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ABSTRACT

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Abstract

The construction industry is widely criticized for its lack of deeper cooperation between actors and the overall low level of productivity. Some companies are forming strategic partnerships to answer to these problems however the growing demands of stakeholders are forcing companies to explore more collaborative approaches such as business ecosystems. The business ecosystem approach requires actors to co-create value and to consider the health of the entire network which would be a beneficial approach for the industry. Therefore, the main objective of this study is to investigate how strategic partnerships can be utilized in the formation of business ecosystems in the construction industry.

The chosen research approach for this study was a single case study on a concept focusing on parking garages from the infrastructure sector. The data was collected by conducting seven semi-structured interviews on four employees from the case company, one from a consulting company and two from the supplier and subcontractor companies that represent the potential partners of the case concept.

The findings of the study indicate that strategic partnerships can be utilized in the formation of business ecosystems in the construction industry. Strategic partnerships can be used for defining the core business of the ecosystem, bringing actors with the suitable capabilities to the ecosystem and encouraging more collaborative relationships between the different partners. Business ecosystems can in turn facilitate the creation of better solutions for stakeholders, the implementation of standardization and the improvement in productivity. However, the distinct characteristics of the industry may hinder the formation ecosystems thus the application of the ecosystem approach is a long process.

Key words	construction industry, strategic partnerships, business ecosystems

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Tiivistelmä

Rakennusalaa kritisoidaan laajasti sen syvemmän yhteistyön puutteen ja matalan tuottavuustason takia. Jotkut yritykset muodostavat strategisia kumppanuuksia vastatakseen näihin ongelmiin, mutta sidosryhmien kasvavat vaatimukset pakottavat yrityksiä tutkimaan yhteisteistyökeskeisempiä lähestymistapoja, kuten liiketoimintaekosysteemejä. Liiketoimintaekosysteemit vaativat toimijoita luomaan arvoa yhdessä ja ottamaan huomioon koko verkoston hyvinvoinnin, mikä olisi hyödyllinen lähestymistapa alalle. Sen vuoksi tämän tutkimuksen päätavoite on selvittää, miten strategisia kumppanuuksia voidaan hyödyntää liiketoimintaekosysteemien luomisessa rakennusalalla.

Valittu tutkimustapa tälle tutkimukselle oli tapaustutkimus parkkitaloihin keskittyvästä konseptista infrarakentamisen sektorissa. Tutkimusaineistoa varten haastateltiin puolistruktuuroiduilla haastatteluilla seitsemää henkilöä, joista neljä oli tapausyrityksestä, yksi konsultointiyrityksestä ja kaksi toimittaja- ja aliurakointiyrityksistä, jotka edustavat konseptin potentiaalisia strategisia kumppaneita.

Tutkimuksen tulokset osoittavat, että strategisia kumppanuuksia voidaan hyödyntää liiketoimintaekosysteemien luomisessa rakennusalalla. Strategisten kumppanuuksien avulla voidaan määrittää ydinyritys, tuoda asianmukaisilla kyvykkyyksillä varustetut toimijat ekosysteemiin ja edistää yhteistyötä eri kumppanien välillä. Liiketoimintaekosysteemeillä voidaan taas helpottaa parempien ratkaisujen luomista sidosryhmille, standardisoinnin implementointia ja tuottavuuden lisäämistä. Rakennusalan erityispiirteet voivat kuitenkin hidastuttaa liiketoimintaekosysteemien luomista, joten niiden omaksuminen alalla on pitkä prosessi.

Avainsanat	rakennusala, strategiset kumppanuudet, liiketoimintaekosysteemit

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A case study from infrastructure construction

Master's Thesis
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1 INTRODUCTION

1.1 Background of the study

Operations in the construction industry heavily rely on combining the processes of different actors, such as clients, main contractors and subcontractors into larger coordinated entities. This stems from the diverse nature of the construction industry which requires expertise in various technologies and products thus promoting a high level of specialization. When companies focus on their core expertise it creates a need for collaborative and complementary way of working between different actors at construction sites. (Pulkka et al. 2016, 131.) However, even though the actors in the industry are required to work closely together, it has been reported that the industry faces poor cooperation, limited communication and lack of trust (Gadde & Dubois 2010, 257). Especially the procurement process between these actors has been criticized for not promoting deeper communication and integration therefore resulting in a fragmented field (Love et al. 1998, 375). The fragmentation has raised a lot of concerns because partnerships, in particular, are a crucial lifeline for supply chains (Liker & Choi 2004, 104).

One of the main reasons for the lack of more profound integration and long-term partnerships is that construction is seen as a project-based industry. This refers to the fact that the majority of construction projects demand a unique set of technical and financial resources and number of required actors therefore creating a sense of discontinuity (Skaates et al. 2002, 391; Segerstedt & Olofsson 2010, 351). Thus, cooperation is tied to the duration of projects which erases the motivation of exploring longer-term benefits of collaboration. In addition, as most of the projects in the industry are executed according to the "design-bid-build" pattern (Segerstedt & Olofsson 2010, 350) it highlights the separation between the design and building phases of the construction process thus diminishing the aspect of learning from previous projects. Skaates et al. (2002, 391) argue that in spite of the fragmented and project-based nature of the industry there is significant interaction during the construction phase of individual projects. However, this interaction remains as short-term as a new set of workers from a certain company or an entirely new group of companies is chosen for each project, therefore eliminating the possibility for mutual orientation and bonding.

Feelings of discontinuity and uncertainty do not only cause issues in the business relationships alone but also in the whole construction process. There has been discussion

on how short-term cooperation in different projects is linked to poorer quality of construction and innovation (Ahonen et al. 2020, 173). When all the different actors at the construction site focus on their own individual goals, it can lead to miscommunication thus affecting the quality and productivity of the construction process. In addition, Håkansson and Ingelmansson (2013, 41) emphasize how poor cooperation between different organizations along with strict focus on individual projects and lack of knowledge transfer are some of the main obstacles that prevent the construction industry from answering to the growing demands of an industrial renewal. The construction industry has been widely criticized for being conservative and passive towards innovations (Dewick & Miozzo 2002, 823–824) therefore there exists a significant need for a fresh mindset for observing and developing the industry.

The ecosystem concept is becoming a growing topic of interest in the business arena. The concept is used more widely in the information and communications technology (ICT) sector (Adner & Kapoor 2010; Eamonn 2015) but its possible applicability in lower-tech sectors and industries, such as the construction industry, has gained more interest in recent literature. An ecosystem can be generally defined as a group of companies that interact with each other and are dependent on the activities of each other (Jacobides et al. 2018, 2256). Furthermore, it refers to a network of actors in which the partaking actors work interdependently towards common goals while providing products and services and co-creating value (Moore 1998, 168; Iansiti & Levien 2004, 36). Thus, it can be implied that the ecosystem concept aims to provide a new way of examining the value creating processes of different organizations as more complex interconnected entities instead of separate individual processes.

The growing significance of the ecosystem approach can be partly linked to the pressures many organizations face to focus only on their core activities to maintain their competitive position in the market (Williamson & De Meyer 2012, 30). This encourages companies to outsource some of their operations which is very common in the construction industry. The increased need for longer-term cooperation has even resulted in a rise of interest in partnerships between different actors in the industry in the past few decades (Gadde & Dubois 2010, 254). Especially strategic partnerships have been regarded as beneficial as they facilitate various benefits, such as better productivity, lowered costs, decreased project times, learning between projects and more effective use of resources (Bresnen & Marshall 2000b, 231). As companies form strategic partnerships with several actors and utilize these networks of partners from project to project it creates the

possibility of co-evolving together and finding new ways of creating value. This is because it has been suggested that informal relationships without any labels between actors in networks takes the pressure off the relationships and promotes genuine joint learning and cooperation (Holt et al. 2000, 416). Thus, it can be implied that strategic partnerships can offer the means for companies to bring together valuable actors and gradually form a functional business ecosystem with them.

As the construction industry is clearly in need of a transition from its firm-centric focus to a more collaborative state, business ecosystems could serve as the appropriate approach for this change. The ecosystem approach obligates the actors to not only collaborate but also be aware of and act according to collective norms and goals thus promoting the significance of the whole network (Thomas & Autio 2014, 21). Therefore, business ecosystems provide a more comprehensive analytical lens for examining how the industry can be developed from its current criticized uncreative state into a highly innovative and deeply cooperative environment.

1.2 Objective and structure of the study

Although there is an interest of applying the ecosystem concept to low-technology industries, the focus of academic literature on business ecosystems in the construction industry is quite narrow. There has been research on the general applicability of the concept to the industry (Pulkka et al. 2016) and studies on developing the effectiveness and productivity of construction through different platform-based ecosystems (e.g. Laine et al. 2017; Woodhead et al. 2018; Aksenova et al. 2019) however there seems to be a lack of research on a more relationship-based view on business ecosystems in the industry.

As the actors in the construction industry usually have bilateral and low involvement relationships with each other while business ecosystems require open and continuous cooperation between all of the participants, it is useful to examine if construction companies can utilize more familiar collaboration forms, such as partnerships, in bringing together a group of actors and gradually forming a co-evolving and co-creating business ecosystem. In addition, as most of previous literature on partnerships in the construction industry focus on project partnering between contractors and clients (Bygballe et al. 2010, 240) it was deemed as important to fill some of the research gap by narrowing the scope of this study to strategic partnerships between the contractor and supplier and subcontractors. Therefore, the main objective of this thesis is to investigate *how strategic partnerships can be utilized in the formation of business ecosystems in the construction industry.*

To provide a thorough understanding of the researched issue the following sub-objectives are answered:

- What characteristics influence the operations of the construction industry?
- What types of strategic partnerships are there in the construction industry?
- What is the role of business ecosystems in the construction industry?

The first sub-objective focuses on examining the unique features of the construction industry and the associated issues that have resulted in the need of an industrial renewal. The second sub-objective pursues to understand the significance of strategic partnerships in the industry. The third sub-objective explores what business ecosystems are and what their role is in the construction industry. The main objective of the thesis will be achieved by answering the sub-objectives with the help of previous literature on the matter and through empirical research conducted in the context of a new infrastructure construction concept, a parking garage concept. This concept is designed by a multinational construction company based in Finland and the idea of it is to shift focus from project-based cooperation to longer-term partnerships therefore creating a possible setting for an ecosystem. A more thorough explanation of the concept will be provided in chapter 5.2.

The structure of the thesis is as follows: first, the thesis will focus on presenting previous literature on the construction industry, strategic partnerships and business ecosystems. This will serve as the theoretical framework of the thesis and will help to understand the setting of the research. Then the research methodology used in this thesis is explained along with a description of the parking garage concept which is utilized as the potential setting for an ecosystem. Next, the findings of the empirical research will be presented with a thorough analysis of them. Lastly, the thesis will end by presenting the final conclusions from the study along with the limitations of the study and suggestions for future research.

2 THE CONSTRUCTION INDUSTRY

The construction industry is a large industry composed of numerous processes, products and services that are provided by various actors. In general, the term construction entails both the erection, upkeep and repair of different structures and also the demolition of these structures. In addition, land development is listed under the construction term. (Eccles 1981, 450; Nam & Tatum 1988, 134.) As construction encompasses a large variety of processes, the industry as a whole can be divided into smaller sectors. These sectors include infrastructure, building construction, construction product industry, surface contractors and heating, piping and air conditioning (HPAC) contractors (Toimialat 2020). As a result, actors in the industry work across sectors to provide different construction products, services and solutions to the society.

The importance of construction to society does not limit only to the construction industry but its significance can also be seen in other industries and sectors. The construction industry provides end products, such as buildings, roads and bridges, that are crucial for the daily functionality of society (Håkansson & Ingemansson 2013, 40). Pheng and Hou (2019, 25) emphasize that the industry produces investment goods that are utilized in helping to create other goods and services for consumption. This implies that the industry is highly dependent on the activities of other businesses and thus faces a highly volatile demand as it cannot on its own generate a demand for its products (Nam & Tatum 1988, 136). Therefore, there is a two-way dependency between the construction industry and the rest of the society. The demand is also affected by the costliness, immobility and other characteristics of the industry. For instance, usually construction happens only after the client has recognized the need for it and the products are rather immobile and complex which means that the industry is not able to accumulate stock to prepare for future demand. (Pheng & Hou 2019, 26.) There are some recurring materials, such as concrete elements, that can be prefabricated but often the requirements set by the client call for customized products.

The significant role of construction and its volatile demand have implications on the economy also in terms of labor. For instance, the level of unemployment in low business cycles is higher in construction than in other industries (Segerstedt & Olofsson 2010, 349). This is because construction products can be very costly which means that in uncertain times clients abstain from making large investments. In addition, the industry faces challenges in stocking up for future demand therefore when there are no orders for

construction the operations in the industry halt. However, in high business cycles the need for workforce is substantial because on-site work is labor intensive. This has resulted in the hiring of more unskilled people than any other industry as the need for labor cannot be fulfilled with the available skilled labor. (Segerstedt & Olofsson 2010, 349; Pheng & Hou 2019, 27.) The utilization of unskilled labor can however lead into various challenges at the work site, such as quality problems, because the unqualified workforce does not have the required competencies to handle the complex construction products. Thus, the need for competent labor is often attempted to fulfill with the help of foreign labor. The increased use of foreign labor during the past years has pushed construction companies to reflect and possibly develop their own ways of operating because workforce from other countries may have new capabilities and new working methods that are introduced to the current processes. (Håkansson & Ingemansson 2013, 54.) However, it should be noted that the industry is slow to adjust to changes therefore the adaptation of new methods can take long periods of time. There may be several reasons why the construction industry is passive in terms of development but the industry's unique characteristics have commonly been seen as a major hindrance of advancements.

2.1 Main characteristics of the construction industry

It is a common statement that the construction industry has several distinctive characteristics which differentiate it from other industries. These characteristics include degree of specialization, project-based nature, immobility, durability of products and fragmented structure (Nam & Tatum 1988, 133; Dewick & Miozzo 2002, 824; Segerstedt & Olofsson 2010, 348; Pulkka et al. 2016, 131). Many explain that these features are the main reason for lack of innovation, particularly technological innovation, and lack of improvements in efficiency in the industry (Nam & Tatum 1988; Dubois & Gadde 2002; Pulkka et al. 2016). This suggests that traditional means for increasing efficiency, such as mass production of products, are not seen as suitable in construction thus creating a need for other solutions or resulting in the reinforcement of the current stagnant nature of the industry. However, the slow rate of technological integration and innovation in addition to the special characteristics of construction should not be used as an excuse for the status quo state of the industry. The shipbuilding industry which shares similar features with the construction industry, such as its project-based nature, has been able to develop its outdated processes into efficient ones despite of its peculiarities. This is why it has been proposed that

construction should not rely on getting along with its current inefficiency but instead learn from the shipbuilding industry. (Salminen 2016, 23.)

One of the features most often linked to the construction industry is immobility. Traditionally, not only the end product is immobile but also the production process of the constructed product occurs at the place of consumption (Nam & Tatum 1988, 134). This emphasizes how the industry is usually closely tied to its local environment. International markets are important especially for the construction product industry and many companies utilize foreign labor and materials in their projects but the actual construction process of different projects is guided and controlled by national regulations and local culture (Segerstedt & Olofsson 2010, 348). Thus, the importance of local knowledge is crucial in the industry which is why foreign operations and subsidiaries are usually run by a local management team (Ahonen et al. 2020, 119).

The immobility and locality of construction also affects the material flows of each construction project. Each of these projects require various materials from multiple domestic and international suppliers delivered to the site which means that the project managers have to carefully and effectively plan the timely arrival and utilization of the materials and the orchestration of all parties involved (Gidado 1996, 213). This calls for seamless cooperation from multiple actors which in reality can often be challenging or even impossible. It has been stated that about a third of the productive work at construction sites is in fact paid idle time which is the result of poor coordination of various processes at the sites (Aapaoja & Haapasalo 2015, 110). Incoordination between suppliers and subcontractors can cause tension among these actors due to unwanted delays, for example, which highlights the importance of facilitating concurrent and well-timed material flows and processes throughout the lifespan of project production.

The high level of social responsibility of the construction industry to the society has resulted in the high level of specialization of the industry. Construction is known for its complex products which require different materials and equipment and are regulated through various regulations and conditions which in turn has contributed to the need for specialized knowledge and expertise. (Nam & Tatum 1988, 136–137; Pulkka et al. 2016, 131.) As the industry encompasses a large variety of specialized actors, it highlights the importance of cooperation between complementary actors in order for the industry to provide products and solutions to the public. This is why the role of subcontractors and suppliers of different materials is extremely crucial in construction (Dubois & Gadde 2000, 207). The utilization of subcontractors and suppliers is also a way for construction

companies to mitigate potential risks (Segerstedt & Olofsson 2010, 351) as the subcontractors, for instance, may have better resources and superior skills to perform certain tasks.

However, as the significance of complementariness of the actors and the materials and services they provide is emphasized whilst their level of complexity is increased, it can cause difficulties between actors. When the complexity of different processes and their individual components is increased by quality and cost demands, work safety requirements, technological advancements of products and services and environmental concerns it becomes more challenging for actors to fit their inputs together in a complementary manner (Gidado 1996, 214; Pulkka et al. 2016, 132). This highlights how companies may be reluctant to make changes and developments in their processes and materials because the high level of different regulations makes it challenging to cooperate in the already fragmented industry.

It has been often noted that the construction industry is highly fragmented when examined from several aspects. One of the most distinctive signs of fragmentation in the industry is separation between the design and construction process which can affect the productivity and innovativeness of different projects (Nam & Tatum 1988, 142; Segerstedt & Olofsson 2010, 348; Pulkka et al. 2016, 131). When designers make designs of projects without the skills and accumulated knowledge of experienced construction companies the probability of future rework is higher which is costly in both time and money to all the actors working at the project (Love et al. 1999, 8). The lack of cooperation between the designers and construction companies also prevent advances in construction technologies and innovation activity as the companies cannot share knowledge on practices that have been successful or unsuccessful in previous projects. This can encourage designers to utilize the same technologies and practices that have been prevalent in past years and restrict possible development in the industry (Nam & Tatum 1988, 143).

