusions from sector relational factors as the sample is too small for it. In addition to this, it needs to be noted that research was conducted in Finland, and therefore the research is not considering any cultural factors or the influence over different market structures. However, the limitation was done purposefully, to keep the research topic coherent. These topics could also be further studied in the future.

The second limitation concerns the primary data collected and the data collection method used. The collected data was not completely comparable as the questions varied as the interview was done by using semi-structural interview method. This means that the interview questions varied depending on the interviewed person, and the course of conversations. However, this is an issue that concerns all the studies that have been done with using this method.

Some of the new research topics have already been introduced in Results Chapter (5), as the experts gave their opinions of what subjects should be further studied. These were for example, the maturity of companies concerning business ecosystems, the regulation and privacy issues, and how to communicate the value in attractive way. Also, even though in this research the existing ecosystems have been mapped, the list is not comprehensive and existing ecosystems in Finland could be further studied. In additional to this, it would be beneficial to gain understanding from international markets, as it was many times mentioned during the interviews that business ecosystems should be considered in international perspective. Therefore, also similar kind of mapping should be done from international ecosystems that do not have any Finnish members included.

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Appendices

Appendix 1 – Summary of collaboration studies

Dimension	Study	Viewpoint/themes
Physical distance	Inoue et al., (2018)	Localization
	Kamenskikh (2018)	Close physical distance
	Braccini et al, 2012	International
Different partner types	Jang et al, (2016)	Asymmetric partnerships
	Nieto & Santamaria (2006)	Asymmetric partnerships
	Minshall et al. (2010)	Asymmetric partnerships
	Singh et al. (2018)	Asymmetric partnerships
	Allmendiger et al. (2019)	Asymmetric partnerships
	Bengtsson & Kock, (2000)	Competitors
	Maroofi (2015)	Competitors
	Shawyun, (2010)	Non-profit organizations
	Rice (2018)	High reliability organizations
Partner selection	Holmberg & Cummings, (2009)	Tools and partner selection process
	Park & Zhou 2005	Motivations
	Koza & Lewin (1998)	Motivations
Benefits of collaboration	Dyer and Singh (1998)	Competitive advantage sources
	Jang et al. (2016)	Benefits gained from different sizes of the partners
	Agarwal and Selen (2006)	Higher-order capabilities
	Bengttson and Kock (2000)	Resources
Challenges / risks of collaboration	Dyer & Singh (1998)	Identification of suitable partners
	Das & Teng (2000)	Internal tension framework

Trust in collaboration	Wehmeyer, et al. (2001)	Trust and its dimensions
	Dogson (1994)	Trust
	Inoue et all, (2018)	Trust
	Chi & Holsapple, (2005)	Trust
	Dyer & Singh, (1998)	Trust
	Smith et al. (1995)	Trust
	Shawyun, (2010)	Trust
	Najjar et al (2013	Trust
Different collaboration types	Moore (1995	Business ecosystems
	Moore (1993)	Business ecosystems
	Moore (2006)	Business ecosystems
	Iansiti & Levien (2004)	Business ecosystems
	Raxavi et al (2010)	Digital business ecosystems
	Gyrd-Jones and Kornum, (2013)	Co-branding
	Mohan et al. (2018)	Co-branding
	Washburn et al (2000)	Co-branding
	Besharat (2010)	Co-branding
Other	Pekas & Allio (1994)	Process view
	Christoffersen et al (104)	Performance and measuring
	Arino (2003)	Performance and measuring
	Ragman & Korn (2014)	Longevity and performance
	Smith et al. (1995)	Literature review
	Kumar & Van Diessel (1996)	Technology and collaboration
	Chi & Holsapple, (2005)	Technology and collaboration

Appendix 2 - Summary of data and data sharing studies

Subject	Dimension	Study	Viewpoint/themes
Data and data sharing	Data types	Chen, Chiang & Storey (2012)	Big data, analytics, BI
		Woerner & Wixom (2015	Big data, business strategy
	Data as resource	Seppälä et al., (2019)	Data similar resource as capital or labour
		Levitin & Redman (1998)	Data properties, implications
	Infotmation/data sharing	Seppälä et al (2019)	Data sharing in supply chain
		Du et al., (2011)	Data sharing in supply chain
		Dawes (1996)	Information sharing among government agencies
		Gil-Garcia et al., (2007)	Affection of perceived impediments of information sharing projects
		Bidgeli et al (2012)	Socio-technical framework for information sharing in government agencies
		Higgins et al., (2014)	Data sharing in publig sector
		Swarup et al., (2006)	Data sharing agreements
	Technology of data sharing	Mukhopadhyay (1995)	Electronic data interchange (EDI) to business
		Walton and Gupta (1999)	EDI in supply chain
		Wang and Seidmann (1995)	EDI affection of the competitive position of supplier
	Commercialization of data	Thomas and Leiponen (2016)	A literature review of commercialization of data
		Najjar & Kettinger (2013)	Data monetization
		Woener and Wixom (2015)	Data monetization
		Davenport's and Kudyba's (2016)	Data products

Appendix 3 - Open banking and Payment Service Directive

The open banking system and payment service directives that that have led to current situation, where companies in financial sector are encouraged to share data with other companies. Open banking system is introduced because it heavily affects the collaboration formation in financial industry and one of the cases studied in this thesis is from financial sectors. Financial institutions have traditionally used a "pipeline business model" where a business produces and offers a products and services directly to the customer (Nicholls, 2019, p. 147). This means that open banking model is completely changing financial industry.

