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SCHOOL OF BUSINESS, ECONOMICS AND LAW

Learning from Innovation Collaborations

An exploratory study of learning practices and challenges in innovation collaborations by large organizations in Sweden

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Acknowledgement

My journey throughout the master's program was an enriching one. I came to pursue my studies at a place which stands at the complete opposite end of the spectrum in all aspects compared to my homeland. Deep inside I was looking for an adventure and I was not let down.

Studying almost the full program online and then conducting a thesis during the pandemic in another country was not an easy feat. However, I must say the whole experience has made me reflect hard on myself, made me more aware of my strengths and capabilities along with my weaknesses.

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My thoughts are with my family back home, who went through the toughest battle while I was here pursuing my dream. Thank you for your unconditional love and support. I believe my father is in a better place now, and I have his blessings for my coming days.

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Abstract

Innovations are regarded as a principal source of competitiveness and renewal in organizations. Given the complex nature of products and services along with the pressure of faster time to market which increases the inherent risk of any innovation, it is now almost impossible to constantly innovate for any organization with collaborating with others. Innovation collaborations are now more commonplace than ever. The connection between learning and innovation is a close one; learning enables innovation and the innovation process itself is a learning process. Therefore, it is imperative now that organizations focus on the learning aspects of innovation collaborations and effectively learn from them.

The thesis was aimed to explore how large companies in Sweden capture value from innovation collaborations in the form of learning, through investigating the learning practices in the innovation collaborations and identifying the challenges that impedes the learning process. The methodology used were literature review and an explorative cross-sectional study conducted through semi-structured interviews, which were analysed using thematic analysis method. The learning practices were investigated in connection with selected prominent learning concepts that are relevant in innovation collaboration context. The identified challenges of learning were analysed at both organizational and partnership level, leading to the conclusion that learning in innovation collaboration is a complex process intertwined in between individual, organizational, and inter-organizational level. Large organizations' outlook towards innovation collaborations and their partners largely shapes the collaboration dynamics that eventually impacts the successful management of collaboration and learning.

Keywords: *organizational learning, inter-organizational learning, innovation collaboration, inter-organizational collaboration, learning practices, learning challenges*

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1. Introduction

In this first chapter, the research theme is established through discussing the theoretical background and the problem discussion. Then the research question and purpose are presented in light of the background and problem discussion. At the end, delimitation and disposition of the thesis are presented as well.

1.1 Theoretical Background

Innovation has been recognized as an important success factor for organizations in today's hyper-competitive business environment (Dodgson, Gann & Phillips, 2014). It is well established in the literature that constant innovation is the key to achieve and maintain competitiveness (ibid). As per Schumpeter's (1934) definition, innovation involves new combination and in modern economics, it is almost impossible for one organization to develop range of capabilities in all aspects of a business i.e., research, technology, marketing etc to create new combinations for competitive advantage (Dodgson et al., 2014). At the same time, customer requirements have become more complex; product and service features are therefore becoming more advanced and complicated mirroring those requirements (Calia, Guerrini and Moura, 2007). Faster time to market is always a factor of competitiveness and evolving uncertainties and risks remain as inherent characteristics of innovation and product management (Oxley and Sampson, 2004). These dynamics of innovation-based competition, market and risks have pushed organizations outside their boundaries to look for alliances and collaborators to effectively produce innovation for quite some time now (Dodgson, 2011). As Salter and Alexy (2014, pg 26) argued, "Collaboration is a stylized fact of innovation".

Innovation collaborations can be defined as "inter-firm relationships in which one firm takes a collaborative approach to its innovation activities by involving external partners" (Smirnova, Rebiazina & Khomich, 2017, pg 126) and "combining knowledge, technologies, and other resources across organizational boundaries" (Davis & Eisenhardt, 2011, p. 160). In an environment where innovation-based competition has gained increased importance (Teece, Pisano, & Shuen, 1997), innovation collaborations and networks are the way of gaining access to new knowledge, resources and market (Dodgson, 2011). The significance of inter-organizational partnerships, aka innovation collaborations and networks, for organizing innovation activities are also emphasized by the modern model of innovation process - the fifth or sixth generation innovation process (Miller and Morris, 1999; Nobelius, 2004) or the open innovation model (Cheshbrough, 2003).