The fragmentation and lack of innovativeness and cooperation of the construction industry can also be credited to the project-based nature of the industry. Skaates et al. (2002, 391) suggest that the significance of individual projects increases as the level of complexity increases thus implying that the project-based nature of the construction industry is strengthening. However, the focus on individual projects has raised concerns as it has contributed to many issues that are seen as unbeneficial for the industry. For instance, as every construction project requires a unique set of technical, financial and socio-political resources it promotes discontinuity between projects (Skaates et al. 2002,

391). Dubois and Gadde (2002, 625) further emphasize that it is rare that same teams work together on several projects and if they do it is usually coincidental and their roles have been altered in some way.

Competitive tendering is one of the reasons why the roles of companies can change from project to project and why relationships are seen as short-term. Traditionally, clients choose a contracting model which pushes contractors to compete for the project therefore often resulting in the selection of a different contractor for each project (Nam & Tatum 1988, 143). In addition, the contracting models include conditions and demands for each project that clearly control what is also expected from the suppliers and subcontractors chosen by the main contractor to minimize the potential risks related to the projects (Peltonen & Kiiras 2013, 40). Furthermore, Cox and Thompson (1997, 129) state that the main contractor in turn utilizes competitive tendering to ensure that subcontracting is executed by the lowest-price actor and the risks can be further mitigated in the supply chain. This demonstrates how even if contractors and suppliers and subcontractors have aspirations to develop their relationships and operations, the influence of clients and the contracting models they choose can hinder these efforts. Therefore, the competitive tendering and current contracting models do not promote the formation of deeper and long-lasting relationships between actors.

Furthermore, the duration and depth of relationships between contractors and suppliers and subcontractors are strongly controlled by the formal contracts made between them. As the contracts are made for clarifying responsibilities and defining the relationships between parties and as main contractors utilize several subcontractors and suppliers simultaneously, the process has been facilitated by the creation of standardized subcontracts. (Kankainen & Pekkanen 2006, 561–562.) Even though the specifics of the contracts are negotiable these legal agreements are often examined to be inflexible in time and they greatly dominate how the relationships progress. As Cox and Thompson (1997, 128) emphasize, traditionally the function of relationships in the industry has been to deliver the procured material or service therefore when the business objective has been reached usually the maturity of the relationship has been reached as well.

2.2 Infrastructure construction

Infrastructure construction will be examined in more detail because the case concept of this thesis focuses on parking garages which are common infrastructure products. Infrastructure construction is one of the main sectors of the construction industry and it

provides the technical structures that enable the daily functioning of society. In general, the infrastructure sector can be divided into three different market areas: property construction, construction of community structures and construction of connections between communities. The property construction market entails different site preparation works of buildings, parks, wind turbines and environmental construction projects, for example. (Vainio & Nippala 2013, 6.) Construction and maintenance of streets, water supply, district heating and distributing networks of electricity are included in the community structures market. The construction of connections between communities in turn entails all the structures that enable activity between these communities such as roads, railroads, bridges, tunnels, ports, airports and technical networks through which electricity, heat and information are distributed. (Vainio & Nippala 2013, 6; Tietoa alasta 2020.) Thus, the infrastructure sector is responsible for a variety of complex and large end products.

The role of main contractors, subcontractors and suppliers in the complex infrastructure sector is undoubtedly important but clients also play a crucial role. Especially public clients are prominent in the sector as the community structures and the connections between communities are important to the daily operations of the society thus are an interest to municipalities and the state (Tietoa alasta 2020). Even though the role of the client is important in construction projects, the level of involvement may vary between projects as the client may appoint a main contractor to subcontract all activities of the project or it may choose to execute these tasks within its own network (Dubois & Gadde 2000, 211). Also, the level of past experience of the client may affect the outcome of projects significantly. Barlow (2000, 975) identifies that experienced clients, especially different government bodies, have more demanding requirements for construction projects as they want to raise the standards of the industry to a higher level. In addition, as the share of clients from the public sector is large in infrastructure projects, these projects are subjected to different requirements and demands set for the public actors. Municipalities and the state face different financial and legislative restraints, such as expenditure budgets, that are not imposed on private sector clients in the same manner (Cox & Thompson 1997, 131). Infrastructure projects are therefore exposed to both direct and indirect demands and requirements from the client.

Companies of the infrastructure sector face several challenges due to their prominent role in the society. As the ongoing and planned projects in addition to previously constructed infrastructure projects affect the daily activities of other industries, businesses and people, these actors are often very interested in the various aspects of the projects.

This can cause difficulties because the involvement of different stakeholders with diverse interests in the matter at hand can result in conflicting priorities and disagreements (Karlsen et al. 2008, 8). Clashing priorities force the companies of the infrastructure sector to reflect on how the projects can be executed without causing conflicts by dismissing the requirements made by some stakeholders. In addition, these companies have to take the ever-growing interest in sustainability into consideration as stakeholders have become more aware of the negative impacts of construction to the environment. Especially construction materials contribute to the deteriorating of the environment because nonrenewable resources are utilized in the production of them. Moreover, as infrastructure products are often large they require substantial amounts of different materials. This has urged the creation of various sustainability legislations and widely approved objectives, such as CO2 emission objectives, which optimistically will make the industry more sustainable in the long run. (Mahamadu et al. 2016, 16–17.) However, this requires the efforts from all the actors in the industry as finding alternative materials and solutions can be time-consuming in the slowly adaptive industry.

2.3 Need for an industrial renewal

Even though the effects of the distinctive features of the construction industry have been apparent for years to actors inside and outside of the industry, the development in terms of relationships and productivity has been slow and the demand for an industrial renewal is still present (Håkansson & Ingelmansson 2013, 41). The effectiveness and productivity issues of the construction industry have been tried to approach through different methods which have influences from other industries. For instance, there has been interest in implementing offsite and takt construction to different projects in the hopes of standardizing processes and materials and tackling some of the issues caused by the core characteristics of the industry (e.g. Larsson et al. 2014; Frandson et al. 2013). Offsite construction, also referred to as prefabrication, allows companies to standardize and prefabricate some of the elements of the construction products to facilitate the construction process (Goulding et al. 2015, 163). Takt construction, in turn, refers to the standardization of processes at the worksite to ensure timely finishing of processes (Frandson et al. 2013, 527).

Offsite construction is closely related to the manufacturing industry as it concerns the prefabrication efforts of construction (Goulding et al. 2015, 163). By standardizing and prefabricating some of the recurring products used at construction projects it enables various benefits to emerge. For example, it has been suggested that prefabrication

facilitates better quality control in a controlled environment, increases effectiveness of processes and resource use, reduces the amount of waste, provides safer working surroundings and enables greater economies of scale (Arif & Egbu 2010, 537; Aapaoja & Haapasalo 2015, 111; Goulding et al. 2015, 181). This is because future demand of materials and labor can be better predicted and collaboration between actors can be planned ahead of time.

However, even though the potential benefits are appealing the adaptation of prefabrication and standardized products is complicated. For instance, especially infrastructure construction products are complex which is a major hindrance for the utilization of standardization in the industry. As the demands of clients become more complex construction companies are forced to utilize project-specific solutions which can greatly vary between different projects. When the industry fixates on the common view that all products are unique and have to be customized for each project it prevents people from seeing aspects that could actually be standardized in even the slightest way. (Aapaoja & Haapasalo 2015, 112, 114.) This emphasizes how offsite construction requires changes in the deep-rooted traditional views and ways of working in the industry which can be challenging due to the slow nature of the industry.

Standardization efforts in the construction industry do not only concern materials but also the various processes needed to assemble the materials into complete products. The standardization of these processes is closely linked to takt construction which mainly concentrates on improving the efficiency of the production process at worksites (Aapaoja & Haapasalo 2015, 114). “Takt” is a German word which means “rhythm” and takt time is used as a unit of time during which the constructed product has to be built to ensure the timely completion and smooth flow of processes (Frandson et al. 2013, 527). In other words, takt construction is used to clearly state where and in which order processes must be executed at the worksite and who is responsible for each of these processes. Thus, it can help to decrease the high level of paid idle time at worksites (Aapaoja & Haapasalo 2015, 110).

In addition to more defined interfaces and increased effectiveness, some of the other identified possible benefits include better quality, time savings and decrease of disruptions or surprises during production (Frandson et al. 2013, 530; Aapaoja & Haapasalo 2015, 112). However, the implementation of takt construction can be challenging because it requires more collaborative and precise interactions between different actors and higher utilization level of technology. Aapaoja and Haapasalo (2015, 112) emphasize that

especially the lack of cooperation due to the fragmented nature of the construction industry negatively impacts the adaptation process of standardization in the industry.

The level of cooperation and relationships is a significant topic when discussing the need for an industrial renewal in the construction industry. In order for the industry to reach a higher degree of effectiveness through takt and offsite construction, for example, a major change in interorganizational collaboration and relationships is inevitable. Several researchers have identified that there has been a growing interest in partnerships and strategic alliances in the industry in the past few decades (Bresnen & Marshall 2000a; Beach et al. 2005; Bygballe et al. 2010; Gadde & Dubois 2010) but historically relationships in the industry have mostly been based on market forces. For instance, contractors have many arm's length relationships with suppliers of the same category because it enables them to generate competition between the suppliers, thus ensuring the most suitable price for the procured product (Gadde & Dubois 2010, 257). This also allows the actors to avoid dependance on each other which is a common occurrence in an industry with a low level of trust.

Nevertheless, companies have become more aware that relying on only distant relationships is not favorable in the modern society. For example, different stakeholders have started to demand more from the constructed products, such as sustainability and technological aspects, which companies cannot provide on their own (Dewick & Miozzo 2002, 823–824). In addition, for the companies to really understand how they can better include the expectations and demands of stakeholders into their operations and products they must continually collaborate to ensure learning between projects. This has pressured various actors to explore different forms of deeper cooperation, such as strategic partnerships, which have been beneficial in other industries.

However, as the level of interdependency and connectivity in the business environment is constantly increasing (Aarikka-Stenroos & Ritala 2017, 23) the focus on purely bilateral partnerships may not be sufficient enough in answering to the prevailing issues in the long run. Competition in other industries has already shifted from between companies into competition between entire business ecosystems meaning that networks of cooperative and co-evolving actors across industry boundaries are competing for the same market share (Eamon 2015). As the construction industry is slowly advancing in terms of technology, for example, different business ecosystems are bound to emerge. Therefore, by securing a valuable group of strategic partners already in the early stages of an industrial reform enhances the possibility of forming a competitive business ecosystem for

future competition. These business ecosystems can be then utilized in the tackling of some of the previously identified widespread problems such as lack of coordination and productivity issues. The summary of the problems identified are presented in Table 1.

Table 1 Summary of identified problems in the construction industry

Characteristic	Associated problems
Immobility	Poor coordination between actors at worksites, paid idle time, unwanted delays
Specialization and complexity of products and processes	Challenges in fitting inputs together, reluctancy towards developing products and processes, hinders standardization efforts
Fragmentation of different actors	Higher probability of rework, prevents development of technologies and practices, hinders standardization efforts, low level of trust
Project-based nature	Discontinuity between projects, competitive tendering, emphasis on formal standardized contracts, short-term relationships

As these problems are hindering the development of the construction industry it is crucial to examine in more detail how business ecosystems can actually improve the current situation. The ongoing ways of operating are undoubtedly not sufficient enough thus the industry has to be open for new options. Therefore, the ways business ecosystems can solve some of these identified problems in the construction industry will be analyzed more carefully in chapter 4.5.

3 STRATEGIC PARTNERSHIPS

In this chapter the different elements of strategic partnerships are examined in more detail. As one of the aims of the case concept of this thesis is to form strategic partnerships with different suppliers to provide an effective parking garage solution to clients with the effort of the whole network, it is beneficial to examine the required elements and expected benefits of these partnerships.

3.1 Defining strategic partnerships

Collaboration between different organizations is more of a necessity than an option nowadays as it is becoming more difficult to answer to the growing demands of customers alone. Partnerships have become a popular collaboration form because there are various levels which they can be executed at. In the construction industry partnerships are usually divided into two categories which are project and strategic partnerships (Bygballe et al. 2010, 241; Gadde & Dubois 2010, 258). Project partnering refers to relationships that are formed for a specific project therefore are short-term and focus on the transactions between the partners whereas strategic partnerships refer to more intense and strategic collaboration that extends across multiple projects (Beach et al. 2005, 613). However, it should be mentioned that project alliances are becoming more visible in the construction industry and they can be viewed as a hybrid of project and strategic partnerships. Project alliances are collaborative relationships between companies that share a joint liability of a project (Salminen 2017, 103). Therefore, it can be implied that these alliances follow the duration of project partnerships but require the more comprehensive collaboration of strategic partnerships.

Moreover, Ståhle and Laento (2000, 103) suggest that partnerships can be divided into to three different levels which are operative, tactical and strategic. Operational partnerships can be linked to project partnerships as they focus mostly on the buyer-supplier relationships of the participants. Tactical partnerships concentrate on finding a common way of operating by learning from each other and by combining ways of working to remove overlaps and create savings. Strategic partnerships, just as in the construction industry, are longer-term collaborative relationships where the participants aim to create significant strategic advantage. (Ståhle & Laento 2000, 103.) Thus, in strategic partnerships the partners share a strong level of dependency and trust with each other.

Strategic partnerships can be challenging to define because there are several views on what these partnerships actually entail. Moreover, the interpretation of strategic partnerships can vary depending on the context they are viewed in. Generally, strategic partnerships can be defined as highly interdependent relationships between companies who seek to gain collective benefits, share compatible goals and cooperate to reach common goals that would not be achievable alone (Mohr & Spekman 1994, 136). Ståhle and Laento (2000, 93) emphasize that the cooperation must entail sharing of intellectual capital to ensure that the partners obtain strategic advantage from the partnership such as product or business innovations. Therefore, companies have to carefully consider what is the right level of openness with each strategic partner to support the success of the relationship but also to protect their own vulnerability.

In the construction industry, strategic partnerships are mostly used to distinguish longer-term collaboration between multiple projects from the traditional short-term and project-based cooperation (Beach et al. 2005, 613; Bygballe et al. 2010, 24; Gadde & Dubois 2010, 258). However, it is understood that strategic partnerships include various aspects thus there are more extensive definitions for them. For instance, the Construction Industry Institute (1991, according to Beach et al. 2005, 613) defines strategic partnering as a long-term collaboration between organizations that strive to attain predefined business objectives by maximizing the effective use of the resources of the partners. Moreover, the partnership requires the participants to integrate operations and processes to ensure long-term commitment (Lönngren et al. 2010, 405). This is supported by Beach et al. (2005, 613) who identify that some of the common resources must be invested in the development of the relationship. Therefore, strategic partnerships can be viewed as a means to deal with both the poor relationships of the industry and the considerable productivity issues. However, it should be acknowledged that even though there is a general understanding of what strategic partnerships mean the definition of them is still imprecise due to the vast group of practices, tools, values, attitudes and techniques that can be linked to them (Bresnen & Marshall 2000b, 231).

Although strategic partnerships are an attractive form of closer collaboration due to several potential strategic, economic and technological advantages, many of these partnerships fail to succeed (Mohr & Spekman 1994, 136). As there does not exist a universal approach to strategic partnerships, the motivations or foundations for the partnerships may not be strong enough. Therefore, potential partners must ensure that they have open and honest communication with each other so that other crucial elements for the success

of the partnership can be defined (Monczka et al. 1998, 567; Mohr & Spekman 1994, 138; Beach et al. 2005, 615). Some of the most common elements for strategic partnership success are presented next.

3.2 Elements of strategic partnerships

Strategic partnerships have a strongly dependent nature and require much more effort than other forms of partnerships which is why there has been a lot of interest in why these partnerships are not always successful and what elements are usually present when they are considered to be a success. Ståhle and Laento (2000, 26) identify that there are three crucial elements for success which are intellectual capital, added value and trust. All of these elements are closely connected as partners combine intellectual capital in the hopes of increasing the level of strategic advantage of the partnership thus creating added value for the participants. Mohr and Spekman (1994, 138) emphasize that the shared knowledge must be accurate, relevant and timely to ensure that it can be utilized in achieving the goals of the partnership. Moreover, for partners to even share sensitive intellectual capital with each other there must be a high level of trust (Ståhle & Laento, 103). In other words, trust can be considered as the basis for strategic partnerships but the roles of shared information and added value are also significant.

Sharing of information is an important aspect of any collaboration form however in strategic partnerships the content of the information is different. Strategic partnerships require the participants to share critical information often about core competencies because it creates the opportunity to find new business innovations from the combined pool of information (Mohr & Spekman 1994, 139; Ståhle & Laento 2000, 94). This information can include know-how, customer networks, future projects, experience and financial information, for example. Therefore, the more information the partners are willing to share the higher the level of potential added value is but also risk. In addition, the sharing of sensitive information can be a gesture of goodwill and confidentiality which can help to increase the credibility and trustworthiness of a partner thus encouraging the other partner to reciprocate (Das & Teng 1998, 504–505). Information sharing is also important in terms of flexibility and adaptivity. When partners share timely and accurate information and become more aware of each other's capabilities it creates an environment where the partnership can adapt to the changes of uncertain markets, for example (Beach et al. 2005, 616). By being adaptive and flexible, changes in prevailing conditions are not

seen as threats to the partnership but opportunities to find new innovations and added value.

Trust is an important prerequisite for information sharing and for the general process of forming strategic partnerships. Trust can be defined as the assumption organizations share with each other that they both behave in a commonly accepted manner while honoring their own and each other's vulnerabilities (Sako 2006, 268; Rousseau et al 1998, 395). This is important in strategic partnerships where partners share knowledge that in the wrong hands could potentially negatively affect the competitive advantage of the partners. When the amount of tacit and critical knowledge is high the need for trust is also high (Ståhle & Laento 2000, 54).