Open banking means that banks are providing access to their customer information in secure, digital form to third party service providers (usually FinTech companies). These third parties are providing services for customers by using their data, usually with the combination with data from other sources. (Nicholls, 2019, p. 122.)

Major changes in legislation started open banking model system. One legislation that has affected the situation greatly is PSD2 (Payment Service Directive), that was set to define common legal framework for payment market in European Economic Area that entered into force for the most part of 13th of January 2018.The aim of this directive is to increase the level of integration and efficiency in the market, and also to increase the level of consumer protection with new authentication principles. This law is also is aiming to encourage the development of innovations and competition at the level of digital payment, with giving more choices to the end consumers. (Passi, 2018, p. 335, 337; European Commission, 2015; FIN-FSA). The directive opens EU payment market for companies that are offering consumer or business-oriented payment services, since it gives them access to the payment accounts (European Commission, 2015). In other words, PSD2 allows financial institutions to give their customer data for third-party use, for them to be able to offer new services for customers. However, the access can only be given with explicit consent of the customer (FIN-FSA).

The reason why open banking is important, is because it is a rising trend and traditional actors in financial service sector have been forced to change and adapt into recent digital and regulatory revolution within the payment services market and the technologies supporting banking and financial services, in order to survive in competition. The reason why third parties are interested in open banking possibilities are because they see the possible benefits of it. Open banking is not without its own challenges, but third party companies are aware of these

complexities of financial services market yet they see that collaborating with bank they can increase their own relevance quickly and also to build trust in their brand and their scale in size. (Passi, 2018, p. 335-337.)

There are two economic theories that are explaining the benefits of open banking: transaction cost economics and the network effect. According to transaction cost theory, a bank saves costs and limits the risks it needs to take by allowing other parties to do the production of new services, rather than it would start to produce them by itself. (Zachariadis & Ocean, 2016, p. 8). This benefits everybody, the bank, the third-party and the customer, because more services are leading to more satisfied customers. The network effect means, that more users a platform gains, value of the platform increases (Zachariadis & Ocean, 2016, p. 9). This means that more bank allows third parties to develop new services, more it attracts new users. These theories are also explaining why companies should establish business ecosystems.

Other benefits of open banking are improved customer experience, new revenue streams, and sustainable service model for traditionally underserved markets. When done right, open banking can also deliver benefits for many actors because of increased security for example through enhanced identity validation and fraud detection. However, banks often see open banking more as a threat than as an opportunity because their role in the market will change, since they can no longer act as a gatekeeper for the data they possess. Still, banks will gain many benefits from open banking, such as they are being able to create new services, and to enhance customer and business offerings (Broadsky & Oakes, 2017 p. 3-6). Also, the services created on the basis of open banking can be modular and flexible by their nature, that will make it possible to respond to ad hoc requests, and to adapt to the technical specifications required at an international level (Passi, 2018, p. 340). This also helps banks to answer the increasing customer demands. Open banking brings many benefits for consumers, businesses and also for the economy as a whole. Possible benefits include expanding of monetary products and services, improving credit application processes, new payment initiation options, new businesses, improving financial literacy and helping to prevent exploitation of vulnerable borrowers. (Nicholls, 2019, p. 123.)

However, there are many issues and risks that needs to be carefully considered in open banking model. These issues are for example privacy concerns and legislation, data protection, control and portability, liability issues, regulatory expertise, and capacity and also cybersecurity issues. (Nicholls, 2019, p. 135-140.) Open banking also forces banks to invest heavily into technological innovations. They also must renew their distribution channels and

offer new innovative services to their customers, and to make finance more easily available and faster for customer but still maintain the maximum security. The challenges are also born because customers have evolved, and their expectations have risen. Now customers are expecting variety of services, that can be accessed from multiple different channels and they also expect to gain similar level of experience than they are gaining from GAFA companies (Google, Apple, Facebook, Amazon). This means customers are expecting to gain highly personalized and real time service from banks. Also, the relationship between banks and clients require huge trust and flexibility. (Passi, 2018, p. 335.) It is highly important to create effective rules against offences in virtual spaces, in order for market to stay open and safe (Passi, 2018, p. 337). Risks also include infrastructural challenges and data protection challenges. Data sharing in financial services are risk- and permission -based which brings its own challenges. (Broadsky & Oakes, 2017, p. 3).

Even though, there are many challenges and risks, still open banking is seen to bring more opportunities, since it bring benefits to end users and foster innovations and new competition between banks and non-banks, but it also is likely to create new financial services ecosystems, which will change the banks' role in markets. It will also raise issues about regulation and data privacy. (Broadsky & Oakes, 2017, p. 1). Open banking brings many possibilities to create new services for both, consumers, and businesses. The possible services created with open banking model are concerning financial service areas, for example savings, credits, and treasury management. These services could be for example robo-savings planner services, real-time credit scoring, reconciled invoicing services, international cash management services and many more. (Passi, 2018, p. 342.) Third party service providers could also offer financial product comparison, money management applications, financial service applications, e.g. loan and mortgage applications, and electronic payment applications (Nicholls, 2019, p. 122-123).