There is a close connection in between innovation and learning. Learning has been identified as an important factor of innovation both conceptually and empirically (Alegre & Chiva, 2008). The innovation process itself in essence is a learning process (McKee, 1992) and the learning capabilities of an organization has been seen to have positive impact in its innovation performance (Lundvall & Nielsen, 2007). Taking cue from the already established practice of inter-organizational partnerships for innovation, Miettinen et al. (2008) conducted a study of learning and organizational collaboration for product development where they highlighted the importance of boundary-crossing innovation and learning for the long-term organizational

strategy. On the strategy level, learning is a crucial success factor in creating innovative organizations (ibid).

Lampela (2009, pg 14) argued that "Learning is strongly related to competitiveness through innovation and renewal". Overtime organizations especially large ones become introspective due to their well-established routines (March, 1991), which creates competency traps (Leonard-Barton, 1992) and eventually restricts their ability to innovate and compete (Dodgson et al., 2014). Collaboration works as an impetus to learn about technologies, practices, and strategies in other organizations (Child and Faulkner, 1998). The process of learning from collaboration partners in the form of inter-organizational learning helps large organization to reflect back on its own routines, "question the status quo, and examine and assess the relevance and applicability of different approaches and practices in partners" (Dodgson, 2014, pg 466). Therefore, the importance of learning in the context of collaboration and networks has been recognized as a possible source of competitive advantage for a firm (and also for the network), especially in today's turbulent environments where innovations have a high value (Knight, 2002; Lundvall & Nielsen, 2007; Martínez-Noya and García-Canal, 2016).

1.2 Problem discussion

The organizational learning phenomenon is widely researched, but it remains scattered till date as noted by different reviewer during the last three decades i.e., Fiol & Lyles (1985), Easterby-Smith (1997), Easterby-Smith, Crossan & Nicolini (2000), Shipton (2006) and Do & Mai (2021). The actual learning process at the functional level, however, remain as a 'black-box' in the organizational learning research since learning is mostly studied in connection with a positive outcome like company performance or competitive strategy (Do & Mai, 2021).

Accordingly, the importance and impact of learning within and form collaborations is also well researched in literature. As Easterby-Smith, Lyles and Tsang (2008) argued, organizational learning researchers got more interested in inter-organizational aspect of learning along with the rise of collaborative business networks. In line with this argument, we have seen conceptual models of organizational learning process to be adapted to the level of inter-organizational learning (IOL); for example, the 5I model proposed by Jones & Macpherson (2006) expanded from the 4I model of Crossan, Lane & White (1999). Even then, research concentrating on the actual practices and barriers of IOL remains very limited. This phenomenon was acknowledged very recently by Anand, Kringelum, Madsen & Selivanovskikh (2020).

In their bibliometric review of IOL research, Anand et al. (2020) identified prominent areas and themes of IOL research from 124 publications within 2009 and 2019. The seminal papers center arounds either the impact and role of IOL in different contexts (i.e., society, institution, the innovativeness of individuals and organizations, supply chain networks) or focuses on the role of different factors (i.e., the role of social capital, trust, explorative and exploitative capability, and absorptive capacity) on IOL. One of the emerging research themes in IOL is the role of innovation (ibid). Papers with innovation theme mostly reflect on the causal relationship between IOL and innovative performance or are connected to the fundamental learning paradox of exploration and exploitation with additional focus of ambidexterity at the collaboration level (ibid). Anand et al., (2020) also highlighted that learning patterns in innovation collaboration context have been mainly explored through case-studies (Holmqvist 2004, Lampela 2009) and there is a need for more exploratory research to develop a common understanding of the practices and challenges.

1.3 Purpose and research question

Given the established notion that learning is necessary for strategic renewal and competitiveness, the purpose of this thesis is to explore how large organizations actually learn in the context of innovation collaborations. Focusing on large organizations' perception towards innovation collaborations and investigating learning practices and associated challenges in them, the purpose is to understand empirically how learning happens at the functional level when these organizations collaborate with other companies for innovation. This leads to the research question of the thesis:

How do large organizations learn from innovation collaborations?