The development of trust requires a lot of time and effort which is why shared experiences, shared learning, commitment, common values and communication are important factors for the process (Mohr & Spekman 1994, 137–139). Especially open and continuous communication between partners is crucial for the development of a trusting partnership. Communication naturally entails information sharing but it also includes discussions on mutual values, norms and differences (Das & Teng 1998, 504–505). Being on the same wavelength about values and norms helps the partners to stay committed and work towards their collective goals. Moreover, when partners regularly communicate about their differences they are able to solve possible problems through shared conflict resolution techniques and avoid destructive conflicts (Mohr & Spekman 1994, 139; Das & Teng 1998, 504).

As building of trust is a long-term process, shared experiences and learning are central from this perspective. When partners receive positive outcomes from shared projects, for example, it supports the significance of the formed strategic partnership and reinforces the feeling of trust between the partners (Beach et al. 2005, 619). Furthermore, the partnerships have to have learning mechanisms, such as feedback processes, which allow the partners to reflect on what should be done differently in the future and what aspects have been successful so far (Holt et al. 2000, 418). This encourages the participants to commit to the maintenance and development of the partnership thus increases the level of trust. In addition, as the shared experiences and learning opportunities accumulate and level of trust increases, the need for formal structures decreases in the partnership. Formal structures, such as partnership contracts, are important gestures of expectations, commitment and trust in the initial stages of the partnership however informal mechanisms, such as

social dynamics between the partners, can become a significant aspect in the flow of the partnership (Bresnen & Marshall 2000b, 232).

The current low level of trust, information sharing and productivity in the construction industry require companies to find ways to facilitate the formation of strategic partnerships and work harder towards the success of them. Even though some of the prominent characteristics of the industry, such as irregular and infrequent relationships, hinder the building of trust between actors (Gadde & Dubois 2010, 257) there are some processes and techniques that can help to achieve and manage the needed elements for strategic partnerships. For example, the increased interest in standardization in the construction industry can facilitate the formation of long-term relationships especially between main contractors and suppliers (Bygballe et al. 2010, 244). When the actors frequently work together around the same product it enables the actors to give feedback and development ideas to each other thus promoting shared learning and building of trust.

Partnering workshops or meetings have also been identified as being beneficial in the development of trust and understanding between potential partners as the workshops pose as a channel for voicing expectations and problems, for example (Beach et al. 2005, 618; Lönngren et al. 2010, 409). Usually communication between different companies in the industry is poor therefore the need for different mechanisms for promoting more open communication is high. Even though the formation of strategic partnerships in the construction industry is possible, Gadde and Dubois (2010, 262) emphasize that the industry-wide shift towards strategic partnerships is realistically a very slow one as the adaptation of these partnerships require major changes in the intrinsic conditions of the industry.

3.3 Benefits and shortcomings of strategic partnerships

Strategic partnerships in general have been attributed to several significant benefits which is why their appeal has been on the rise. Often companies form strategic partnership to gain access to new markets and technologies or to attain the means for providing a broader range of products or services (Mohr & Spekman 1994, 135). This way companies can improve their competitive position when they cannot do it alone or lower their production and transaction costs, for example. In addition, through strategic partnerships companies can acquire know-how, tacit information or capabilities from the partner that they can use to further develop their own core competencies (Kale et al. 2000, 218). Although partners have individual objectives when entering a strategic partnership it is important to remember that the partnership continues only as long as both parties perceive they are receiving

benefits from the partnership (Monczka et al. 1998, 556). Therefore, benefits gained through the partnership must be distributed equally.

Even though there is some skepticism towards strategic partnerships in the construction industry, there are several identified benefits from more collaborative and longer-term relationships in the industry. One of the most criticized aspects of the operations in the industry is that when companies focus on individual projects it creates the need for a steep learning curve at every project (Cox & Thompson 1997, 128). This causes inefficiency costs as every project has to be started from square one. In strategic partnerships continuous learning and improving is promoted between projects therefore eliminating the need for a completely new learning curve at every project (Bresnen & Marshall 2000b, 231). Benchmarking, for example, is an actively used method to ensure that the most effective processes and practices are transferred between projects (Gadde & Dubois 2010, 261). This can help to reduce unproductive idle times at worksites and increase the quality of work as companies are more aware of the best practices.

Moreover, when the productivity of projects is increased the expected cost savings are substantial (Bresnen & Marshall 2000b, 231). Cost savings are also generated through the decreased need for rework at worksites. Strategic partnerships enable key players to participate in the early stages, such as the design phase, of the construction process thus enabling the utilization of their expertise and know-how in technical decisions (Beach et al. 2005, 615). The early prevention of poor execution decisions thus increases the probability of reaching or even exceeding performance goals in terms of quality, cost and time as resources are not used for additional work.

In addition to decreasing the amount of unpredicted work at projects, strategic partnerships enable companies to bring stability into their operations. Strategic partners usually share information about potential future projects, for example, which can help especially the supplier to effectively plan the distribution of their resources (Bresnen & Marshall 2000b, 231). This also operates as a guarantee for the contractor that the needed resources for the future project are secured. Moreover, it eliminates the need for competitive tendering at each project therefore decreasing the costs related to the tendering process (Gadde & Dubois 2010, 260).

More collaborative and longer-term relationships have also been suggested to increase the overall satisfaction between partners. For instance, in a study of main contractor and supplier partnerships by Beach et al. (2005, 617) 47 percent of the respondents had noticed a decrease in the number of conflicts with the suppliers they had partnered

with. Furthermore, Bresnen and Marshall (2000a, 829) identified in their study that especially the ways disputes were addressed and resolved in partnerships increased the level of satisfaction between partners. When partners have open communication and trust between each other it can decrease the inclination to resolve conflicts through legal actions, for example.

While strategic partnerships offer several potential benefits, the partnerships may not always lead to the desired outcomes. One of the reasons for this is that partners fail to transmit crucial information about the strategic aspects of the relationship between different levels of their respective organizations which can prevent the partners from working according to collective values towards mutual objectives (Gadde & Dubois 2010, 255). In addition, as partners are continuously pressured to improve the performance of their operations it can cause a lot of tension in the partnership thus increasing the possibility of disagreements between the partners (Bresnen & Marshall 2000a, 829). Therefore, partners should have realistic expectations towards the outcomes of partnerships and be aware that partnerships do not always guarantee a higher level of performance.

It should be noted that sometimes strategic partnerships can even cause serious damage to partners. For instance, some companies engage in these partnerships only to behave opportunistically meaning that they exploit the relationship to get access to the partner's know-how and capabilities (Das & Teng 1998, 491). Kale et al. (2000, 217, 219) further argue that companies can even lose their core capabilities to their opportunistically behaving partners. Thus, even though the information sharing element of strategic partnerships is crucial for the success of the partnership it can also pose as a great risk to the partners. Therefore, as some choose to rely on opportunistic ways to answer to the increasing level of competition, it is important that companies consider carefully who they form strategic partnerships with.

4 BUSINESS ECOSYSTEMS

As the ideal future state of the case concept can be viewed as a form of a business ecosystem, it is crucial to understand what elements and structures are relevant for business ecosystems. Therefore, this chapter will examine business ecosystems in more detail. Moreover, this chapter concludes how strategic partnerships can be utilized as a foundation for the formation of business ecosystems in the construction industry and what potential benefits creating such in the construction industry could entail.

4.1 Defining business ecosystems

As the social and cultural shifts of society, increased level of available technology, sustainability challenges and the more open ways of interaction between different stakeholders of business have made the field even more complex, the ecosystem concept has emerged as a way to describe the increased interconnectivity of different actors (Aarikka-Stenroos & Ritala 2017, 23). This approach enables a more extensive view of how the dynamics of cooperation and competition are becoming more interdependent and how companies are becoming more dependent on each other than ever before. The need for a new approach for examining networks is derived from how businesses cannot rely on only improving their own internal competencies but have to focus on maintaining the collective health of the whole ecosystem they are part of (Iansiti & Levien 2004, 11).

In previous literature, business networks have been extensively used to explain the horizontal and vertical relationships of cooperating actors therefore ecosystems and business networks are closely related to each other (Gulati et al. 2000, 203). However, the ecosystem approach entails a broader network of participants, such as governmental agencies loosely tied to the ecosystem, thus being a more extensive perspective than a business network (Heikkilä & Kuivaniemi 2012, 19). In addition, ecosystems do not focus only on the bilateral relationships between actors but also the multilateral interdependence within the participants of the ecosystem (Adner 2017, 42). This differentiates business ecosystems from strategic partnerships as well as strategic partnerships usually focus only bilateral relationships. Thus, the ecosystem approach may provide a more useful perspective for examining the interfirm relationships formed to adjust to the increasing complexity of doing business.

Although ecosystems are a trending topic in business literature, scholars have been unable to form a unified definition of the term in a business context. Moore (1993, 76)

initiated the utilization of the analogy by stating that business ecosystems comprise of different actors that work in a cooperative and competitive manner to provide solutions to customers. The simultaneous competition and cooperation between various actors are visible in natural ecosystems which is why the term is considered suitable for examining extensive business networks. The actors of the ecosystem include suppliers, producers, labor unions, government agencies, other stakeholders and customers therefore traditional views of industrial boundaries should be forgotten (Moore 1998, 168–169). The general structure of the business ecosystem is demonstrated in Figure 1.

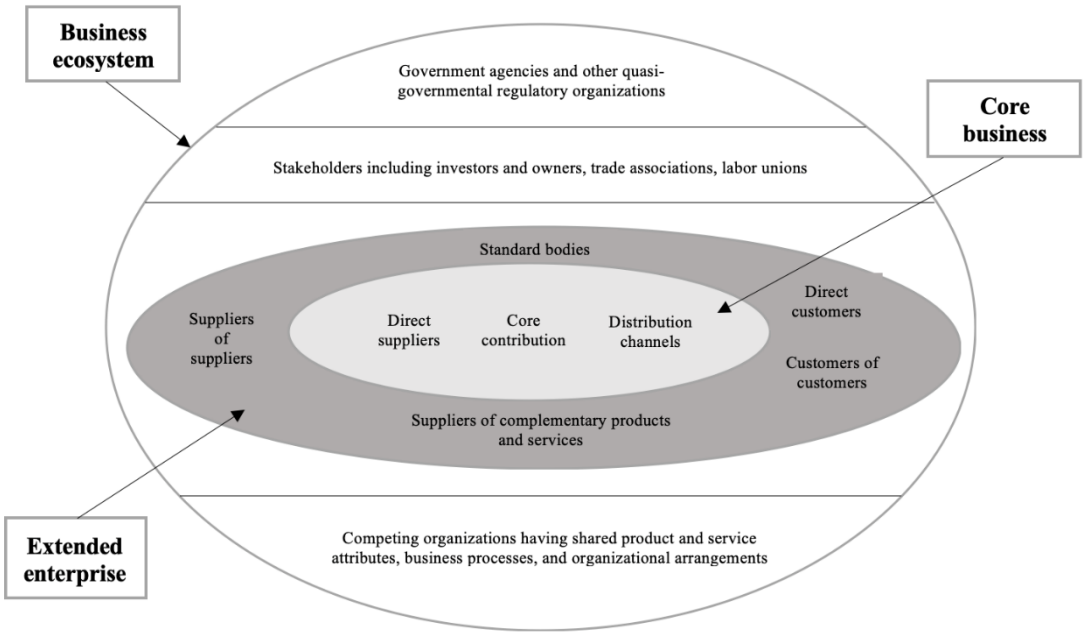

Figure 1 Business ecosystem (Moore 1996, 27)

According to Moore (1996, 27) business ecosystems can be divided into three different levels which are core business, extended enterprise and business ecosystem. The core business level entails actors that are the most committed to the business, the extended enterprise level includes second-level suppliers, complementors and customers of the business and the business ecosystem level recognizes the role of government agencies and different stakeholders, for example, to the business. By understanding that the operations of every business are affected by not only the core business actors but an extended network enables businesses to be more prepared for potential opportunities and challenges in the future. This is because some actors can have a significant impact on different operations without being directly involved in the business (Heikkilä & Kuivaniemi 2012, 20). Thus, this view of business ecosystems emphasizes the number of actors connected

to a central organization and how these actors interact with each other to create value (Adner 2017, 41).

Even though Moore's definition of business ecosystems is very vague and can entail any networks the concept has gained a lot of interest in the past decades. The vagueness of the concept has encouraged many scholars to present their own interpretations of it thus increasing the fragmentation and confusion around business ecosystems. For instance, Iansiti and Levien (2004, 8) also work with the ecosystem analogy and suggest that business ecosystems are composed of loosely tied actors that share a common fate therefore depend on each other for collective effectiveness and survival. These ecosystems also entail a focal organization, a keystone, which regulates the health of the ecosystem. Peltoniemi and Vuori (2004, 13) do not base their definition directly on natural ecosystems but recognize that business ecosystems are self-sustaining dynamic structures that are comprised of interconnected organizations. Moreover, Adner's (2017, 42) definition is further disengaged from the natural ecosystem analogy as it emphasizes the role of a central value proposition and how a multilateral group of organizations align their operations around it. Even though there exists multiple definitions for the concept it is evident that all views emphasize the interconnected nature of the participating actors. This explains the increasing interest in the concept as the already highly networked society is becoming even more connected and complex thus requiring new ways of examining business relationships.

The emergence of ecosystems in various settings has resulted in the utilization of the term in similar yet differing situations. This has led to more specific definitions of different types of ecosystems however the division between the types can vary a lot. For instance, according to Jacobides et al. (2018, 2256–2257) ecosystems can be divided into three categories: a business ecosystem approach which focuses on an individual company and its environment, an innovation ecosystem approach which concentrates on a certain innovation or value proposition and the organizations around it and finally a platform ecosystem approach focused on the arrangement of different actors around a technological platform. The types identified by Valkokari (2015, 20) also include business and innovation ecosystems but the third type is classified as knowledge ecosystems. Business ecosystems utilize different resources to produce customer value, knowledge ecosystems emphasize the creation of new knowledge and technologies whereas innovation ecosystems combine the main aspects of the previous two meaning integration between resources and new knowledge to create innovations for customer value. However, Thomas

and Autio (2014, 3–4) argue that ecosystems should not be restricted into the mentioned categories but the ecosystem concept should be considered as a more extensive analytical lens for examining networks collectively creating value. These varying views demonstrate the challenging nature of determining a shared definition for the concept in a business context.

This thesis focuses on business ecosystems which are defined as networks of various interdependent actors that provide solutions which require the complementary inputs from all parties involved (Thomas & Autio 2014, 1; Pulkka et al. 2016, 129; Jacobides et al. 2018, 2256). The business ecosystem concept is not viewed as an established business model but as a continuingly evolving perspective for examining the ways organizations co-evolve and co-create value in a larger network. Thus, the emphasis is on the participating actors that usually assemble around a central firm and strive to gain benefits by creating customer value (Valkokari 2015, 20). The ecosystem is comprised of both formal and informal relationships between the actors which enables flexibility (Jacobides et al. 2018, 2261). Furthermore, the participants are committed to the ecosystem by sharing a common vision and agreement of the development of the shared project (Koenig 2013, 79). Thus, the element of interdependency is strongly present. Moreover, the focus on business ecosystems in this thesis does not mean that the importance of technological platforms in the operations of ecosystems is downplayed. Often the keystone company provides some kind of a platform that enhances the performance of the ecosystem and is available to the participating actors (Iansiti & Levien 2004, 70). Therefore, platforms are considered as beneficial tools for the operations of ecosystems but they are not the basis for the existence of business ecosystems.

4.2 Roles in business ecosystems

As actors can be part of several business ecosystems simultaneously, these actors can have different roles in each ecosystem. Scholars have presented various conceptualizations of the roles to give insights of the strategies and behaviors that can be linked to them. One of the most known conceptualizations is by Iansiti and Levien (2004, 68) who identify three significant ecosystem roles which are keystone, dominator and niche player. All of these roles entail opportunities to affect the operations of the ecosystem and to gain benefits from it.

Keystones or hubs are central actors that actively pursue to improve the collective health of the entire ecosystem by creating and sharing value (Iansiti & Levien 2004, 72).

Other scholars have also recognized the significance of a central actor and refer to it as leader (Moore 1993, 76; Ander 2017, 48), lead firm (Williamson & De Meyer 2012, 25), architect (Gulati et al. 2012, 573) and ecosystem captain (Teece 2014, according to Jacobides et al. 2018, 2258). Many companies strive to be the central actor of an ecosystem but it should be noted that the leadership is not self-generated. Other actors of the network have to willingly accept and value the role of the leader (Moore 1993, 76; Adner 2017, 48). The importance of a focal actor is derived from how they have a distinguishable role in the emergence of ecosystems but also in the survival of them. For instance, keystones provide the foundations for ecosystems, such as solutions or platforms, that enable the other actors to develop their own capabilities for value creation purposes for the whole network (Iansiti & Levien 2004, 75). Thus, the keystone is the supporting force of the ecosystem and the withdrawal of it would result in the deterioration of the ecosystem.

Keystones can sustain the ecosystem health and survival through various methods such as providing stability, creating diversity and increasing productivity (Iansiti & Levien 2004, 69, 82). As ecosystems have surfaced to deal with the ever-increasing complexity of doing business, the keystones ensure that their array of ecosystem actors is diverse enough to be able to respond to any disruptions in the external environment (Iansiti & Levien 2004, 71). This also promotes the stability of the network as external changes do not halt the operations of the ecosystem. Central actors also promote the continuation of the ecosystem by improving its productivity which is done by encouraging development, connecting compatible actors and incorporating new innovations (Moore 1993, 76; Iansiti & Levien 2004, 83; Williamson & De Meyer 2012, 25). This way keystones play an important role in both creating and sharing the value therefore supporting the central role of them. However, it is important to understand that even though the actions of keystones can be considered as generous, they do them for their own benefit as businesses are fundamentally self-centered (Iansiti & Levien 2004, 82).