Open banking does not only benefit Finland, it also gives international level benefits. Open banking can help European payment service providers to compete not only on local level, but also against global giants outside of Europe (Passi, 2018, p. 344). However, the challenge with the global level competition lies with the different laws and regulators in different countries. According Thomas and Leiponen (2016) literature review the challenge is that each country is evolving its own legal and regulatory frameworks. For example, in US there are no regulators protecting personal privacy, but many laws specific for particular sector of activities, and in EU there is a single body of rules protecting personal data and privacy. (Thomas and Leiponen, 2016.)

Appendix 4 – Case interview questions

Data/ekosysteemi kysymykset *Data/ecosystem questions

Ekosysteemillä tarkoitetaan tässä tutkimuksessa yritysten ja muiden sidosryhmien muodostamia yhteisöjä, jotka on koottu yhteisen alustan ympärille ja jossa yritykset jakavat toisilleen dataa. Ekosysteemeiden sisällä yritykset tekevät jonkinlaista yhteistyötä, ja yleensä ekosysteemillä on ainakin yksi yhteinen päämäärä.

(In this thesis, ecosystems are seen to be communities build by companies and other stakeholders around to some platform, where companies are sharing data to each other's. Inside of an ecosystem, companies are collaborating somehow and usually ecosystem has at least one common goal)

1. Kuuluuko yrityksenne johonkin datanjakamiseen liittyvään ekosysteemiin*? *(Is your company part of some data sharing ecosystem?)*

-> "Kyllä": "Yes" (PER EKOSYSTEEMI)

1. Mitä muita yrityksiä ekosysteemiin kuuluu? *(What other companies are involved with the ecosystem?*

2. Onko yrityksenne muodostanut tiiviimpiä kumppanuuksia ekosysteemin jäsenten kanssa? *(Have your company formed some tighter partnerships with other members of the ecosystem?)*

3. Mikä on yrityksenne tavoite ekosysteemissä? *(What is your company's goal in this ecosystem?)*

4. Mikä on ekosysteemin tavoite/miksi ekosysteemi on synnytetty? *(What is the goal of the ecosystem/Why the ecosystem was established?)*

5. Mikä on yrityksenne rooli ekosysteemissä (esim datan jakaja, muuntaja, analysoija, palveluntuottaja) *(What is your company's role in the ecosystem, e.g. data sharer, analyzer, service provider?)*

6. *Mikä oli yrityksenne rooli ekosysteemissä (Orkestraattori/vetäjä vai osallistuja)? (What is your company's role is the ecosystem (orchestrator or participant?)*

7. Kuuluuko yhteistyökumppaninne (X) kyseiseen ekosysteemiin? *(Is your partner (X) involved with this ecosystem?*

->"Ei": □**"No"**

1. Jakaako yrityksenne dataa muille yrityksille kuin yhteistyökumppanillenne? Jos kyllä, niin kenelle/keille? *(Is your company sharing data with other companies than with your partner?) If yes, them to who?)*

2. Oletteko miettineet ekosysteemin perustamista tai semmoiseen liittymistä? *(Have your company thought about establishing data sharing ecosystem or participating in one?)*

Datan jakaminen Case yhteistyökumppanille (Data sharing to case partner)

1. Käytättekö jotain valmiiksi olemassa olevaa mallia datan jakamisen pohjalla vai oletteko kehittäneet mallin itse? (Have you used some theoretical framework on the basis of data sharing?)

2. Mitä dataa jaatte yhteistyökumppanille? Miksi? *(What data are you sharing with your partners? Why?)*

3. Maksaako datanne jotain yhteistyökumppanillenne? (Is your data costing something for your partner?)

4. Mitä dataa yhteistyökumppani jakaa teille? Miksi? *(What data your partner shares with you? Why?)*

5. Saako yrityksenne mitään seuraavista hyödyistä kun jaatte dataa yhteistyökumppanillenne: *(Has your company gained any following benefits from sharing data to your partner?)*

   a) kustannusten säästö *(Cost savings)*
   b) pienennetyt riskit *(reduced risks)*
   c) uutta tulovirtaa *(new revenue streams)*
   d) tyytyväisempiä asiakkaita *(More satisfied customers)*

6. Onko jotain muita hyötyjä, joita ei juuri mainittu? *(Are there some other benefits that was not mentioned?)*

7. Kuinka datan jakaminen tapahtuu? (teknologia, esim Filesharing, messaging (EDI jne.), real-time API?) *(How data sharing happens?) Technology, e.g. filesharing, messaging (EDI etc.), real-time API?))*

8. Mitä sääntöjä/rajoituksia olette asettaneet datan jakamiselle? (What rules or limitations have you set to data sharing?)

9. Mitä sääntöjä tai rajoituksia olette asettaneet datanne käytölle? (What rules or limitations have you set to your data usage?)