To answer the above research question, the following sub-research questions have been formulated:

I. *How do large organizations perceive innovation collaborations and learning from them?*
II. *What are the practices of learning within innovation collaborations?*
III. *What are the challenges of learning from innovation collaborations by the large organizations?*

Organizational learning is a fairly old concept and have been explored extensively in the literature. However, the context of learning here, which is innovation collaboration, makes the research question relevant as discussed in the last sub-section. While there is research on different types of collaborations and their role in learning, the perception of large organizations towards innovation collaborations and their partners sets a critical background for the collaboration itself and the learning mindset. Learning practices will be investigated in line with established organizational learning concepts that are relevant in inter-organizational collaboration context. The challenges of learning from innovation collaborations will be explored at different levels i.e., at both organizational and partnership level to understand the underlying dependence in between and if the challenges impact the learning practices anyhow. Therefore, looking through the point of view of the large organizations, the thesis aims to contribute to the existing literature in understanding the practical dynamics of innovation collaborations that eventually shape and impact learning by the participants.

1.4 Delimitations

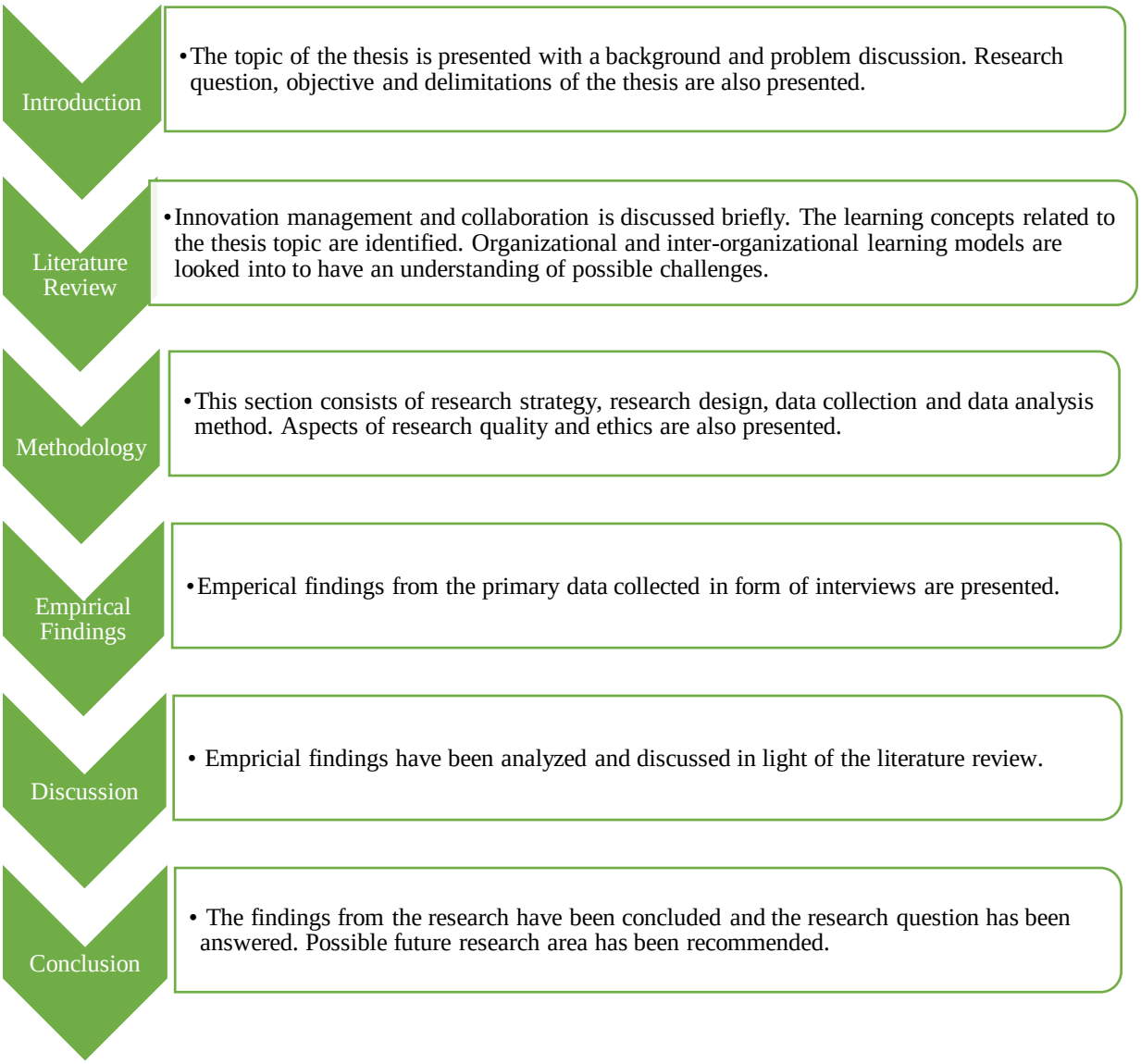
The research has been restricted with some limitations regarding the scale and in turn empirical findings. The study was based on large companies operating in Sweden and how they deal with innovation and learn from their collaboration partners. It is important to keep in mind that all innovation projects and collaborations in every organization have different goals and requirements, and deal with different degree of innovation. The radicality of innovation in the collaborations and their connection towards learning practices and challenges are not considered separately.