Dominators are actors that participate in ecosystems to either control and own a considerable portion of the ecosystem or to collect as much value as possible from it while barely contributing to the actual value creation process. An actor with the motivation mentioned first is called a classic dominator and an actor with the latter motivation is referred to as value dominator. (Iansiti & Levien 2004, 74.) Therefore, dominators can threaten the health of the entire ecosystem as they slowly decrease the diversity of the network and hinder the critical feature of equal value sharing. As the diversity of the dominated ecosystem diminishes, its capability to react to external changes decreases and

competing ecosystems with more efficient keystones can take over the market (Iansiti & Levien 2004, 116). Thus, the dominator strategy can potentially generate short-term gains but does not promote long-term success.

Niche players have an important role in ecosystems as they comprise the bulk of the network. These actors either develop or already possess capabilities that differentiate them from all the other actors within the ecosystem thus they are specialized in a specific niche. (Iansiti & Levien 2004, 77.) This means that niche players support the ecosystem health by enabling diversity in the ecosystem with their resources and capabilities. Moreover, in an effective ecosystem the niche players provide complementary components that collectively form the end product (Iansiti & Levien 2004, 129). Complementariness is a commonly agreed feature of these inputs (Teece 2007; Williamson & De Meyer 2012, 25; Thomas & Autio 2014, 3; Jacobides et al. 2018, 2258) as it facilitates the efficient creation of value for the individual actors and the entire ecosystem when the inputs are aligned right. The specialization and complementariness of the components causes niche players to be very dependent on the other actors of the ecosystem however it also enables them to concentrate their own activities on developing their capabilities thus increasing the productivity of them (Iansiti & Levien 2004, 129). This is how niche players utilize the foundations and tools provided by keystones.

Even though keystones are important for the operations of niche players, niche players play an important part in guiding the keystones as well. When niche players have the opportunity to be part of several ecosystems simultaneously it causes pressure on the keystones to provide more value to ensure that the niche player will remain in the ecosystem (Iansiti & Levien 2004, 78). Therefore, some niche players knowingly pursue this strategy to generate greater value sharing in the ecosystem. However, sometimes niche players leave the ecosystem as keystones are not willing to share enough value or they do not provide adequate tools for the ecosystem. This can also be considered as a power move from the niche player as it can encourage some keystones to act more fairly and honestly towards the ecosystem. (Iansiti & Levien 2004, 138.)

As ecosystems continuously react to changes and evolve, the roles of the participating actors may change over time. For instance, keystones can limit the role or even eliminate an actor from an ecosystem if they believe the actor is causing damage to the health of the network (Iansiti & Levien 2004, 71). This means that keystones can exclude harmful dominators from the ecosystem. Moreover, sometimes the ecosystem evolves so much that the focus of it shifts away from the original keystone to another lead firm (Moore

1993, 76). This can either result from a natural shift or from intense competition within the ecosystem. Therefore, keystones must actively develop themselves with the ecosystem if they want to keep their role. However, Adner (2017, 48) suggests that leadership does not have to be tied only to one actor that in some ecosystems shared leadership can be successful.

The role of niche players can also change over time as the competition between complementary inputs progresses. If niche players do not constantly develop their products other actors from the ecosystem may slowly take over the niche they occupy. This pressures the players to consider if they should put in more effort to further establish their role in the ecosystem or to accept their defeat and leave the ecosystem. (Iansiti & Levien 2004, 130.) Therefore, ecosystem actors have to continuously assess their motivations and capabilities and reflect if they are suitable for the role they have chosen.

4.3 Structure of business ecosystems

The complexity and variety of business ecosystems signifies that there is no commonly agreed structure for them. Several scholars have proposed approaches that stress different aspects such as Moore (1993) who highlights the importance of component and process structure, Adner (2017) who suggests that the structure is defined by the activities of the actors and Jacobides et al. (2018) who emphasize the modularity of the structure. Even though all of the approaches focus on different aspects, many recognize that ecosystem structures are significantly affected by the roles of the ecosystem actors and their interdependence.

The focal actor of a business ecosystem has an important role in the overall structure of the ecosystem. It can decide if the business ecosystem is open or closed meaning that it can regulate which actors have access to the platforms and solutions, for example, that it is offering (Jacobides et al. 2018, 2269). By having a closed ecosystem, the focal actor can ensure that the network consists only of a specific group of actors who are essential for the health of the ecosystem whereas an open business ecosystem allows roughly anyone to enter. Moreover, Williamson and De Meyer (2012, 27) state that by controlling the allowed members, the ecosystem leader can make sure that the participating actors are important strategic partners. In closed ecosystems the membership can be controlled with standards set by the central actor (Iansiti & Levien 2004, 162; Gulati et al. 2012, 576). Standards can be defined as interfaces that promote interaction between the participants of the ecosystem. This means that a standard is a common agreement of the used format

of a file, for example, that ensures that different actors of the business ecosystem are able to interact with each other. Moreover, the simpler the standard is the more effective the interaction is. (Iansiti & Levien 2004, 162.) Thus, focal actors can affect the information sharing between different actors of the ecosystem which in turn facilitates building of trust between them (Gulati et al. 2012, 581). This helps to strengthen the relationships between the actors thus creating continuity.

The interactions and interdependencies between actors also affect the levels of architecture of the ecosystem. As these networks entail various actors and the actors are dependent on each other's efforts in the ecosystem it creates the opportunity for multilateral structures (Adner 2017, 42). It has been noted that often studies focus on the bilateral relationships of organizations (Gulati et al. 2012, 573; Williamson & De Meyer 2012, 26; Jacobides et al. 2018, 2265) however the ecosystem approach tries to disclose how actors create and share value in more complex and intertwined networks between multiple participants. Multilateral structures also cause challenges such as how to prevent value from disappearing or from being captured entirely by the external ecosystem (Teece 2007, 1340) but by understanding that there are multiple levels of interaction it can help focal firms, for example, to provide adequate tools for value capture. Therefore, an important consideration in the attempts of defining the structure of an ecosystem is the question of how extensive the broader ecosystem actually is (Adner 2017, 56).

An important aspect of structure in business ecosystems is that it requires flexibility. A flexible structure enables the business ecosystem to re-configure according to changes and disruptions in the market and the general environment (Williamson & De Meyer 2012, 41). Teece (2007, 1335) emphasizes that ecosystems must be able to adjust their complementary inputs, routines, systems and structures to ensure long-term profitability. This means that the actors of the network have to be able to make rapid changes to their operations and products when necessary. The incorporation of both formal and informal relationships within ecosystems facilitates these changes because alterations can be made without having to renegotiate any contracts (Jacobides et al. 2018, 2275). In addition, these relationships enable interaction between various parties and self-organization within the ecosystem thus eliminating the need for a strict leadership structure (Williamson & De Meyer 2012, 40). However, sometimes the coordination of the re-configured inputs and structures can cause issues between the actors. Jacobides et al. (2018, 2260) propose that effective business ecosystems already entail predefined rules and processes how these issues are solved thus promoting the flexible nature of the ecosystem.

4.4 Strategic partnerships as business ecosystem foundations in the construction industry

The interest in ecosystems in the construction industry has increased in the past years as the industry requires a renewal and a shift towards ecosystem thinking could help make the industry more effective and competitive in the long run. The formation of business ecosystems could support the efforts of solving some of the industry-wide problems because business ecosystems stress network-level cooperation and awareness instead of firm-centric orientation (Thomas & Autio 2014, 21).

Generally, the whole construction industry can be viewed as a vast ecosystem as the actors in the industry are connected by loose ties, relationships are based on complementary inputs and the operations of the industry are affected by various actors from several industries (Dubois & Gadde 2002, 622–623). Moreover, same companies can cooperate at one project while simultaneously competing at another thus highlighting the interdependent nature of cooperation and competition in business ecosystems (Junnonen 2016, 269). However, as the actors in the industry are very focused on their own individual operations and interactions between companies are usually short-term the application of the business ecosystem view to smaller entities is hindered and the potential benefits cannot be realized. Therefore, companies that aspire to be keystones of smaller scope business ecosystems have to find ways to increase the longevity and cooperation with their core business partners to facilitate the development of a collaborative ecosystem. This thesis focuses on how strategic partnerships can facilitate this.

Strategic partnerships can help to create the initial foundations for business ecosystems in the construction industry because first of all they help companies to define the first level of ecosystems, their core business. As contractors, the keystones of the business ecosystems, have several suppliers for the same categories it prevents them from forming durable and meaningful relationships with the suppliers (Gadde & Dubois 2010, 257). By choosing strategic partners from each category, contractors do not have to go through competitive bidding at each similar project and the saved time and costs can be used to mutually develop the offered product or solution. Secondly, the deliberate selecting of strategic partners can help the focal actor to ensure that the potential ecosystem has enough capabilities and diversity to be able to provide the solution even in the case of disruptions (Williamson & De Meyer 2012, 27). As the actors in the construction industry are faced with a high level of social responsibility, disruptions in the broader ecosystem

are commonplace. Therefore, by making sure that the suppliers, the niche players, have the capabilities to develop and innovate their inputs over time, the keystone can expect higher probability of ecosystem success.

Strategic partnerships are also important in creating formal and informal relationships between the niche players of the potential business ecosystems. As traditionally suppliers are switched from project to project (Gadde & Dubois 2010, 257) it prevents repeated collaboration between these actors. However, as business ecosystems require the whole network to co-create and share value it is essential that niche players are able to collaborate more frequently. When contractors form strategic partnerships with their suppliers it also facilitates the building of relationships between the different suppliers. Kale et al. (2000, 218) propose that strong bilateral partnerships can evolve into larger networks because the partnerships allow the participants to create new connections or even partnerships with other actors based on the recommendations made by the original partners. In the construction industry where the level of trust can be low, referrals can help companies to find credible and trustworthy partners that they would not have found without help (Bygballe et al. 2010, 246). Moreover, as strategic partnerships enable the involvement of the partners in the early stages of the whole construction process (Beach et al. 2005, 615) it can facilitate cooperation between the suppliers and potentially result in better execution decisions. Therefore, strategic partnerships can potentially be used to bring business ecosystem actors together thus creating an initial foundation for them.

4.5 Benefits of business ecosystems in the construction industry

It is crucial that construction industry companies facilitate the creation of foundations for business ecosystems because these ecosystems can aid the industry to solve some of the problems identified in chapter 2.3. For instance, the business ecosystem approach could encourage construction companies to view that they all share the same fate and recognize that more individual and collective value can be created and shared by working together (Iansiti & Levien 2004, 8–9). Moreover, as it has been stated that the external network of companies is the driving force for renewal (Håkansson & Ingemansson 2013, 56), understanding the significance of the larger network can help the entire industry to become more productive. In fact, it has been noticed in project alliances that when the actors work together for the greater good and the mutual objectives of the project the probability of the timely and effective completion of the project has increased (Yli-Villamo & Petäjäniemi 2013, 65). Therefore, when the significance of collaboration and the potential

of a larger external network are identified, it can help construction companies to overcome the existing conditions that reinforce the fragmented and project-based nature of the industry.

The utilization of a larger network can also help with the issues caused by the ever-increasing complexity of products and processes caused by the demands of stakeholders. For instance, traditionally the actors in the industry develop their inputs individually which can lead to a situation where it is very challenging to fit different inputs together in a complementary manner (Pulkka et al. 2016, 132). Even though strategic partnerships can help with this by allowing the early involvement of partners in the execution decisions (Beach et al. 2005, 615), business ecosystems bring an entire network together that can result in the creation of a complete solution for the clients, for example. In fact, it has been noted that stakeholders have started to demand these more comprehensive solutions because they wish for more compensation for their possible investments (Williamson & De Meyer 2012, 24; Aapaoja & Haapasalo 2015, 115). When the actors of the ecosystem collectively develop the solutions and understand that changes made by an individual actor also affect the operations of the entire network they are embedded in, the ecosystem is more capable of reacting to the changing demands of its surrounding environment (Aarikka-Stenroos & Ritala 2017, 12). Hence, the business ecosystem approach can make the construction industry more flexible, thus increase its productivity in the long run.

The productivity of the construction industry can also be potentially increased with the technological platforms that are provided by the keystones of the ecosystems. The platforms allow continuous interaction and information sharing between the actors (Iansiti & Levien 2004, 162), which can facilitate the standardization of materials and processes in the industry. The reason for this is that when actors constantly collaborate it creates opportunities for them to identify reoccurring materials and processes that can possibly be standardized which in turn can help to increase the overall productivity of the industry (Aapaoja & Haapasalo 2015, 111). Moreover, as the inputs of construction companies are usually seen as complementary, the ecosystem approach ensures that the standardization efforts are executed in a way that benefits the operations of the whole network.

As the construction industry is a very labor-intensive industry the ecosystem approach should benefit the worksite operations as well. Worksites entail a lot of different material flows and processes which can cause challenges in the coordination of actors at the site thus causing tension between them (Aapaoja & Haapasalo 2015, 110). Business ecosystems can facilitate effective coordination between these actors as ecosystems

require them to communicate frequently and have clear roles in the network (Aarrikka-Stenroos & Ritala 2017, 30). Moreover, if companies are able to standardize some of the products or processes needed at the worksite it facilitates the coordination even more. In addition, as ecosystem actors should have a common vision of the development process of the offered product or solution (Koenig 2013, 79), it decreases the amount of unproductive time as everyone is aware of what is expected next. As worksite operations are a significant component of the entire construction process it is important that they are effective and clearly organized.

5 METHODOLOGY

5.1 Research approach

A qualitative research approach was viewed as the most appropriate and useful approach for this study for many reasons which are explained next. Qualitative research is used when the studied topic cannot be adequately understood through quantitative methods and the topic is generally unfamiliar in the research context (Hennink et al. 2020, 45). There exists a lot of confusion around business ecosystems in several contexts which is why an explorative approach is beneficial when examining phenomenon. Moreover, as the aim of this thesis is to explore how strategic partnerships possibly affect the process of forming ecosystems in the construction industry, it is important to understand the views and experiences of the engaged actors of the process. One of the main features of qualitative research is that it focuses on understanding the perceptions of the participants of the study (Hennink et al. 2020, 10) which supports the suitability of this approach for the purpose of this thesis. In addition, as business ecosystems focus on the relationships of different actors involved, a qualitative research method helps to take the social and cultural context of the matter into consideration (Eriksson & Kovalainen 2015, 5). This is especially important when examining an industry with various distinctive and deep-rooted characteristics and a multicultural set of actors which are relevant aspects in the construction field.

Qualitative research also provides flexibility in the research design as developments in a certain component during the process may require modifications in the design of another research component (Maxwell 2013, 2). An adaptive approach is beneficial in terms of this thesis as similar studies have not been done before in the context of the construction industry thus components of the planned research process may have to be altered to better fit the objective of the study. Another reason for choosing a qualitative approach is that according to Maxwell (2008, 221), qualitative methods are usually used when the data sample is quite small. The empirical research of this thesis focused on the actors involved in the parking garage concept mentioned earlier in the thesis which means that the scope of the research is not large.

As the research of this thesis focuses on a particular concept, the chosen qualitative approach is a case study. Furthermore, this study is an intensive case study as it focuses only on one case and the objective is to provide a comprehensive and contextualized

description and analysis of it (Eriksson & Kovalainen 2015, 133). A thorough picture helps to better understand the different interpretations and views of the phenomenon being studied. An important aspect of ensuring an in-depth description of a particular case is that the researcher has access to case specific material (Creswell 2007, 95). The researcher of this thesis has been working for the case company for two years now and has been part of several work assignments related to the concept being studied therefore has information of the case that cannot be acquired elsewhere.

Another reason for choosing a case study approach for this thesis is that it usually provides a practical and understandable way of presenting complex business phenomena (Eriksson & Kovalainen 2015, 133). Business ecosystems can be viewed as complex because of their versatile nature and the fact that there have been difficulties in forming a unified definition for them in the business context. In addition, case studies have also been said to be useful when the research project is in its early stages (Rowley 2002, 16) which is the case in this thesis. As business ecosystems have not been widely researched in the construction industry before, a case study can provide preliminary and exploratory insights that can be later on studied on a larger scope and reflected to the whole industry.

5.2 Case introduction

The case chosen for the research of this thesis is a building concept currently focusing on parking garages which has been developed to answer some of the demands of a renewal of operations in the construction industry. The concept is developed by a large multinational construction company which operates in several European countries and its operational headquarters are located in Finland. The company is divided into multiple segments such as infrastructure, housing and business premises which all contribute to the company's position as one of the leading Northern European construction companies.

The aim of the case concept is to introduce a new approach to construction by utilizing standardization and digital solutions to improve the productivity, transparency, quality and overall performance of the production process. Takt construction with the help of supporting digital tools are seen as essential instruments in the standardization as they bring more transparency to the resource and material flows. Parking garages were chosen as the testing grounds for this concept because the infrastructure segment of the case company has a lot of specialized and advanced knowledge on the construction of them. Furthermore, in an industry where products are seen as complex parking garages are rather straightforward products with several reoccurring material or work categories. The

identification of these central categories is crucial as it enables the efforts of standardizing the material and resource flows and possibly enables the prefabrication of the materials in future projects.

Another significant aspect of the case concept is the aim of forming strategic partnerships with the providers of the identified categories. The development of deeper and longer-term relationships with these selected actors facilitates the standardization efforts of the concept as the traditional supplier choice process of competitive bidding is not implemented. This enables continuous cooperation with potential partners which promotes mutual learning between projects and building of trust.

The potential strategic partners were chosen by a set of criteria which included level of understanding of the concept and digital capabilities, for example, to ensure that all participants have the motivation and capabilities to commit to a strategic and long-term relationship. At the moment the case company has signed a letter of intent with each of the potential partners but an official strategic partnership will be formed if the collaboration is perceived as effective and successful after the ongoing pilot project. By securing partnerships in the initial stages of the concept it enables the involvement of partners who are experts in their own field already in the design phase, thus resulting in higher quality products and effective solutions, for example. By forming these partnerships the company aims to gain financial benefits for all parties involved and to create a network where the parties can co-create value and co-evolve together. This is why this concept is a potential environment to study the formation of ecosystems in the construction industry as the desired outcomes are clearly related to ecosystems.