10. Mitä valmisteluita jouduitte tekemään että datan jakaminen oli mahdollista? (esimerkiksi teknologian uusimista, sopimuksia jne) *(What preparations have you done in order for data sharing to be possible? E.g. new technology, agreements)*

11. Onko datan jakaminen tuonut yrityksellenne uusia liiketoimintamahdollisuuksia, jos kyllä niin mitä? *(Has data sharing brought some new business opportunities for your company? If yes, then what?)*

12. Onko jotain mitä haluaisitte tähän osioon lisätä? *(Is there something you would like to add?)*

Yhteistyö (Collaboration)

1. Miten kuvailisit yritystenne välistä yhteistyötä? (esimerkiksi onko kyseessä strateginen allianssi, tai joku muu löyhempi yhteistyön muoto) *(How would you describe the collaboration with the partner? Is it e.g. strategic alliance or looser form of co-operation)*

2. Kuinka yhteistyö alkoi (esimerkiksi kuka lähestyi ketä?) *(How the partnerhip started? Who approached to who?)*

3. Kuinka kauan yhteistyö on ollut käynnissä? *(How long have the collaboration/partnership been going on?)*

4. Kuinka kauan yhteistyön oletetaan jatkuvan? *(How long have you planned to keep the collaboration/partnership going on?)*

5. Mitä yrityksenne hyötyy yhteistyöstä? *(How is your company benefitting from the collaboration?)*

6. Onko yhteistyö ollut onnistunutta? *(Has the collaboration been successful?)*

7. Onko yhteistyöstä ilmennyt haasteita, mitä? *(Has there been some challenges with the collaboration/partnership? What?)*

8. Mitä tavoittelette yhteistyöllänne? Ovatko tavoitteet yrityksenne strategian mukaisia? *(What are you planning to achieve with the collaboration? / Are these goals/objectives in line with your company strategy?)*

9. Mittaatteko yhteistyötänne jotenkin? Jos kyllä niin miten? *(Are you measuring the collaboration somehow? If yes, then how?)*

10. Mitä muita liiketoiminnan mahdollisuuksia näette yhteistyönne luovan?/mitä muita liiketoiminnan mahdollisuuksia näette että vastaavantyyppinen yhteistyö voisi luoda? *(What new business opportunities this collaboration will bring? What other new business opportunities do you think this collaboration could bring?)*

11. Onko jotain mitä haluaisitte lisätä? *(Is there something else you would like to add?)*

Appendix 5 - Expert interview questions

Ekosysteemikartoitus / Ecosystem mapping

1. Mitä ekosysteemeitä tiedät olevan Suomessa? *(What business ecosystems you know exists in Finland)*

2. Onko nähtävissä alakohtaisuutta? *(Do you see some sectoral relation?)*

3. Ollaanko Suomessa jäljessä tässä asiassa verrattuna muihin maihin? *(What kind of situation we have in Finland compared to other countries?)*

4. Mitä näet että tulevaisuudessa tällä kentällä tulee tapahtumaan? *(What do you see will happen in the future?)*

5. Onko jotain muuta mitä haluaisit lisätä? (What would you like to add?)

Appendix 6 - Establishment interview questions

Ekosysteemin synty /Establishment of an ecosystem

1. Kerro vapain sanoin omasta roolistasi suunnitteilla olevassa ekosysteemissä *(Please, tell with your own words about your own role in the planned ecosystem)*

2. Kerro vapain sanoin suunnitteilla olevasta ekosysteemistä (keitä kuuluu, mikä on kenenkin rooli ekosysteemissä jne) *(Please, tell with your own words about the planned ecosystem, e.g. which parties are involved, the roles etc)*

3. Mikä on ekosysteemin tavoite, eli miksi se aiotaan luoda? *(What is the goal of this ecosystem? Why it has been established?)*

4. Mikä on teidän yrityksenne tavoite ekosysteemissä? *(What is your company's goal in this ecosystem?*

5. Miten ekosysteemin luominen sai alkunsa? *(Esimerkiksi: mistä ajatus lähti, kenen osapuolen idea, kuka kontaktoi ketä, miten se tapahtui?) (From where the idea to establish an ecosystem started? Which party came up with the idea to establish an ecosystem? Which party approached whom? How did it happen?)*

6. Mitä eri vaiheita ekosysteemin luomiseen kuuluu/on kuulunut? Ja kuinka kauan eri vaiheisiin menee/on mennyt aikaa? *(What are the different phases when ecosystem is established? How long the phases are lasting/have lasted?*

7. Mitkä asiat ovat tärkeitä kun luodaan ekosysteemiä? Miksi? *(What matters needs to be considered when an ecosystem is established? Why?)*

8. Mitä haasteita on tullut vastaan / Mitä haasteita näet että prosessissa voi olla? *(What challenges have you faced during this process/ What challenges you see that there might be?)*