5.3 Data collection

When conducting research, it is crucial to plan how the data will be collected. There are several ways of collecting this data such as interviews, documents, direct observation and participant observation and they all may provide different kinds of insights on the studied phenomenon (Rowley 2002, 23). This implies that researchers should consider in advance the possible findings they may gain from different methods of data collection and choose the most suitable one or a combination of few for the purpose of their study. Interviews were chosen the data collection method for this thesis because the interpretations and views of individuals were seen as essential for the study and interviews are often used to get access to information that is not available in a published form (Eriksson & Kovalainen

2015, 94). Thus, interviews can help to access case-specific information which is crucial for the formation of an in-depth understanding of the topic being studied.

In order to gain relevant insights from the data collection process it is also important to reflect on what kind of structure the interviews should have. Interviews can be generally divided into structured, semi-structured and unstructured interviews from which semi-structured interviews were chosen for this thesis. Semi-structured interviews are usually used to research questions that include the words "what" and "how" (Eriksson & Kovalainen 2015, 94) which is the case in this study. In addition, less structured interviews are seen as helpful in exploratory studies (Hennink et al. 2020, 119). Moreover, semi-structured interviews include predetermined themes and questions which guide the interview process but the researcher can modify the order or even add or omit questions to better suit the organizational context or the flow of the discussion (Saunders et al. 2009, 320). The possibility of making changes to the structure of the interviews was seen as necessary in terms of this thesis because the level of practical knowledge on the case concept varied between the interviewees meaning that some questions had to be modified to accommodate their level of knowledge. However, the content of the questions remained the same to ensure that the collected data was comparable.

Interviews are a versatile method for data collection as they can be executed in various ways and can include different amounts of participants. For instance, interviews can be conducted as face-to-face interviews but also as telephone and various online-mediated interviews (Saunders et al. 2009, 321; Eriksson & Kovalainen 2015, 84). Qualitative interviews are usually done face-to-face however the current special situation of the world caused by the COVID-19 virus required the researcher to choose a remote interview option. During the pandemic the use of different online-based communication platforms for businesses has increased thus the interviews were chosen to be conducted through the Microsoft Teams platform as it is widely used in the construction industry. In addition, the utilization of an online platform also helps with the practical issues of conducting interviews for research purposes. For example, there are various ways of recording interviews such as taping the interview simultaneously with a tape recorder, writing notes down during or after the interview or videotaping the interview (Eriksson & Kovalainen 2015, 97). In Microsoft Teams interviews can be recorded and downloaded in the platform which enables the researcher to fully concentrate on the conversation without having to stress about issues relating to recording. In addition, online platforms make scheduling

of interviews easier as none of the participants have to travel to a specific place to attend the interview (Hennink et al. 2020, 133).

The interviews in this thesis were chosen to be conducted between two people. Interviews can be either conducted as group interviews or between two people however it is more common that interviews are conducted according to the latter one (Eriksson & Kovalainen 2015, 84). One-on-one interviews allow the interviewees to freely express their personal perceptions and views on the fairly new research topic without having to be cautious of the opinions of other people. The selection of the participants for the one-on-one interviews was done through purposeful sampling meaning that the participants are intentionally selected because they have the most relevant information in terms of the questions and goals of the research (Creswell 2007, 118; Maxwell 2013, 97). As this thesis focuses on a specific case it was important that the selected participants were involved with the case concept. Furthermore, in order to maximize the possibility of obtaining versatile and comprehensive data on the case concept it was seen as necessary to interview individuals from different organizational levels of the case company and individuals from the involved potential strategic partners.

The process of the interviewee selection in practice was initiated by discussions of the potential candidates with the supervisor of this thesis from the case company. On the basis of these discussions eight potential interviewees were contacted in March 2021 by email which entailed information of the purpose of the thesis, a short description of business ecosystems, interview themes, estimated duration of the interview, promise of anonymity and a privacy notice. Five of the contacted people accepted the request almost immediately however after a few weeks the three people who had not yet answered were approached again as a reminder. After the reminders two more interviewees agreed to participate and the remaining candidate declined due to lack of time.

The dates of the interviews were set by email with each participant and the interviews were conducted through the Microsoft Teams platform during the time span of 2nd of March and 31st of March. All of the interviews followed a similar structure with some small changes. At the start of the interview all of the interviewees were reminded of the purpose of the thesis, themes of the interview and that the interview would be taped for transcription purposes. The interviews were conducted in Finnish because it enabled a more relaxed atmosphere and more natural flow of conversation as all the participants were Finnish. Some interviewees also chose to turn their camera on for the interview which was particularly beneficial when the researcher and the interviewee were not that

familiar with each other before. The duration of the interviews ranged from 31 minutes to 57 minutes thus keeping within the given estimation of the duration of the interview. The summary of each interview including the informant, title of the informant, company, date and duration of the interview are presented in Table 2.

Table 2 Summary of the interviews

Informant	Title	Company	Date	Duration
Interviewee A	Procurement engineer	Company A	2.3.2021	35 min
Interviewee B	Consultant	Company B	10.3.2021	57 min
Interviewee C	Site manager	Company A	22.3.2021	31 min
Interviewee D	Vice president	Company A	22.3.2021	57 min
Interviewee E	Vice president	Company A	23.3.2021	35 min
Interviewee F	Sales manager	Company C	25.3.2021	46 min
Interviewee G	CEO	Company D	31.3.2021	40 min

Interviewees A, C, D and E represent the case company which is referred to as Company A in this thesis. All of these interviewees have a different organizational position in the company and role in the case concept which enabled the researcher to obtain a broader internal view of the case. Even though the title of two interviewees is vice president they are vice presidents of different areas of the company thus have differing roles. Some of the interviewees also have a background in another industry before working with Company A which also gave breadth to the collected data as they may see issues that long-term construction industry employees may be blind to. Interviewee B is a partner from a consulting company referred to as Company B and the interviewee has been actively part of the development of the case concept. The interviewee is especially informed of the technological platform used in the case concept. Interviewees F and G are representatives of two of the potential strategic partners of the case concept, Company C and D respectively. Both interviewees have been actively involved in the case concept thus had experience from the operations of the concept.

5.4 Data analysis

After the data was collected through the conducted interviews the next step was to analyze the data. The first step of this process was to transcribe as accurately as possible all the recorded interviews into a Word document which ended up being 53 pages long. This

document was then proofread to ensure that the text was understandable and that the researcher had a comprehensive sense of each interview. In addition, during the proofreading, the interviewees' answers were bolded in the document to increase the clarity of the structure of the transcribed data.

After the transcription process was finished, the data was organized according to different themes that emerged from the interviews. This is called thematic analysis as it refers to when empirical data is organized according to a specific concept, idea, distinction or trend that can be distinguished from the gathered data (Eriksson & Kovalainen 2015, 222). As the interview questions were formed with the research questions and theory in mind, the recognized themes from the data were mostly in accordance with aspects that were brought up in the theoretical framework. In addition, an operationalization table was created to ensure that the link between the theory and empirical findings was clear. The operationalization table is presented in Table 3.

Table 3 Operationalization table

Research objective	Sub-objective	Theory/ Used literature	Themes	Analysis (chapter number)	Findings
How can strategic partnerships be utilized in the formation of business ecosystems in the construction industry?	What characteristics influence the operations of the construction industry?	Construction industry theory	Project-based nature Lack of long-term cooperation Competitive tendering Fragmentation	6.1	Lack of learning curve Unproductiveness Discontinuity Distant relationships Working in silos Standardization challenges
	What types of strategic partnerships are there in the construction industry?	Strategic partnerships Construction industry partnerships	Strategic partnership elements Benefits Adjustments Commitment	6.2	Long-term Mutual objectives Added value Information sharing Cost savings Willingness to adjust Measuring of benefits Involvement of management
	What is the role of business ecosystems in the construction industry?	Business ecosystems Construction industry theory	Benefits Multilateral relationships Technological platform Barriers for benefit realization	6.3	Early involvement Large pool of knowledge Standardization Answering demands Regular meetings Simple technological tools Unclear roles Poor information sharing Lack of trust

The table presents how the different aspects of the research support each other and how the findings of the study have been constructed. In the analysis process, first the themes that were related to the need for an industrial renewal were identified and data related to them were gathered to another Word document under the title Industrial renewal. Then the themes related to strategic partnerships in the construction industry were established and again the data related to the themes were transferred to the same document under the title Strategic partnerships. The same process was repeated with the themes and

data related to the potential benefits of the ecosystem approach to the construction industry and they were moved under the title Business ecosystems. This way it was easy to for the researcher to recognize where the data for a particular sub-objective could be found from.

Moreover, in the new Word document the data relating to each theme was gone through more thoroughly. Under each theme the researcher chose to highlight similar views on the issue with an assigned color to better recognize connections between the collected data. For example, the researcher highlighted all the data that mentioned early involvement as a business ecosystem benefit with an orange highlighter and the data concerning a larger pool of knowledge as a benefit with a blue highlighter. This was done under each theme. When similarities are assigned to a specific color it helps to identify entities more clearly. After the data was color-coded, it was reorganized again so that under each theme the findings with the same color were grouped together to make the structure more understandable. This also provided a logical order for the analysis of the data which is presented in chapters 6.1, 6.2 and 6.3.

5.5 Trustworthiness of the study

The evaluation of the trustworthiness of the research is an important aspect of the methodology of the study because it helps to assure the reader that the research is valid. This can be assessed in many ways depending on the nature of the research but the trustworthiness of this study is examined through four different criteria that have often been used to evaluate qualitative methods. These criteria are credibility, transferability, dependability and conformability (Lincoln & Guba 1985). The criteria and factors that support them will be explained next.

Credibility of a research refers to if the study is valid and if the chosen research approach and data collection method is sufficient enough to provide suitable data for analysis (Bickman & Rog 2008, 11; Elo et al. 2014, 3). In other words, the credibility examines how well the gathered data supports the statements made in the study. One of the methods for ensuring that the gathered data was sufficient enough for the purpose of this thesis was that the interviewees were purposefully selected according to their involvement in the case concept. The interviewees chosen for this research represented different organizational levels of the case company, strategic consultants and members of potential strategic partners which enabled the gathering of diverse interpretations of the studied phenomena. In addition, according to Eriksson and Kovalainen (2015, 213) credibility is

also affected by the researcher's familiarity with the topic being researched. The delivery of the theoretical framework of this thesis required the researcher to do an extensive literature review on the construction industry, strategic partnerships and business ecosystems. This was done during the course of six months. Moreover, the researcher has worked in the industry for the case company for two years and was previously familiar with the case concept which helped to understand the reviewed literature on the construction industry in a more thorough manner. Therefore, the researcher was very familiar with the studied topic.

Transferability is related to how generalizable the study is meaning that can the current research be linked to previous research in some way (Eriksson & Kovalainen 2015, 308). Thus, it is important to establish connections between different studies to demonstrate that the research is noteworthy. This requires the thorough explanation of the data and research and it is also beneficial to describe the context, culture and selection processes of the study (Elo et al. 2014, 6). The transferability of this study was reinforced by providing a detailed description of the research setting and used research methods. This allows future studies to replicate the research process and arrive at similar results. In addition, the case concept used in this study was described in detail to create a more thorough understanding of the setting of the study. Moreover, the context of the study, meaning the construction industry, was thoroughly explained in the theoretical part of this report because it is extremely important to understand the unique characteristics of the construction industry to fully understand the underlying problems that affect all construction. This helps other researchers to identify the features that might affect the transferability of the research in other contexts. In addition, strategic partnerships and business ecosystems were also explained carefully to provide links to previous studies and to demonstrate the research is relevant.

The dependability of a study refers to the actions taken to ensure the researcher provides enough information about the steps of the research process and that the overall process has been logical, traceable and also documented (Eriksson & Kovalainen 2015, 326). This also enables the reader to understand how much the research context and the researcher have affected the presented findings (Lincoln & Guba 1985, 316–317). The dependability of this study was established by providing a thorough step by step explanation of the research process. Moreover, the interview questions that were used in the data collection process are presented in the Appendix of this thesis to demonstrate the nature of the conducted interviews. The details of the interviews, such as the title of the interviewee,

dates and durations, were also presented to bring more insights to the course of the interviews. However, as one of the aspects of dependability is to consider the influence of the researcher on the findings it is important to examine it more carefully. The researcher has previously helped with some work tasks related to the case concept such as conducting background checks on the potential partners which means that the researcher had existing information about the case and some of the actors related to it. Even though the researcher has not been actively part of the concept in the past year and the researcher tried to perform the analysis process of the data as objectively as possible it should be noted that the previous knowledge may have influenced how the researcher interpreted some data.

The last criteria, confirmability, refers to how well the findings presented in the study can be linked to the gathered data and can other researchers confirm the made findings (Lincoln & Guba 1985, 300; Elo et al. 2014, 6; Eriksson & Kovalainen 2015, 308). Therefore, confirmability concerns the objectivity of the research (Elo et al. 2014, 2). This study provided an extensive explanation of the entire research process to ensure that other researchers can replicate the study if necessary. Moreover, the structure and themes used in the analysis of the data were presented in the form of an operationalization table for the reader to understand how the transcribed data was organized and analyzed. This brings transparency to the research process and provides insights to the logic behind the made interpretations and findings. Even though the research process was described as carefully as possible the anonymity of the interviewees and the companies they represent hinder the exact replication of the study. Moreover, as the interviews conducted in the data collection process were semi-structured it permitted changes in the structure and progress of the interview thus further preventing other researchers from creating an identical study.

5.6 Research ethics considerations

A significant process of research is considering the ethical aspects related to it. This is especially true in qualitative research because it involves the perceptions and interpretations of humans and allows the researcher to get access to the interviewee's subjective experiences (Brinkmann & Kvale 2005, 157). As ethics refers to doing good it is important that the researcher applies relevant ethical principles into the research process to ensure that no harm is caused to the participants (Orb et al. 2001, 93).

One of the most crucial aspects of ensuring the ethicality of a research is the consent of the participants. The research subjects must clearly state their consent and willingness to participate in the research (Orb et al. 2001, 95; Brinkmann & Kvale 2005,

167; Aluwihare-Samaranayake 2012, 69). This has to be done before the actual data collection. For the participants to make a fully consensual decision the researcher has to inform them about the purpose and characteristics of the research, how the confidentiality of the participants and their inputs will be secured and their right to withdraw from the study (Brinkmann & Kvale 2005, 167). Usually this is done with an informed consent sheet which was also the case in this study.

All of the contacted potential interviewees were approached by email which included a document titled "privacy notice" which entailed all of the aforementioned details in a table form to provide clarity. In addition, the table included information about how long and how the data would be stored and who has access to it. Moreover, the purpose and characteristics of the study were described in more detail in the actual email to ensure that the participants were really aware of the research. The participants were also encouraged to contact the researcher if they had any questions about the topic of the study or the research process of it and it was emphasized that participation in the process was completely voluntary. Only one contacted candidate declined to take part in the research but all the other participants clearly stated their willingness to contribute.

As the selected data collection method for this research was semi-structured interviews it was also important to analyze the line between wanting to receive as much information as possible and respecting the boundaries of the interviewee (Brinkmann & Kvale 2005, 169). The researcher did review the interview questions with the supervisor from the case company and tried to remain as objective as possible during the interview to ensure that the data collected was thorough enough for the purpose of the research and did not overstep any boundaries of the interviewees. However, due to human nature complete objectivity cannot be guaranteed.

6 FINDINGS

In this chapter the findings from the collected and analyzed data are presented. The findings are divided into three sub-chapters that correspond the sub-objectives of this thesis.

6.1 Characteristics that influence construction industry operations

All of the interviewees acknowledged that the construction industry is in need of considerable changes as the current ways of operating are not productive in the long run. Especially the project-based nature, lack of long-term collaboration, competitive tendering and fragmentation were seen as significant problems that have led the industry to a sub-optimal state. Actions have been taken to improve the situation but as construction companies have managed with the current practices the motivation for changes can be low thus the development is slow.

The lack of deeper and long-term collaboration and overall fragmentation of actors in the construction industry are seen as problems that should be solved as quickly as possible. Several interviewees mentioned how the high turnover of project organizations, suppliers and subcontractors at each worksite prevents the formation of a collective learning curve which is seen as crucial for sustainable development. The lack of mutual learning hinders the identification of processes and materials that should be adjusted for future projects thus prevents companies from improving the productivity of their operations. Moreover, the discontinuity of relationships between projects means that every project is started from scratch and it cannot be counted on that as the previous project went well that the next similar one will be successful as well because some or even all the actors may have changed. Therefore, the incentive to develop interorganizational collaboration is low because there is no guarantee that the companies will work together again.

The uncertainty of future collaboration was mostly recognized by the interviewees to be caused by the competitive tendering that is widely executed in the construction industry. Traditionally, main contractors tender suppliers and subcontractors for each material and work category at every project to ensure the most competitive price. As there is a vast number of different actors in the industry the utilization of price competition can mean that every project is performed by a different set of actors. However, interviewees from Company A and Company B viewed this way of operating as problematic because

repeated tendering generates additional costs and diminishes any efforts of building more lasting relationships between actors.

> *The construction industry should evolve from the unproductive competitive tendering that does not provide any added value to the state where time and effort is put into the development and management of supplier and subcontractor relationships. (Interviewee B, Company B)*

A more lasting approach to collaboration was also identified as an important aspect by Company C and Company D. As representatives of the supplier and subcontractor point of view the interviewees brought up that competitive tendering causes a lot of instability in their operations. Usually suppliers and subcontractors do not know about potential future projects therefore they are not able to plan which projects they should make an offer to. In addition, there is no certainty that they will win any of the projects as many other actors compete for the same projects. Thus, competitive bidding is seen as unbeneficial in the long run from both the main contractor's and supplier's or subcontractor's viewpoint.

Even though competitive tendering was identified even as the ruling criterion for supplier and subcontractor choices, the role of personal relations was also acknowledged by the majority of the interviewees. Individual worksite managers, for example, have worked with specific actors at previous projects and have been satisfied with their work therefore they utilize the same suppliers and subcontractors at other worksites as well. This is especially visible at projects that are executed in a remote place where the selection of suitable suppliers or subcontractors is narrow. It was noted by a few interviewees that this can lead to even a standardized way of working together because it is easier to count on an actor that has proven to be reliable in the past.

> *The relationships are not written on paper but when there is a need concerning subcontracting or even designing everyone has their own contacts who to call for help. (Interviewee E, Company A)*

This challenges the common view that there are only short-term relationships in the industry. However, the personal relations only apply at the projects that the specific worksite manager works at therefore the relationships are not profound. Moreover, an interviewee from Company A noted that as these relationships are loose and main

contractors have to keep up their competitiveness the tendering process is not ignored despite of personal relations.

A third aspect that was brought up in the interviews that affects the collaboration and formation of relationships between construction industry actors is the contracts that are formed at the end of the tendering process. As main contractors are faced with demands, budgets, risks and other contractual elements from clients the main contractors in turn push these elements to the suppliers and subcontractors they utilize as companies do not want to carry the risks of large multimillion projects on their own. This means that the contracts that are formed between these actors entail strict sanctions that can cause a lot of tension between actors and thus hinder any collective efforts of increasing the performance of the project.

> *There is a lot of tussling over final financial statements, sanctions, complaints and it is very tough on everyone. It is not profitable business for anyone that actors bicker about these aspects until the end of projects and emails are sent back and forth to prove that I am right. The time spent on this is a waste as the time could be used to improve the collective productivity, for example. (Interviewee E, Company A)*

Furthermore, it was mentioned by a few interviewees that sometimes it seems like actors in the industry wait for the opportunity to point out mistakes that the other one has made.

> *It feels like contractors and suppliers play the game of cat and mouse to see who gets to snap about something first. They are repelling magnets in a sense which of course does not develop the operations of either of them. (Interviewee F, Company C)*

Therefore, there is a need for change especially in the contracts made with suppliers and subcontractors because the current ones do not encourage deeper collaboration.

The strong project-based nature of the industry and fragmentation of actors has also led to the situation that many companies do not acknowledge the bigger picture they are part of. As pointed out by many of the interviewees, it is typical that construction companies work in very defined silos and they focus on developing their own internal capabilities instead of examining how different parties could work more efficiently towards mutual goals. Moreover, as projects are broken down into specific material and work

categories which are fulfilled by certain subcontractors and suppliers the strength of the silos increases because the actors are confined in the specific categories.

> *The weakness of the project-based nature of the industry is that we are seen only as the material supplier who manufactures the products according to the given manufacturing drawings. (Interviewee F, Company C)*

The disintegration of different actors is especially visible in the design phase of the construction process. Several interviewees mentioned that its very unusual that suppliers or subcontractors are involved in the design phase of projects even though these actors could bring valuable insights to the decisions. Interviewee B emphasized that the current separation often results in the need for additional work because the designs may not entail aspects that are central for the actors at the worksite. Moreover, the interviewee from Company C specified that there have been projects where their early involvement in the design phase could have made the production process a lot smoother therefore possibly increasing the productivity of the whole project.

Throughout the interviews it was often noted that all of the mentioned problems ultimately culminate to one of the biggest problems of the construction industry which is the incapability of standardizing materials and processes. Several interviewees from Company A stated that as a large multinational company it is problematic that there is no mutual way of operating on the corporate level or segment levels. One interviewee even expressed that it looks unprofessional to other companies when each project is executed in a different way. However, all of the interviewees recognized that construction companies cannot escape the prevailing characteristics of the industry such as its project-based nature, lack of repetition and poor interorganizational collaboration which cause considerable challenges to standardization efforts. When projects are designed by different architects and designers and the material flows and processes are performed by a changing set of suppliers and subcontractors the repetition which is needed in takt construction and prefabrication may be difficult to identify.

Nevertheless, actors in the industry are intensely trying to find even small aspects of projects that could be standardized to improve the whole construction process.

> *Our ultimate goal is that we have semifinished configurations because when you look at parking garages they do not differ from each other*

> *that much that the design process should be started from scratch every time. So, if we had a few product configurations and a semifinished design the end product could be quickly constructed according to those standardized aspects. (Interviewee B, Company B)*

Hence, the standardization could help to improve the productivity issues that the construction industry is facing by increasing the predictability and effectiveness of the construction process. Furthermore, standardization was mentioned to increase the understandability of entireties which is a significant aspect in large construction projects where multiple material flows and several actors have to be managed. Thus, when there is a more defined way of building the collaboration between different actors is less complicated.

Yet, the interviewees repeatedly came back to how the general view that all projects are complex and different will cause issues in any standardization efforts.

> *Everyone will not take this concept so seriously because they think that this does not concern their production as they have "special projects" such as schools that cannot be carried out by takt construction because all rooms differ from each other. (Interviewee D, Company A)*

Therefore, the role of management is crucial in the implementation of new ways of operating. Moreover, one interviewee underlined that in larger companies upper management should be involved in the process because the scaling of the new operations will not be successful if they have to be taught at each project individually. In a similar way, Interviewee G stated that as the CEO of Company D it is part of the CEO role to encourage change and support the efforts made towards it. So, it can be implied that the standardization will not be successful in the construction industry if all actors do not commit to it.

Overall, it was mentioned in the majority of the interviews that all of the changes that are needed in the construction industry also require a significant cultural shift. The skeptical attitudes towards change and new innovations, for example, have been the same for decades therefore noticeable advances in the industry will not be achieved easily or quickly. However, several interviewees emphasized that many other industries have managed to overcome similar issues before thus the construction industry needs companies that are ready to take the first steps towards more productive and sustainable ways of

operating. It was suggested that when these companies are able to show concrete benefits that have been achieved by making changes this can result in a snowball effect in the entire industry. Thus, it can be stated that it seems like the industry is ready for an industrial renewal.

6.2 Strategic partnership types in the construction industry

As mentioned in the theoretical framework, the interest in more strategic partnerships is fairly new in the construction industry and the interpretation of what partnerships entail may vary between companies. For instance, several interviewees mentioned that often annual contracts between main contractors and suppliers or subcontractors that bind specific products or work to a specific price for a year are referred to as partnerships because technically the contract obligates the parties to have a relationship that is not tied to a specific project. However, these contracts do not promote deeper collaboration between the companies because the aspects of the agreement are seen as constant and site supervisors from the main contractor may still select to work with another supplier or subcontractor due to personal preferences. Therefore, it is important that partners clearly define what is meant with partnerships especially when they entail strategic elements.

Company C has a few similar strategic partnerships that are pursued in the case concept with other contractors from the industry. These partnerships have always lasted for several years and all of them entail active mutual development which supports both parties. In addition, the company has some long-term contracts with its own suppliers where the collective development of materials is also promoted. Company A has a lot of different relationships on the corporate level however it was mentioned that on the infrastructure segment level the interest in strategic partnerships is on the rise but official partnerships have not been made yet. It was brought up that a completely new partnership contract was composed for the purpose of the case concept as Company A did not have an existing contract for these kinds of partnerships. Company D also does not have official strategic partnerships with other contractors but the company is often approached by these contractors in the hopes of collaboration. Thus, it can be implied that strategic partnerships are still rare in the construction industry but their significance is increasing.

Even though all of the companies in the case do not have strategic partnerships yet, all of the interviewees had very similar views on what these partnerships mean to their companies. There were several aspects that were brought up the most in the interpretations. It was commonly seen that strategic partnerships refer to collaborative relationships

with a long-term outlook. For instance, two interviewees from Company A emphasized that strategic partnerships involve a mutual view of how the partnership will be developed across multiple projects. In addition, several interviewees mentioned that the partners continuously develop products and processes throughout the partnership thus it requires regular inputs from both parties. Therefore, strategic partners are expected to have excellent collaborative skills and the aspiration and capabilities to develop their own and collective operations. To elaborate, the interviewees from Company B and Company C brought up that strategic partnerships should be utilized in answering to the increasing environmental and sustainability demands from stakeholders, for example. As these partnerships are more lasting than project relationships it creates the possibility to find ways to make construction more sustainable.

Another aspect that is commonly seen as central for strategic partnerships is that the partners share mutual targets.

> *In a nutshell, strategic partnerships mean working towards a mutual goal. (Interviewee A, Company A)*

A mutual objective gives the partnership a direction and motivation to actively develop the relationship. Moreover, half of the interviewees mentioned that clear goals help the partners to understand the scope of the partnership more comprehensively meaning that it is understood that the relationship is not project-based but a long-term commitment. For Company C it is also important that the partners share similar values that help to find the common ways to approach issues and targets. Thus, strategic partnerships are seen to call for deeper conversations about the expectations towards the relationship than in traditional project partnerships.

Furthermore, strategic partnerships should also add value to the operations of both partners. In other words, the partnership should enable the partners to do something that would not be possible to do alone. This differentiates strategic partnerships from project partnerships as project partnerships do not bring any long-term value to the operations of the companies, only to the project they are working on. In strategic partnerships the added value may be something that was not expected at the start of the relationship.

> *[...] they have know-how even beyond what we are looking for in the beginning. (Interviewee B, Company B)*

As the partners constantly support each other and their mutual path towards shared goals it can create opportunities for the partners to use their know-how in new ways.

In addition, in order for the partners to share the added value in a fair way it is important that relationships are based on openness and transparency. When the partners do not hide anything and crucial information is shared it helps to create trust between the partners. However, contrastingly openness, or the lack of it, is seen as barrier for forming true strategic partnerships in the construction industry.

> *The actors in the construction industry are considerably more conservative about what is shared and what things are brought to the open, and actors want to keep certain matters as secrets which have been openly shared in the electronics industry for ages. (Interviewee D, Company A)*

This circles back to the cultural shift that is needed in the industry for the new ways of operating to be realized.

The views on what information should be shared between the partners varied a little bit depending on if the company is a contractor or a supplier or subcontractor. Interviewees from Company A and Company B who represent the main contractor's side in the case concept emphasized how it is important that the partners share cost structures. By understanding how the cost of the material or the subcontracted work is composed it enables the identification of what aspects should be developed together and what computational risks and waste are included in the price. This facilitates more comprehensive cost management thus increases the predictability and transparency of construction. However, it was brought up by one of the interviewees that there have been some challenges relating to the sharing of cost structures because the level of trust with one potential partner is not high enough yet that the partner would be willing to share such critical information. This emphasizes how the usual low level of trust in the industry can hinder the development of strategic partnerships.

From the supplier and subcontractor side Company C and Company D emphasized the importance of sharing information about the future's outlook meaning that information about prospective projects should be shared. As traditionally suppliers and subcontractors cannot choose which projects they will be part of or they do not even know about future projects before the tendering phase is topical, strategic partnerships are expected to bring more stability to their operations as they know at which projects their

services are needed at and they are more aware of the timing of them. Reciprocally, the suppliers and subcontractors are able to provide information about their future capacity and competences to participate in the projects to the main contractor thus enhances the predictability of the contractor's operations as well.

Another important aspect that is expected to be shared in strategic partnerships is timely information from both the corporate level and worksite level. This is enabled by regular meetings and workshops where the progress of the partnership can be monitored and future development steps can be deliberated. For example, half of the interviewees mentioned how it is important that experiences and information especially about the new technological systems used in the case concept are openly shared between the partners because it enables the companies to develop the systems to better fit the needs of the partners. Furthermore, the information flow from worksites was seen as extremely important by several interviewees.

> *We noted it quite quickly that the worksite must be prioritized moving forward because the main objective of all the different solutions has to be the facilitation of worksite operations. If we do not generate any social value at the worksite then we will not generate any financial or green value or anything else. (Interviewee B, Company B)*

As the operations of construction companies are focused around different worksites it is not enough that strategic partnerships revolve around decisions and experiences at the corporate level. Most of the interactions happen at the worksites therefore the majority of interviewees emphasized that the information has to flow effectively through all company levels.

When it comes to the benefits that are expected from the strategic partnerships either at the worksite or otherwise in the operations of the partners the expectations were quite similar between the companies. For instance, one of the most emphasized benefits of strategic partnerships was cost savings. As the construction industry is highly driven by financial aspects, the partnerships are expected to create cost savings and increase the profit margin.

> *What benefits are expected for us? Purely a better profit margin. It is achieved through different things such as takt construction, planning*

> *but what is left below the line should be a better percent than what is has been before. (Interviewee A, Company A)*

> *[...] when you look at the current ways of operating you should see that everything can be done twenty percent cheaper if it was done with a proper partnership model and supporting processes. (Interviewee B, Company B)*

Traditionally contractor companies try to secure these savings by tendering the potential suppliers and subcontractors and then forming an inflexible contract including demands and sanctions to ensure that the cost stays stable. On the other hand, one interviewee mentioned that suppliers and subcontractors acknowledge the strict terms and the risks related to them and therefore give a costlier offer. However, in strategic partnerships the cost savings are expected to be higher because the partners try to collectively find the ways manage the costs. The majority of interviewees from Company A highlighted how partners are able to plan the cooperation more carefully thus minimizing the idle time at worksites as processes are clearer and the materials are more likely on time at the worksite. This is enabled by continuous cooperation and the supporting digitals tools through which the backlog of companies can be secured. When the big picture of the operations of the partnership is understood the predictability of future activities is improved and the misuse of resources is prevented.

It was also mentioned that when partners work at several projects together it is easier to identify the solutions that have been profitable at previous projects thus can result in cost savings when the solutions are implemented at upcoming projects as well. Furthermore, when the suppliers and subcontractors are involved throughout the lifespan of projects their know-how can be utilized in making the used solutions even more productive and in making more profitable execution decisions. In fact, one of the criteria for the potential partners in the case concept was cost efficiency which refers to the partners understanding and motivation to find cost efficient solutions. It was pointed out by Company C and Company D that partnerships enable a more thorough commitment to the finding and development of solutions because all the resources can be used to the process instead of spending them on the competitive tendering process.

Moreover, Company C emphasized that it has only had good experiences of working with partners because it promotes the early intervention in problems thus prevents rework, for example, which in turn eliminates additional costs.

> *[...] when the partners have become familiar with each other's procedures and have in a way reached a level of trust then in the case of problems in delivery or in quality the partners can intervene on these issues and they are solved in a stand-up manner. When you have collaborated with the same actor for a longer time the forming of trust is inevitable and the handling of issues is much easier. (Interviewee F, Company C)*

When the partners are in tune with each other's way of working it reduces the need to comment on small matters through different channels. In the best case, it was mentioned that when there is trust between the partners the first thing when problems arise is not to refer to the demands and sanctions set in the contract but to find a suitable solution together. This was also pointed out by an interviewee from Company A that the company should understand that mistakes will be made in partnerships as they are new to the company but partnerships should be given a chance and not just be dissolved after the first error. Strategic partnerships are long-term commitments therefore they should be given time to develop.

As strategic partnerships are not prevalent among the case concept companies or the construction industry in general, it can be proposed that the formation of these partnerships requires companies to adjust their procedures and find ways to make each other to commit to the partnership. The willingness or readiness to change to enable the formation of strategic partnerships varied greatly between the case companies. Company C and Company D stated that they are very willing to adjust and develop their operations to either enable the formation of the partnership or to make it more successful. As an example, the interviewee from Company C explained how the company has hired an additional person to its information technology department to better answer to the digital know-how criterion that the case company has set to the potential partners. Moreover, Company C sees that this demonstrates the company's motivation to develop its capabilities and its commitment to the partnerships. However, both Company C and Company D emphasized that the advantages and disadvantages of making changes or investments in resources should be carefully considered each time but when the adjustments are seen to create more benefits both companies are willing to make the modifications to enable the formation of the partnership.

Company C and Company D also had very similar views on how long-term commitment to strategic partnerships can be promoted. Company D perceives that the commitment is developed through the daily activities of the partners. When the partners learn each other's procedures and they find mutual ways to operate it further engages the actors into the partnership. Furthermore, Company C recognizes that the mutual operations have to measured in some way meaning that the partners have to demonstrate that the partnership is beneficial thus the commitment to it is rational. For example, as the construction industry is a very labor intensive industry the partners can measure how the collaboration can improve the effectiveness of the used hours at worksites. When the benefits of the partnership can be demonstrated through visible data it is easier to get people to understand the value of the partnership therefore encourage the commitment to it.

On the contrary, from the viewpoint of the contractor the willingness or readiness to adjust to enable the formation of strategic partnerships is not as high as among the suppliers and subcontractors. The majority of interviewees from Company A sees that on the case concept level the company is more willing to make changes to its ways of operating but on a higher level the readiness is not sufficient enough. For instance, an interviewee from Company A stated that the company believes that it is willing to change and develop for the sake of strategic partnerships but then again especially the management level of the company wants to ensure that a lawyer is actively involved in the discussions of the partnership and the YSE conditions meaning the General Conditions for Building Contracts are included in the foundations of the partnership. As traditionally risks have been managed through strict and quite standardized contracts it can be challenging to move forward from them.

Moreover, few interviewees from Company A pointed out that it will be demanding to change the attitudes in the company because so many people have been in the construction industry for years and are set on the current ways of operating.

> *There is this certain kind of hero culture at the worksites meaning that the one who rescues the difficult situation at the last moment is the one who is the biggest hero. And with this whole partnership model we are trying to arrive at a point where these difficult situations do not happen. [...] it can be hard for the people who have been in the construction for a while to understand that with this different way of thinking and operating we can achieve so much more. (Interviewee D, Company A)*

Therefore, companies have to find the ways to successfully implement the partnership operations throughout the company because in the worst case the partnership can fail when things are not done according to the mutually discussed guidelines.

Nevertheless, Company A has taken steps towards forming strategic partnerships even though it has not been easy. For instance, two interviewees mentioned that the initiation of the case concept required a lot of efforts to explain and justify the significance of it to the higher management. In addition, as the concept is only in its piloting phase it was mentioned that it faces a lot of pressure to be successful in order for the concept to receive the approval of scaling it to future projects across different segments as well. Thus, in a larger company the implementation of new procedures and views can be more demanding than in smaller and more agile companies.

However, Company A has quite similar views with Company C and Company D on how the commitment of partners to the strategic partnership can be promoted. Several interviewees stated that the increased productivity and the measuring of it is one of the most significant motivators that increase the commitment to the partnership. In most cases this means that money is considered as the best way to ensure that the partners are engaged in the cooperation in the long run.