9. Mitä muuta haluat lisätä? *(What would you like to add?)*

Appendix 7 – Ecosystem mapping results

Sector	Ecosystem	Year of foundation	Open: yes/no	What is the ecosystem about?	Partners	Goals/aims	Services/Solutions
Build-up environment	**Vastuu Group / Platform of Trust** ***Sources**: Vastuu group, 2020-2020D; Plarform of trust 2020.*	2019	Yes	Data content and technical interface ecosystem for build-up environment.	Many partners, so just some mentioned: Aacon Oy, Admicom Finland Oy, Aitio Finland Oy, Alertum Oy, AM Security Oy, Apprix Oy, Atentis Oy, Aventra Oy, Azets Insight Oy, Balance Systems Oy, Bonava, Pajadata Oy, Suomen Säätiöpalvelu Oy, Systemteknik Ab I Eckerö, Taitotekniikka Oy, Takamäki Yhtiöt Ky, Taloustutka Oy, Tamtron Solutions Oy, Tarjova Oy, Tieto Finland Oy, Tietoaika Oy, Tilimanager Oy, Tilipalvelu Eija Mäyrälä Ky, Tilitoimisto Pirjo Gustafsson, Tilitoimisto Raahen Tase Oy, Tilitoimisto Raetsaari Oy, ToP Tunniste Oy, Tunninen, Ulvilan tilitoimisto Oy, Visy Oy, Visma Megaflex Oy, Visma Movenium, Visma Software Oy	Aim is to offer reliable platform and intermediary of reliable data for partner companies, so that they can build services for shared customers by using the data.	Electronical services for needs of build-up environment and to help sector companies with their legal obligations.
Construction	**KEKO** ***Sourcess**: Hemilä, 2020; VTT, 2020*	2019	Yes	Ecosystem that focuses on the built-up environment.	Kone, YIT, Halton, VTT, Netox, Canverion, Nokia, Business Finland	Aim to build new platform-based business models Aim to make buildings safer, more fluent and productive Aim to engage SMEs into ecosystem and to co-innovate new concepts in smart building context	Still very new ecosystem, and the first use cases will be available during 2020

Cross industry	**R3/ Corda (CorDapps)** *Sources*: *Corda, 2020-2020d.*	2016	-	Blockchain platform ecosystem	Over 300 companies, global network, but according to one expert interview has also some Finnish companies included. App builders and explorers including technology partners, system integrators, consulting companies, software vendors from many industries.	Offers open source blockchain platform for partners from multiple industries to solve complex business problems. Designed that data is shared only with relevant parties.	Business solutions for partners.
Cross industry	**Combient group** *Sources*: *Combient, 2020-2020e*	2015	No	Cross industry collaboration network.	Includes 30 large enterprises, and also universities and startups. Assa Ablloy, Atlas Copco, Autoliv, Electrolux, Epiroc, Ericksson, fam, Fazer, Fortum, Husgvarna Group, Höganäs, Investor, K-group, Kone, KoneCranes, LKAB, Munters, Mölnlycke, Permobil, SAAB, SAS, SEB, SKP, Scania, Sigma, Stena, Stora Enso, Södra, Vasakronan, Wärtsilä	The leading cross industry collaboration ecosystem group in the Nordics, that includes Combient Spark, Combient Foundary, Combient Mix and Combient Collegial. Aims to speed up the transformation of parties involved by offering a space where assets can be shared.	The ecosystem has specialized in AI & analytics, open innovation and organization and culture.
Cross industry	**Open Ecosystem Network** *Sources*: *Open Ecosystem Network, 2020-2020B*	2016	Yes	Innovation ecosystem	Hundreds of partners, so only a few larger ones mentioned: Accenture, Telia, Nokia, Microsoft, Aalto Unicersity, My Metsä, MaaS Global, LUT University, K Group, Business Finland, Kone. Ecosystem originally initiated by Nokia	Goal is to bring together ambitious companies from different industries and individuals to help them innovate, and grow business	Helping companies collaborate, being innovative and interact.
Energy	**Flexens / Clic Innovation** *Sources*: *Flexens, 2020; Click Innovation Oy*	2015	Yes	Energy ecosystem	ABB, ÅF, Sumitomo, Andritz, Fortum, BMH Technology, Elenia, FCG, Gasum, Metsä Group, Helen, Kemira, Kuusankoski Recylcing, Metsäteho, StoraEnso, SSAB, Vapo, Wärtsilä, Pohjolan Coima, Outotec, Neste, UPM, Vaisala, Valmet, Vantaan Energia, NLS, University of Oulu, University of Vaasa, LUT university, University of Helsinki, Aalto University, VTT; Åbo Akademi, University of Turku, Tampere University, Finnish Meteorological Institutute, Syke Finnish Environment Institute, Luke, GTK	Aiming to create breakthrough solutions in bioeconomy, circular economy, and energy systems. Public-private-partnership ecosystem	Developing and implementing a full society scale demo of the the FLEXe (energy) concept on Åland Islands