> *Months are euros as well. (Interviewee E, Company A)*

> *It is the money. When both partners earn money with the partnership it is the best guarantee that the relationship will continue in the future as well. (Interviewee D, Company A)*

Therefore, partnerships have to entail some kind of indicators that measure the cost savings, for example, to demonstrate that the partnerships are not just words on paper. In the case concept this has been done on a general level but the implementation of the indicators to the actual operations is done later.

Another aspect that was mentioned as a promoter of commitment was the sharing of future outlook. As a contractor, Company A has knowledge on its own future projects as well as on probable projects of different clients. Therefore, by sharing insider information about the projects to the potential supplier and subcontractor partners Company A can demonstrate that it is committed to continue the collaboration in the future and thus can support the formation of trust with these partners. In addition, the information of future profits can help to engage actors in an industry where financial features are crucial.

In addition, the involvement of higher management in strategic partnerships was seen as a significant aspect of commitment. When the management is involved in the processes related to partnerships it can help them to understand the bigger picture of the collaboration and ensure that partnerships are not just bound to worksite level operations. For example, in the case concept Company A engages the division and unit management in the concept by organizing partnership meetings twice a year where different aspects of partnerships and the indicators of them are examined together. In addition, the interviewee from Company B emphasized how the involvement of different management levels in the partnership discussions can help to develop the company to be more accommodating for strategic partnerships in other situations than in just the case concept. It was mentioned by a few interviewees that a matrix organization approach could better serve the formation of partnerships in the case company because it enables that a specific person is responsible for the management of a specific purpose, such as the strategic partnerships. Therefore, the effective implementation of strategic partnerships in the construction industry may require big changes especially in large companies thus the adaptation of these partnerships on a larger scope can take years.

6.3 Role of business ecosystems in the construction industry

Just as strategic partnerships, business ecosystems are a fairly new approach in the construction industry. However, as few of the interviewees mentioned the whole construction industry can be examined as a large business ecosystem. For instance, Interviewee B stated that in a sense the loose ties between different actors which result in different sets of suppliers and subcontractors at each worksite agrees with the nature of business ecosystems where the actors may change to adapt to the surroundings. Moreover, Interviewee D emphasized how all of the actors are interconnected because Company A, for example, uses a network of suppliers and subcontractors that are also used by other contractors. Therefore, the whole construction industry is a large network where both cooperation and competition exist.

However, smaller scope business ecosystems where a set of actors with complementary inputs provide a solution are not as detectable because the collaboration between actors is focused on individual projects and the actors do not engage in mutual development thus do not co-create value. Couple of the interviewees agreed that companies in the construction industry traditionally look at their participation at different projects as an

individual performance instead of part of a mutual solution thus companies may not acknowledge the potential of business ecosystems.

In the case concept, potential benefits of shifting into operating according to the business ecosystem approach were identified by all of the interviewees. Several interviewees highlighted how collaboration within the concept ecosystem is extremely beneficial in terms of early involvement of essential actors in the planning of the parking garages. When the suppliers and subcontractors are involved in the projects already in the design phase it enables the designers to utilize more comprehensive product data in the execution decisions that are made. The suppliers and subcontractors have specialized know-how and acquired knowledge from previous projects that can help to make the whole construction process more stable and therefore productive. In addition, Company C regards the involvement of multiple actors in the early phases as beneficial because potential problems and development areas that have been identified in previous projects can be discussed more comprehensively. Furthermore, the collaboration of a larger network of actors in making decisions can result in groundbreaking outcomes in an industry where generally things are done in the same way. An interviewee from Company A sees that this is valuable especially for a large company because sometimes the deep-rooted processes prevent it from recognizing ideas outside of the box.

The benefits of having access to a larger pool of information and know-how is not limited to the design phase only as this knowledge is seen as useful in other phases of construction as well. For instance, few interviewees from Company A stated that when the actors openly discuss different issues that are related to the operations of the whole ecosystem it can help to make the risk management of the projects more accurate. In addition, during the construction phase if an actor faces an unexpected or unusual situation that needs to be solved the ecosystem can possess the information or know-how for effectively dealing with it. Therefore, the increased amount of knowledge can enhance ecosystems' ability to react to disruptions in their surroundings.

Another way how a more business ecosystem-based approach can increase the amount of knowledge among construction companies is that the network provides a more comprehensive view of the external ecosystem.

> *As the actors work for other contractors and other clients as well they always have knowledge from the other side and this adds the amount of information in the network. (Interviewee C, Company A)*

Different actors may have different information of future trends and projects, for example, which can be utilized within the ecosystem when shared openly. Furthermore, Company C considers that the network can help the company to come across other actors either in the case concept or through the networks of other actors that it has not worked with before. This can enable the company to find suitable actors that it can collaborate with in other projects outside of the case concept as well. This was also highlighted by Company D that it is important that the actors in the ecosystem involve the external ecosystem in the operations of the concept because it can help to make the ecosystem more successful. As an example, Company D mentioned that it introduced Company A to wholesale business that it uses in its operations and encouraged them to discuss the potential participation of the wholesale business in the case concept even if an official partnership is not formed with Company D in the future. In business ecosystems the actors take care of the collective health of the network therefore it is important to constantly figure out ways to do it.

The ecosystem approach is also seen as a facilitator of making standardization more achievable in the industry. When the actors of the ecosystem are constant for several projects they are able to recognize dimensions of their materials, products and processes that are stable between the projects. For example, in the case concept the parking garages and the needed materials and products are assumed to be quite similar therefore the actors are expected to find dimensions that can be standardized while other dimensions can be adjusted according to the requirements of a specific parking garage. This could also be done in bilateral partnerships between the main contractor and supplier or subcontractor however in multilateral relationships the actors are able to identify standardizable aspects in their complementary inputs which increases the level of standardization. As a result, a material library can be formed where the information of needed materials and products can be stored and used for upcoming projects even if the suppliers or subcontractors of the ecosystem change between projects.

> *We had a first meeting where several potential partners were present and the topic of discussion was the material library. There were a lot of beneficial conversations between the partners that things could be done in an alternative way. (Interviewee B, Company B)*

> *In a larger network the partners can together figure out how a certain aspect of the project should be taken forward because we may not*

> *always ask the right questions because we are not professionals in every field of construction. (Interviewee C, Company A).*

In addition, the standardization of materials and products is seen to shift the industry significantly towards manufactured construction which is expected to automatize the industry and thus make construction more productive.

When the materials and products of construction are more standardized it also enables the standardization of processes through takt construction, for example. In the case concept, the material library facilitates the participating actors to better understand what materials and products are needed in the future. This enables the project management to determine work packages in which the needed materials and processes are clearly determined and therefore material flows and readiness to execute the needed processes are better controlled. Moreover, Interviewee B emphasizes that the timely information of the needed materials and processes should be provided to all the actors at the worksite with a dashboard, for example, which enables the actors at the worksite to clearly see the current and expected future situation of the project. Thus, a more standardized way of construction improves the functionality of interdependent activities of different actors therefore results in an effective business ecosystem.

The majority of interviewees also noted that the demands of clients can be better answered with a collective solution such as the case concept. When different actors bring their complementary inputs into the business ecosystem and continuously collaborate with each other to find the best ways to combine the inputs it creates value to all of the actors of the ecosystem including the clients. This is because the network actively and collectively reacts to the signals it picks up from its surroundings therefore the solution better serves the needs of the external ecosystem. Furthermore, several interviewees emphasized how a collective solution can even exceed the schedule demands that the client has set because the some of the operations of the actors and parts of the whole concept have been standardized. This decreases the need for rework, for example, which in turn ensures that construction advances according to or even faster than the initial schedule.

However, Company A emphasizes that the contracting model defines if a project can be executed by a ready solution such as the case concept. If the client chooses a contracting model where it provides the designs of the project itself, it is challenging for Company A and its network to affect how the project is constructed. Therefore, this kind of collective package or solution thinking is currently applicable only in projects where the

contractor has the opportunity to affect the designs or provide the entire design. However, the interviewee from Company B believes when the standardized ways of operating have been established and actual proof of the benefits of a more networked way of operating can be provided the clients can be assured that traditional contracting models do not offer as comprehensive benefits as the new concept. Therefore, the application of the business ecosystem approach in the industry requires a lot of acquired experience and time.

When it comes to the realization of the potential benefits that business ecosystems can provide to construction companies, the bilateral relationships of companies must be developed into multilateral relationships. In the case concept, it was seen as crucial that the suppliers and subcontractors stay constant between projects in order for an interconnected network to form therefore strategic partnerships were seen as a beneficial way to establish longer-term and at first bilateral relationships with these actors. Moreover, through the interviews different ways of encouraging the development of these partnerships into multilateral relationships among the actors were identified.

All of the companies recognized that it is important that meetings where all or several partners are present are held regularly. Typically, the main contractor and an individual supplier or subcontractor have meetings where the aspects of a specific material or subcontract are discussed. However, when the partners stay the same across projects it creates the opportunity for the contractor to gather all of them to discuss different matters of the projects thus encourages interactions between the partners.

> *The idea is to invite all the partners around the big round table where no one sits at the end of the table and everyone puts forth their expertise so that we can form the best possible end product. (Interviewee A, Company A)*

> *With this piloting we are pushing them around the same table and to think together. (Interviewee E, Company A)*

Furthermore, the role of the Company A as the orchestrator of the concept and of the overall collaboration between the different actors was emphasized. From the supplier and subcontractor viewpoint, Company D stated that Company A is the assembler of the whole concept. Company C specified that Company A ensures that the big picture of the concept is understood and brings the partners regularly together to discuss different matters that are related to the concept.

> *[...] it takes care that everything goes according to a mutual understanding and in a way enables the communication between us partners and enables us to get to know each other better and get the whole concept to move forward. (Interviewee F, Company C).*

As an example, it was brought up that Company A organizes an official partnership day once a year in addition to the meetings held at the worksite to which all partners are invited and different themes are gone through with the whole network. In addition, guest speakers and sparrers are potentially involved in these events as well to further develop the concept. Therefore, Company A acts as the focal firm of the potential business ecosystem because it provides different tools for the other actors to develop their operations and create value together. In addition, the company regulates who is allowed into the network thus the case concept can be potentially viewed as a closed business ecosystem in the future. The role of the focal firm was also acknowledged by Company A itself. For instance, it was mentioned that the company sees itself as the engine, director and orchestrator of the network. Moreover, the company recognizes that it has to provide the appropriate support and tools for the network to ensure that the actors can collectively work towards the common objectives of the concept.

The development of multilateral relationships between different actors in a business ecosystem can also be promoted through different technological platforms. As the actors are expected to share timely information about their operations to enhance collaboration and value creation it is crucial that suitable technological systems are chosen to serve the needs of the ecosystem. In the case concept, Company A has chosen a specific system for the formation of the material library and another system for planning the takt construction aspects of the concept which together form the foundation for a production control system. It was noted from both the contractor's and the suppliers' and subcontractors' side that it is extremely important that the used technological systems are simple enough so that they can be utilized by everyone. For example, according to Company D they have a lot of employees who are knowledgeable in digital systems however they also have employees who may not have much experience with the implemented technological tools. Moreover, it was stated that sometimes different technological terms have just been presented as given which has caused some confusion within the company employees. Therefore, the technological platforms have to be considered from the viewpoint of all participating actors and explained in a thorough manner.

Similarly, from the contractor's perspective it was stated that the technological systems used in the case concept have to be uncomplicated and the amount of them has to be as low as possible.

> *[...] if you have to press three buttons it can already be too challenging at the worksite but with two buttons they can still manage and that is why usability is an essential aspect in the digital world. And in terms of the partnerships, this is an important standpoint that preferably small and agile systems than big and stiff. (Interviewee B, Company B)*

When the system is provided by a small company it is more probable that the system can be adjusted according to the circumstances it is used in instead of the other way around. For instance, all of the interviewees regard the role of the technological tools used in the case concept as extremely important however it was pointed out that the system cannot be the ruling aspect in the concept. Therefore, technological systems used in business ecosystems should be supporting tools that enable more effective information sharing and collective planning and development of processes, for example.

Moreover, an interviewee from Company A emphasized how it is not enough that different technological tools are implemented to solutions like the case concept but there also has to be the element of daily management present. The systems can be used to effectively plan what actions should be performed during a specific time span however there should also be regular meetings where the situation of the project is reviewed. The interviewee highlighted that suppliers and subcontractors should attend these meetings therefore daily management can be used in the development of more collaborative relationships between the potential partners. The more the partners interact with each other the more information they can share with each other thus possibly increase the value in the network.

Even though the usefulness of developing the strategic partnerships into a business ecosystem is evident among the actors of the case concept the road to truly reach this goal is long. As the concept is in its piloting phase, deeper collaboration between the different partners is still absent. Nevertheless, interviewees from Company A highlighted that the company constantly tries to plan and develop the processes of the concept to better encourage collaboration between the partners. As an example, it was mentioned that Company C has started to collaborate with a design company from the network. However,

both Company C and Company D stated that at the moment closer interactions with some of the partners are not needed.

> *But it is a fact that some of the partners provide more advantage for us and others we do not necessarily have to interact with because their operations do not directly affect our operations. (Interviewee F, Company C)*

> *Everyone has their own box. Maybe it is for the best at the moment. (Interviewee G, Company D)*

Therefore, the formation of business ecosystems can be hindered by the traditional way of working in silos and in general by the culture of the construction industry. Yet, Company C and Company D recognized that as the concept develops and the needs of the concept are better understood there will most likely be more cooperation between the partners. That is why the focal firm has to find the specific interfaces of the projects to understand how the collaboration and co-creation of value can be progressively added in the network.

The deep-rooted silo working in addition to the overall self-centeredness of actors in the construction industry also prevents actors from understanding their role in the bigger picture. For instance, both Company C and Company D reported that they are very aware of their own roles in the case concept. On the contrary, according to the interviewees from Company A the partners are somewhat aware of the entirety of the concept but they do not completely understand their roles and obligations in it. In fact, one interviewee mentioned how the management of Company A and the management of a potential partner had to be brought together because the partner did not understand its role in a significant area of the concept. In business ecosystems it is important that the actors understand their roles in the network because the focal firm can eliminate actors from the ecosystem if it believes that they are affecting the health of the ecosystem negatively. Thus, when companies form business ecosystems it is crucial that it ensures that all the actors understand what is expected from them.

In addition to the confusion around ecosystem roles, the lack of openness and trust between the partners were recognized as possible barriers of developing deeper multilateral relationships. It was mentioned by several interviewees that in order for the case concept to reach a more networked structure it is important that information is shared

openly to ensure transparency in the operations of the concept. Furthermore, the transparency enables that the created value is recognized properly and thus shared equally between all the partners, However, the level of trust and willingness of sharing critical information is in general low in the construction industry therefore it can cause challenges in the network relationships.

> *Of course everyone understands that all firms are guided by specific trade secrets and they have information that they do not want to share because it maintains the competitive advantage of the firm. (Interviewee A, Company A)*

Furthermore, it was mentioned by Company A that in order for the potential partners to share critical information such as cost structures with Company A it requires a lot of trust between the companies. Trust in turn requires a lot of time and effort therefore it raised questions if the partners are ever able to form a sufficient level of trust where they are comfortable in sharing information with each other. For example, Interviewee B noted that there has not been any friction between the partners yet but it is to be anticipated because it is common among companies in the construction industry. However, Company C and Company D both believe that when the actors of the network gain more shared experience from different projects it slowly lowers the threshold of sharing information and thus increases the level of trust. Therefore, it is important that the actors in the business ecosystem have the opportunity to work together in several projects.

Overall, the attitudes towards business ecosystems in the case concept were positive. When it comes to the scaling of the concept into other projects as well to promote the formation of other potential ecosystems, it was highlighted that the production control system should be developed into a state that it can be standardized. When the material flows and processes are standardized it provides projects a specific way of building thus makes construction more productive. It was also emphasized that in order for the concept to be successfully scaled it requires the network of partners around it. With strategic partners the projects can be better planned and executed because they are more involved in the entire construction process. Furthermore, it was stated by a few interviewees from Company A that the so-called standardization of partners requires that there is a person who is responsible for the management of the partnerships to enable a more comprehensive understanding of the overall situation of them. Even though there are many aspects that should be standardized to ensure the scaling of the concept to other projects it was

underlined by several interviewees that in practice the operations have to be direct, flexible and agile. Moreover, it was mentioned that as construction is predominately based on the interactions between people it should be noted that the determined processes may not always go as planned. Therefore, even in standardization there has to be room for adjustments.

7 CONCLUSIONS

The aim of this study was to investigate *how strategic partnerships can be utilized in the formation of business ecosystems in the construction industry.* The issue was approached through three sub-objectives which were 1) why is an industrial renewal relevant in the construction industry, 2) what types of strategic partnerships are there in the construction industry, 3) what are the potential benefits of the ecosystem approach to the construction industry. In this chapter, the conclusions of the study are presented. Firstly, the theoretical contributions will be introduced meaning that the findings of the study are reflected on previous literature. Secondly, the managerial contributions are presented to provide practical suggestions for construction companies that are planning on forming business ecosystems. Thirdly, the limitations of the study are discussed. Finally, suggestions for future research are presented.

7.1 Theoretical contribution

Both previous literature and the findings of this study emphasize how the construction industry is in need of major changes to become productive and competitive in the long run. Several researchers (Dubois & Gadde 2002; Håkansson & Ingelmansson 2013; Pulkka et al. 2016) have highlighted how the focus on individual projects, lack of deeper collaboration and poor sharing of knowledge between different actors have all contributed to the stagnant nature of the industry and hinder the development that the industry greatly requires. These aspects were brought up in the study as well with a strong emphasis on the challenges caused by the high turnover rate of actors at each project due to the project-based nature and competitive tendering. When the group of actors differs at every worksite it prevents the formation of deeper relationships and collaboration between different actors and thus limits the sharing of knowledge between them.