Energy	**Gaia /** **Baltic Offshore** **Wind** *Sources*: *Gaia, 2020;* *Business Finland,* *2018d*	2018	Yes	Wind power ecosystem	Arctia, Meritaito, Boskalis Terramare, Pori Offshore Constructions, Prysmian Group Finland, Rajakiiri, Rauma Marine Constructions, Finnish Sea Service, Suomen Hyötytuuli, SSAB, Wärtsilä, Business Finland	Aiming to bring together all the relevant parties e.g. investors, businesses, technology experts, service providers and governmental institutions to create competitive wind power domain in the Baltic Sea with global potential	Offshore wind power production
Environment	**Kompensäätiö sr /** **Compensate** *Sources*: *Compensate, 2020-* *2020b*	2019	-	Finnish foundation ecosystem focusing on environmental issues	Werkling, Frantic, Hellon, BCG, Fourkind, Dottir, SEK, Accenture, Kallan&Co., Hopkins, Cocoa, Rastivo.com, Contentful, Koski Syväri Löyly, Noli, Studios, Posti, YLVA, Finnair, Nordea, Reima, ST1, Tamro, Kyyti, JYY, Jungle Juice Bar, Fleet Innovation	Aims to help stop climate change with offering ways to compensate the emissions. Aims to develop network that helps to create new products and services. Aim to pilot their business model and funds carbon capture projects.	Offering service for their partners to compensate their emissions.
Environment	**Smart&Clean** *Sources*: *Smart&Clean, 2020-* *2020b;* *Sjöstedt, N.A.*	2016	-	Sustainability ecosystem.	Cities: Helsinki, Espoo, Kauniainen, Lahti, Vantaa, Uusimaa regional council, Companies: AFRY, Caverion, Fortum, Gaia, Gasum, Helen, Kone, Lassila & Tikanoja, Neste, Ramirent, Siemens, ST1, Vaisala, YIT Research organizations: Aalto Univertisy, Helsinki University, Lappeenranta Technical University, VTT Government organisations and public foundations: Business Finland, Ministries of the Environment, Economc Affairs and Employment and Transport and Communications, Sitra	Aims to offer solutions for mitigating climate change, to boost business and export smart solutions and clean technology.	Aims to offer climate solutions, including mobility, energy, housing, and circular economy solutions.

Environment	**Griffin Refineries / Plastic Waste Refining Ecosystem** *Sources*: *Business Finland,* *2018b-2018c;* *Griffin Refineries, 2020*	2018	-	Environmentally focused ecosystem	VTT, Suomen Uusiomuovi Oy, L&T, Hackl Container, Urbaser, BMH Technology, Conenor, CoolBrook, Pramia Plastic, Muoviteollisuus Ry, Metsä Tissue, Reclay Group, Korkia, ÅF, Christof Industries, Business Finland,	Aiming to combine different experts from Finland and from international markets with offering a platform for them.	The aim is to create new business opportunities from recycling plastic.
Environment	**Clic Innnovation / 4Recycling** *Sources*: *Clic, 2020b;* *Business Finland* *2019C*	2019	Yes	Environmentally focused ecosystem	Business Finland, Andritz Oy, BMH Technology Oy, Borealis Group, Fortum Waste Solutions Oy, Fortum Oyj, Kemira Oyj, Lassila &Tikanoja Oyj, Metsä Fibre, Metsä Board, Metsäliitto Cooperative, Neste Oyj, Stora Enso Oyj, UPM-Kymmene Oyj and Valmet Oyj as well as The Chemical Industry Federation of Finland, Finnish Plastics Industries Federation and Finnish Forest Industries.	Aims to bring solutions for plastic challenge and to activate cross-industry dialogue to create optimal overall material system. Collects information, connects international actors, forms collaborations, prepare RDI projects etc.	Building solutions for recycling of plastics and developing bio-based materials.
Finance	**Marco Polo Network / TradeIX and R3** *Sources*: *Marco Polo, 2020-* *2020b.*	2017	-	Trade and working capital finance ecosystem	International ecosystem, that includes some Finnish companies. Only few companies from the ecosystem mentioned: Dankse Bank, OP, Damler, Mastercard, Oracle, SMBC	Offering software platform for trade and working capital finance for companies and banks. Aims to improve customer experience, with enabling easier data integration and exchange between partners.	Trade and supply chain finance solutions for partners.
Finance	**Nordea / Nordea Open Banking** *Sources*: *Nordea, 2017; 2020-* *2020b*	2017	Yes	Open Banking ecosystem for developers	International ecosystem, open in Finland, Sweden and Denmark. Parties include software developers and companies, but they are not named in public.	Offering API platform for software developers and banks. One reason behind this platform is PSD2 law that obliges banks to share their data.	Financial data for partners.

Finance	OP / OP Developer *Sources*: *OP, 2017; 2020*	2017	Yes	Open Banking ecosystem for developers.	Platform for banks, FinTechs and startups.	One reason behind this platform is PSD2 law that obliges banks to share their data. Aims to offer APIs for fund, holdings information and financial instruments and open new custodies.	Services concerning identity, health, housing and insurance.
Health	HUS / CleverHealth *Sources*: *CleverHealth Network, 2020*	2017	-	Health technology ecosystem	BCB Medical, BC Platforms, CGI, Elisa, Fujitsu, GE, Innofactor, Microsoft, Noona, Planmeca, Tieto, Takeda, Productivity Leap and Pfizer	Aiming to bring product and service innovations developed with data Aims to be internationally renowned ecosystem. Offers platform for partners.	Health technology export products for companies.
Health	UNA Oy *Sources*: *Una, 2020-2020b*	2017	-	Development ecosystem in health sector.	Owned by 19 hospital districts, municipalities, joint municipal boards, and some strategic partners.	The participants are the main customers of the ecosystem. The ecosystem offers development and expert services.	Una Ydin – Customer data in information management system Una lomake – National level service for pleadings Una Kaari – Information system for customer service and resource management
Housing market	DIAS / Aktia, Alma Talent, Danske Bank, OP, S Bank, Tomorrow Tech *Sources*: *Dias, 2020-2020B*	2018	-	Digital housing market ecosystem.	OP, Danske Bank, Aktia, S-Bank, Nordea, Handelsbank, Savings Banks, POP Bank, Alma, Sanoma, OP Home, Kiinteistömaailma, Blok, Bo LVK, Remax, Neliöt Liikkuu, Change LVK, Premier, Solid House, Huom!, Huoneistokeskus, SKV Kiinteistövälitys, SP Home, Kahdeks8s päivä, Olo LVK, Skanska, YIT, Nettikoti, Visma, PDS, Kivi	Aims to bring real estate agents, banks and builders on to one platform, to enable digital housing market. Aims to make housing market work faster, safer, and more flexible, it is no longer location specific.	Housing market services.
HVAC	Tamlink / Indoor Air Quality *Sources*: *IAEQ, 2020; Business Finland, 2019D*	2018	-	Indoor air quality ecosystem	Airo, Alme, Dekati, Eagle Filters, Fidelix, Filterpak, Fleetlogis, Fläkt Group, Fogscreen, Genano, Koja, Pegasor, Produal, Ramboll, Realin, Smartwatcher, Tikkurila, TPI Control, Vaisala, Vallox, Vuo Power Oy, Tamlink, VTT; Business Finland, Clic, Helsinki Business Hub, Keino, Go4Energy	Offers platform for partners to create new business opportunities and aiming to reach new market segments and areas through collaboration in indoor air sector.	Indoor air solutions.

Logistics	Vediafi / Caas-Net (Corridor as a Service) *Sources*: *Business Finland, 2019B; Vediafi, 2020-2020B; VTT, 2018*	2018	-	Logistics ecosystem	Finnish Transport Safety Agency, Business Finland, the Ministry of Transport and Communications, the Finnish Transport Agency, the Finnish Meteorological Institute, the Finnish Communications Regulatory Authority and Finnish Customs, VTT from the research sector and Vediafi, Dynniq, Infotripla and Indagon from the business sector. Vantaa, Turku and Tampere cities, the Growth Corridor Finland network and YTL ry.	Aiming to build working logistics between Asia and Europe through Finland with combining different parties and by digitalizing actions.	Improving logistics of Finland
Manufacturing	DIMECC / Intelligent industry *Sources*: *Intelligent industry 2012-2012B*	2017	Yes	Manufacturing ecosystem	Elekmerk, Fastems, HT Laser, Innofacrot, Konecranes, Melkki, Nokia, Prima Power, Raute, TietoEvry, Business Finland, Dimecc. Also, a lot of international partners	Aims connects leading equipment manufacturers and digital solution providers in Finland. Aim is to answer individual customer needs, and to sense customer expectations. Keep Finland involved in the data driven business development. Boosting SME network.	Finnish Industrial Internet Forum – combines appliers and digital solution providers with research organizations DIMECC Demobooster, innovation service model, that aims to connect small and large companies Demola, combining organizations with university students. Machine Learning Academy – aims to increase participants understanding of how AI can be utilized with machine learning and company business
Manufacturing	AirFaas / Combi Works *Sources*: *Business Finland, 2018, Combi Works, 2020-2020B.*	-	Yes	Platform ecosystem for manufacturing.	Manufacturing companies, not named.	Aims to offer production facilities globally by offering portal for it. Combine accounting, logistics, production, control systems, funding, and insurance systems in manufacturing sector.	Offers access for small operators to larger providers services. Air FaaS is factory as a service, AirBnB of manufacturing.