In addition, the lack of continuity is seen as a significant barrier for the implementation of standardization in the industry. However, the findings of this study also challenged the idea of the complete lack of closer relationships because it was noted that there are a lot of personal relationships between contractor employees and suppliers and subcontractors they have worked with before. One reason for this can be that as construction is strongly tied to its local environment (Nam & Tatum 1988, 134), it is easier to contact a familiar company that has proven to be efficient in the past, especially at projects that are in a remote location.

When it comes to the poor collaboration between different actors in the industry, the disintegration of especially the design and construction process was found to add to the problem. It has been noted that when designers do not utilize the specialized know-how of suppliers and subcontractors, for example, the possibility of rework is higher because the designs may not take the practical issues of construction into consideration (Love et al. 1999, 8). The findings of this study support this view because it was pointed out that the early involvement of acknowledgeable actors could help to decrease the amount of poor execution decisions. However, often the suppliers or subcontractors are seen just as the providers of the material or subcontracting.

Furthermore, the strict contracts that are formed between the contractor and suppliers and subcontractors ensure that when the procured service or material has been delivered, the maturity of the relationship has been reached as well (Cox & Thompson 1997, 128). Therefore, the relationships do not have room for more long-term collaboration. In fact, it was brought up in the study that the inflexible contracts with sanctions and demands cause a lot of tension and bickering between the different actors, thus the motivation for deeper cooperation is decreased. Hence, the construction industry is in need of a different approach to the relationships between different actors.

As the current approach to collaboration between different actors is seen as suboptimal, the interest in strategic partnerships has increased in the construction industry. There are several definitions of strategic partnerships, and thus it can be implied that there are several types of these partnerships in different industries. According to Beach et al (2005, 613), strategic partnerships between construction companies are intense relationships that include strategic collaboration across multiple projects and require the partners to invest in the development of the relationship. In addition, strategic partnerships must entail three significant elements, which are intellectual capital, added value and trust (Ståhle & Laento 2000, 26).

In this study, similar findings were found as the longevity that includes mutual long-term development ideas, ability to create something that is not possible to do alone and knowledge sharing were emphasized to be important in these partnerships. Furthermore, it was pointed out that openness and transparency are crucial for the equal sharing of the added value and thus for the building of trust between the partners. However, both the findings of the study and previous literature emphasize that overall the level of trust is low in the industry, which can prevent the formation of proper strategic partnerships (Gadde & Dubois 2010, 257).

The types of strategic partnerships can also be affected by what are expected from them. When it comes to the knowledge sharing between the partners, previous studies emphasize that in strategic partnerships this includes the sharing of critical information especially about core competencies (Mohr & Spekman 1994, 139; Ståhle & Laento 2000, 94). The findings of this study highlight how the expectations of what is shared varies between contractors and suppliers and subcontractors. In this study the main contractor wants the potential partners to share their cost structures in order to manage costs and risks more efficiently. On the other hand, the suppliers and subcontractors expect the contractor to provide outlook on future projects to increase the stability of their operations. However, a common view was that the information that is shared has to be timely and has to reach all company levels from the management level to the worksite level. According to Mohr and Spekman (1994, 138) this is important in terms of reaching mutual goals of the partnership. Thus, partners have to ensure that their relationship is structured so that information can flow smoothly and thus mutual benefits such as cost savings and increased satisfaction between the partners can be achieved from it.

Even though strategic partnerships are beneficial for the partners, the increasing demands of different stakeholders and critique towards the unproductive state of the industry have pushed construction companies to examine other approaches to answer to these issues, such as the business ecosystem approach. As usually the cooperation between different actors of the industry is poor and the relationships are bilateral, the formation of a network that requires multilateral relationships can be challenging. However, the findings of this study suggest that strategic partnerships can be utilized in the formation of these ecosystems. First of all, strategic partnerships can be used for recognizing the core business of the business ecosystem. As Gadde and Dubois (2010, 257) emphasize contractors have several suppliers and subcontractors for the same categories to ensure that they have options to choose from. However, this does not encourage lasting relationships with any of the options. The findings of this study indicate that strategic partnerships are seen as essential for the potential ecosystem because it ensures that the same actors are remain unchanged from project to project, therefore enabling the creation of a mutual solution.

Moreover, the study implies that as the strategic partners are chosen carefully with the help of different relevant criteria, such as digital capabilities in the case concept, it ensures that the right actors for the specific purpose of the ecosystem are included in the network. Correspondingly, Williamson & De Meyer (2012, 27) state how it is important that the business ecosystem has a sufficient amount of capabilities and diversity to be able

to serve the output of the ecosystem even if they are faced with disruptions. Thus, it can be suggested that strategic partnerships can be utilized as a method for forming a closed ecosystem. This is a new perspective because previous literature indicates that technological platforms and their standards are used to control the membership of the ecosystem (Iansiti & Levien 2004, 162; Gulati et al. 2012, 576). However, in this study technological platforms were seen as tools for planning processes, information sharing and promoting more networked collaboration.

The importance of strategic partnerships in the formation of business ecosystems was also evident when looking from the viewpoint of the required multilateral relationships. Previous literature suggests that bilateral partnerships can expand into multilateral relationships because the partners are introduced to other partners, thus allowing new connections to form (Kale et al. 2000, 218). Furthermore, as the level of trust is low in the construction industry, referrals are seen as important when forming new relationships (Bygballe et al. 2010, 246). The findings of this study support this as it was mentioned how the presence of constant actors has enabled the different partners to interact more often than in usual projects. It was also emphasized that all the actors expect more regular meetings for the multilateral relationships to really develop. In addition, it was seen as a possibility that some partners may work together in other projects outside of the case as well if they prove to be effective. Thus, it can be implied that strategic partnerships can be utilized in forming more multilateral relationships.

When it comes to the potential benefits of business ecosystems, the findings supported the statements made in the theoretical framework to a large extent. As clients and other stakeholders expect more value from their investments, it has pressured many companies to develop their products and to create more comprehensive solutions to answer to the expectations (Williamson & De Meyer 2012, 24; Aapaoja & Haapasalo 2015, 115). However, when companies develop products alone the complementariness of products that is central in the construction industry may be challenged (Pulkka et al. 2016, 132). The findings of the study imply that in a business ecosystem the products and solutions can be developed together and thus answer more effectively to the demands of the stakeholders. In addition, it was highlighted that the involvement of a more extensive network at the early stages of construction, such as the design phase ensures that a larger pool of information is available and thus better execution decisions are made. This is also evident in strategic partnerships (Beach et al. 2005, 615). However the findings of this study imply that in a business ecosystem it is more probable that even groundbreaking solutions

are created. Thus, business ecosystems can potentially make the construction industry more innovative.

Based on the findings made in this study, it can be implied that the most significant potential benefit of the business ecosystem approach to the construction industry is the ability to implement standardization of materials and processes. When companies collaborate in a more frequent manner, it creates opportunities for the companies to detect materials or processes that can be possibly standardized (Aapaoja & Haapasalo 2015, 111). This was supported by the findings as it was stated that the collaboration between multiple projects enables the actors to identify dimensions of materials that are stable and dimensions that have to be adjusted for different projects. According to Beach et al. (2005, 615) Thus, it can be implied that ecosystems enable the formation of a comprehensive material library that can increase the effectiveness of material production. Moreover, when the materials are more standardized, it enables more accurate planning of the material flows, thus helping to standardize processes through takt construction, for example. This in turn can facilitate more effective worksite operations which increases the overall productivity of the construction process. As a third of the productive work at worksites is paid idle time (Aapaoja & Haapasalo 2015, 110), the need for standardization is substantial.

Nevertheless, the findings of this study suggest that the construction industry may not be equipped for the formation of business ecosystems yet. One reason for this is that some of the contracting models used in the construction industry are not seen as suitable for the implementation of business ecosystems. Peltonen and Kiiras (2013, 40) point out that contracting models distinctly state what is expected from both the contractor and the used suppliers and subcontractors at projects which can affect if an ecosystem is suitable for the project or not. Moreover, the findings suggest that in some cases the client provides the designs of the project, thus eliminating the ecosystem's ability to affect how the project is executed. Therefore, the current contracting models may prevent companies from forming more comprehensive solutions with its ecosystem.

Moreover, the actors in the industry are used to working in silos, which according to the findings, can prevent actors from understanding the entirety of the ecosystem resulting in unclear roles in the network. Ecosystem actors should understand their roles in the network to be able to reflect if they are giving enough to the network, if they should put more effort in it or in some cases even contemplate if they should leave the entire network (Iansiti & Levien 2004, 130). The findings also imply that the low level of trust and openness between different actors in the industry can restrain more deeper collaboration and

sharing of information, which is crucial for the business ecosystem to be effective and to create value. The supplier and subcontractor of the case concept did not even see the need for more multilateral cooperation at the time of the study which indicates that the willingness to operate in a more collaborative and networked environment may not be strong enough in the construction industry yet. Therefore, construction industry companies require a major shift in attitudes especially in terms of relationships to enable the formation of business ecosystems in the future.

7.2 Managerial contribution

Some of the findings of this study can also be translated into practical guidelines that can support the efforts of developing strategic partnerships into business ecosystems. First of all, as strategic partnerships are reasonably new in the construction industry, it is important that the potential partners clearly define what the partnership means to both parties. According to the findings and previous literature, it is crucial that the partners set mutual objectives to create a long-term outlook and direction for the development of the partnership. Moreover, as strategic partnerships are expected to bring added value to both partners, the partnerships should entail some kind of indicators that measure this value and thus increase the commitment to the relationship.

Another significant aspect that should be taken into consideration when forming strategic partnerships is the involvement of higher management. When the management is engaged in the partnerships it can help the entire company to understand what partnerships require and what possible adjustments should be made for them to be possible. Moreover, as it was brought up in the findings, not all companies are in reality as committed to adjust as they say, therefore this pressures the management to reflect on if the company is even willing to change. In addition, the findings of the study suggest that in some cases companies should even consider making considerable changes such as transitioning to a matrix organization to better accommodate the formation of more collaborative relationships with different actors.

When it comes to the development of strategic partnerships into business ecosystems, the findings of this study implicate that the most substantial way to do this is to have regular meetings with all of the partners together. The responsibility of arranging these meetings is especially directed at the keystone of the business ecosystem as it functions as the linkage between all the partners. Furthermore, it would be important that the focal

company engages in daily management to ensure that meetings are not only held on appointed times but also when they are seen as needed at the worksite.

Moreover, as technology is slowly becoming more widespread in the construction industry, it is important that the keystones provide suitable technological tools for enabling information sharing between all the partners. Even though there are countless options for technological platforms, previous literature and the common view among the companies of this study emphasize how these platforms have to be simple and serve the purpose of the ecosystem. Therefore, it would be beneficial for future business ecosystems to choose platforms that are straightforward but at the same time agile. When the information sharing between the partners in the business ecosystem is made easy, it encourages frequent interactions between all actors of the ecosystem thus promoting the development of more multilateral relationships.

7.3 Limitations of the study

There are some limitations that have to be taken into consideration in terms of the study. Firstly, as this study focuses only on one infrastructure case in the construction industry, the findings of the research may not be applicable to the entire industry or to other industries. As it was mentioned in the case description, parking garages were chosen as the piloting project because parking garages are rather simple end products with reoccurring material and work categories. However, as usually different end products in the construction industry are seen as complex and unique, the business ecosystem approach in addition to the standardization efforts of different materials and processes may not be suitable to all projects. Moreover, as the majority of the participated interviewees represented the case company and only two interviewees represented the suppliers' and subcontractors' point of view the findings cannot provide a comprehensive view of the contractor and supplier and subcontractor relationships which was the focus of this thesis. Therefore, a more versatile set of companies should be interviewed to increase the generalizability of the study.

Additionally, since both strategic partnerships and business ecosystems do not have a unified definition especially in the construction industry context, the definitions and interpretations made by the researcher for the purpose of this study have an impact on the findings. Moreover, as the definitions were created by combining and excluding aspects of several previous interpretations to better fit the characteristics of the construction industry, the definitions may not be relevant in other industries. Thus, in order for future

research to be more accurate and comparable across multiple industries, a more consolidated definition of both concepts should be formed.

Lastly, it should be noted that the findings of this study are mostly based on the expectations of the interviewees as strategic partnerships and business ecosystems are not yet commonplace in the industry. The case concept is only in its piloting phase and official strategic partnerships have not yet been formed between the actors. Therefore, a study conducted in a more advanced setting can result in different findings.

7.4 Suggestions for future research

The novelty of the business ecosystem approach in the construction industry, especially from the viewpoint of relationships between the actors provides various opportunities for future research. As this study focuses only on one case from infrastructure construction, it would be beneficial to conduct a multiple case study from different construction industry sectors to gain more comprehensive and versatile view of the business ecosystem concept in the industry. In addition, it would be interesting to involve more actors from the ecosystem, such as clients and competitors, in the research to gain perspectives from outside the core business.

Moreover, as the potential business ecosystem of this study has not been established yet, research on an ecosystem that has operated for a while could provide more answers on how the relationships between actors have developed over the course of time. On the other hand, this research could also be conducted as a longitudinal study where the development of the business ecosystem is examined more carefully. This angle could shed light on if strategic partnerships are an effective way to bring actors together and develop multilateral relationships between them or if there are some other approaches for the formation of these relationships. Business ecosystems are more prevalent in other industries, therefore it can be expected that there are several ways to create the relationships.

On a more general level, a valuable direction for future research would be to examine in more detail how the different contracting models used in the construction industry affect the applicability of the business ecosystem approach in the industry. For instance, as it was mentioned in the findings of this study, the more comprehensive solutions that can be provided with the help of the entire ecosystem may not fit the designs presented by the client. Moreover, as clients set strict demands and conditions on the contractors through the chosen contracting model, the contractors in turn mitigate the risk on suppliers and subcontractors thus hindering the formation of deeper and collaborative relationships.

Therefore, it could be useful to find out what contracting models accommodate the utilization of business ecosystems and if clients are willing to adjust their models to permit more collaborative relationships between the different actors.

8 SUMMARY

This study investigated how strategic partnerships can be utilized in the formation of business ecosystems in the construction industry. Despite of the general low level of co-operation between different actors in the industry, the interest in strategic partnerships has been on the rise. However, these bilateral relationships may not be enough to answer to the growing demands of different stakeholders, therefore business ecosystems may be a beneficial approach for companies to form multilateral relationships and to co-create value. Moreover, as there is a lack of business ecosystem research especially from the relationship-based view in the industry, this thesis aimed to provide some insights by conducting a case study on a parking garage concept in which strategic partnerships are planned to be formed and the target end state can be viewed as an ecosystem.

The theoretical background of this study was constructed from previous literature on the construction industry, strategic partnerships and business ecosystems. It was seen as important to examine the prominent characteristics of the industry such as the project-based nature, high specialization and fragmentation because they have been considered as reasons for the industry's inability to develop and become more productive. In addition, as strategic partnerships are a relatively new concept in the industry, their definition, central elements and potential benefits and shortcomings were examined in more depth. Moreover, business ecosystems can be viewed as ambiguous therefore a comprehensive description of them, the roles they entail and the overall structure were provided. Also, the potential ways strategic partnerships can operate as foundations for business ecosystems and what potential benefits can be gained from the formed ecosystem were explored.

The findings of the study support that the construction industry is in need of changes to its current ways of operating, because they do not promote collaborative relationships or even the improvement of the low productivity. The research also showed that even though strategic partnerships are not common in the construction industry, the definitions and expectations for them were very similar across companies. However, the willingness to adjust operations to enable the formation of strategic partnerships varied between the contractor and suppliers and subcontractors, the former being less willing to change and the latter more willing.

The main finding of the study was that strategic partnerships can be utilized in the formation of business ecosystems. It was noted that these partnerships can be used to identify the core business of the ecosystem, ensure that the ecosystem has enough

capabilities and diversity to survive disruptions and encourage the development of multilateral relationships between the partners. Moreover, the potential benefits of business ecosystems were identified to be better ability to answer to stakeholder demands, implementation of standardization in the industry and increase in productivity. However, the prevalent characteristics of the construction industry, such as the low level of trust and fragmentation, can noticeably hinder the efforts of forming business ecosystems in the industry.

Thus, the findings of this study support that strategic partnerships can be utilized in the formation of business ecosystems in the industry but there are a lot of issues that need to be solved before these ecosystems can be successfully realized. Therefore, it is important that there are piloting concepts, such as the one studied in this thesis, to assure the actors in the industry that business ecosystems can make the industry more competitive in the long run.

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APPENDICES

Appendix 1 The interview questions

1. What kind of relationships does your company have with other actors in the industry?
2. What kind of effect does the project-based nature of the industry have on the relationships?
3. What kind of effect does competitive tendering have on the relationships?
4. How do you perceive the current level of collaboration and relationships in the industry?
    a. How could the relationships be developed?
5. What kind of benefits could be achieved through standardization of materials and processes?
6. How do you define strategic partnerships?
7. What kind of features are expected from the strategic partners?
8. What kind of benefits are expected from strategic partnerships?
9. How can commitment to strategic partnerships be encouraged to enable the realization of the benefits?
10. Is your company willing or ready to modify ways of operating to enable the formation of strategic partnerships?
11. What resources or information should be shared in strategic partnerships?
    a. How are resources or information shared between strategic partners?
12. How is working towards mutual goals measured?
13. What kind of relationships do the potential partners of the case concept have with each other at the moment?
14. What is the role of the case company in the case concept?
15. How are the roles of the potential partners perceived?
16. What kind of role does the larger network such as clients, competitors and agencies have in the case concept?
17. What is the role of the technological platform in the case concept?
18. Do all actors in the case concept work towards a shared solution or value proposition?

a. Can the demands of stakeholders be answered better with a shared solution or value proposition?

19. How can bilateral partnerships be developed into multilateral collaboration between all the actors of the case concept?
20. What benefits can be achieved through multilateral collaboration and relationships?
21. How can the equal sharing of benefits be ensured between all the actors of the concept?
22. What resources and information should be shared in a multilateral network?
    a. How should the resources and information be shared?
23. What processes should be standardized for enabling the scaling of the case concept to other future projects as well?