Manufacturing	**BatCircle / Aalto University** *Sources: Batcircle, 2020*	-	-	Circular ecosystem of battery metals consortium	4 universities, 2 research centers, 8 large companies, 15 SMEs, 2 cities Aalto University, Oulu University, University of Eastern Finland, LUT University, Geological Survey of Finland, VTT research, Boliden ltd, Finnish Minerals Group, Fortum, Freeport Cobalt, Outotec, Norilsk Nickel Harjavalta, AkkuSer, CrisolteQ, FENNOSCANDIAN Resources, Ima Engineering, Keliber, Latitude 66, Magsort, Mawson, Mine On-Line Service, Mondo Minerals, Suhanko Arctic Platinum, Teraloop, Terrafame, Tracegrow, Vulcan Hautalampi, City of Harjavalta, City of Pori	Ecosystem operating in manufacturing industry, aims to improve the processes of mining, metals and battery chemicals and increase the recycling of batteries.	Aims to make strong bonds between companies and research organizations to find new business opportunities.
Maritime	**Dimecc / One Sea Ecosystem** *Sources: Dimec, 2020; One Sea 2019.*	2016	Yes	Marine transport ecosystem	Almost 80 companies in ecosystem, so only mentioned few larger ones: Tieto, Wärtsilä, Rolls-Royce, ABB, Awake.ai, Business Finland, Finnpilot,	Aiming to lead the way towards of operating autonomous maritime ecosystem until 2025. One goal is also to set new standards for the industry and to help the industry digitalize and to create new innovations. Research collaboration for partners.	Digital, intelligent solutions for marine industry.
Maritime logistics	**Awake.AI** *Sources: Awake.AI. (2020); Business Finland, 2019.*	2018	Yes	Maritime logistics ecosystem	Vaisala, FMI, F-Secure, Fleetrange, Konecranes, DEAL Ecosystem also includes other parties, such as Business Finland, IMB, Inmarsat etc.	Aiming to bring maritime logistic actors to same platform, to plan, optimize operations and achieve goals and to become the world most trusted AI port platform and build global ecosystem.	Offers digital services, proactive analytics, machine learning models for maritime business.
Metallurgical	**AMET** *Sources: University of Oulu, 2020*	2019	-	Metallurgical ecosystem	University of Oulu, Kaltio Technologies Oy, Luxmet Oy, Quva Oy, Sapotech Oy, Sensmet Oy, SSAB Europe Oy, University of Oulu, Åbo Akademi University, Ovako	Aims to enable strategic renewal of metal refining industry, improve the competitiveness of SMEs and aims to promote growth of export business.	Develops artificial intelligence and platform-based solutions in metallurgical industry.

Mobility	**Kyyti Group / Smart Mobility ecosystem** *Sources*: *Kyyti, 2018; Kyyti, 2020*	-	-	Mobility ecosystem	Lähitapiola, r2p, PayiQ, Dat.mobility, Helkama, Strafica, Ramboll, Vinka, Fluidtime, Roboride, Aalto University, GreenMObility, Switch, 020202, Vamos, Skoda, Sitra, AVM, VTT	Aiming to offer mobility as a service solution for transport operators, corporates and municipalities.	Offer a platform to plan, book and pay the whole intermodal travel chain.
Mobility	**The SmartRail Ecosystem / Skoda Transtech** *Sources*: *SmartRail Ecosystem, 2020-2020c*	2019	-	Mobility ecosystem	Skoda, VTT, Business Finland, 3D Talo, LUT university, Tampereen raitiotie Oy, HKL, Mipro, Mevea, Ambientia, Tamware, DA-Group, EC-Engineering Oy, Lumikko, Teknoware, KAMK, Tampere City, Tampere University, Creanex, Cinia.	Aims to bring together the needed partners to be able to deliver transportation service and co-create.	Aims to offer tram-integrated operations and services at the international market.
Mobility	**Mobility as a service API / MaaS Global** *Sources*: *Whim, 2020; Yle, 2018.*	2015	Yes	Ecosystem offering all transport services at one app.	Sixt, HSL, Go by Veho, Toyota Rent a Car, Hertz, Taksi Helsinki, Lähitaksi, Tier, Menevä	Aims to offer transportation services at one place (including public transportation, city bikes, car rental, taxi services).	Transportation services for end-customers.
Teaching	**DigiOne** *Sources*: *Vantaa, 2020*	2020	Yes	Platform ecosystem for teaching.	Cities, municipality, service providers, technical service providers and other needed partners.	Aims to offer more equal starting point for every teachers and students. Project that aims to collect teaching and learning systems into one nationwide digital platform.	Helps teachers with creating study and new pedagogic plans. Ecosystem is currently being established.
Technology	**ICEYE Oy / Internet of Locations** *Sources* *Business Finland, 2018B; ICEYE 2018; ICEYE, 2020*	2019	Yes	Satellite data ecosystem	Information not found	Aims to offer satellite data, that can be tuned into actionable information.	Solutions for many different industries, such as for insurance, financial, energy, utilities, mining, maritime, security industries and for civil government
Technology	**SILO.AI** *Sources*: *SILO.AI, 2020; Business Finland, 2018.*	2017	-	Artificial intelligence ecosystem	Information not found	Aims to build infrastructure where building AI is easier in the future. It contains AI-model library and helps sharing data between partners.	Offers AI solutions for companies from different industries.

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Sources:
Trans Digi, 2020 | 2019 | Yes | Data sharing platform ecosystem for travel and mobility services. | Information not found | Platform for open data.

Aims to develop sustainable growth of international individual tourism. | Combining different actors from mobility and travel sectors. |

Appendix 8 – Example pictures of used method of coding

	a) Cost savings	b) reduced risks	c) new revenue streams	d) More satisfied customers
Company Y	No	Maybe in the future	Yes	Yes
Company W	-	-	Yes	Yes
Company Å	Yes	Yes	Yes	Yes
Company Q	Yes	Yes	Yes	Yes

	Ecosystem questions				Data sharing questions				Collaboration questions				New business opportunities			
Questions	a	b	c	d	a	b	c	d	a	b	c	d	a	b	c	d
Company x																
Company y																
Company w																
Company å																
Company q																