In this study, learning is investigated mainly at the organizational level, partly also at the inter-organizational level given the context, but individual level learning is as kept out of purview. The content of learning is not the focus of the study, rather the focus is on practices and challenges around learning as a whole, since identifying specific learning content from innovation activities is difficult and can make it hard to investigate that empirically. Also learning is investigated as a full process, different stages of the process i.e., knowledge creation, accumulation, transfer, or internalization and their associated practices and challenges are not looked into separately.

Lastly, since the focus of this research is on learning from collaborating partners, the study is kept limited to business-to-business collaborations. Innovation co-operation with end users i.e., crowd-sourcing, or open innovation with consumer markets have not been included here.

1.5 Disposition of the thesis

The thesis consists of six chapters, which gives it an easy-to-understand structure. The content of each chapter is briefly described below:



2. Literature review

In this chapter, relevant literature for the research topic is presented. Firstly, innovation, innovation management and innovation collaboration & networks have been explored. Then different types of organizational learning and selected learning concepts relevant in collaboration context have been discussed. Finally, two different learning models have been looked into to have an idea about possible challenges that may impede learning.

2.1 Defining Innovation

Innovation has been defined in many ways in the literature. The common perception about innovation is the dictionary definition of it, which is 'introducing something new'. Austrian economists Joseph Schumpeter popularized a broader concept of innovation in the 1930s which strongly influenced the field of economics later on (Goffin and Mitchell, 2017). According to Schumpeter (1934), innovation can be the introduction of a new or improved product, new methods of production, opening of a new market, using a new supply sources or new forms of competition. The key to this definition is 'new', however it is not limited to new product concept but rather expands along the whole process around it. Michael Porter (1990) defined innovation in a much similar way, focusing also on improvement of technologies and better ways of doing things and emphasised that innovation may result not only from formal R&D but also from organizational learning. According to Miller and Morris (1999), innovation has a business aspect, and a novel invention can be innovation only if that has been commercialized also.

The understanding of innovation has evolved overtime and now it is widely accepted that innovation is rather a process than a moment of novel ideation. A wider definition of innovation can be "a process of turning opportunities into new ideas and putting these new ideas into widely used practice" (Tidd et al., 2001, pg 38). According to this definition, innovation can impact several aspects of a business i.e., product, service, process, or organization (Tidd, 2001). Innovation can also be categorized based on their impact to the existing paradigm – incremental or radical (Goffin and Mitchell, 2017), which eventually can be explained and understood by the degree of influence or change in the current thinking, practices, or solutions (Lampela, 2009). The competitive environment of an organization dictates which innovation area it should focus on and at what level, such as product and service innovation, process improvement or innovation, radical or incremental innovations, business model innovation etc (Goffin and Mitchell, 2017).

In this study, innovation has been considered as a broader concept that focuses on developing a new product, service or process or a combination of all or any two of the three. Different types of innovation are a relevant discussion while looking into several learning concepts, however, it is not really very straight forward to distinguish the degree of innovation. Thus, the radicality of innovation was not taken into consideration while conducting the empirical study.

2.2 Innovation Management

The concept of innovation management is important for this study which is focused on the learning aspects of innovation and much of the innovation activities in organizations are information and knowledge intensive requiring the organizations to continuously learn from the processes. Innovation management is defined as the complex process of managing information and knowledge both inside the organization as well as outside, at inter-organizational level (Nonaka & Teece, 2011). Innovation management literature talks about the concept of *generations of innovation*, organization of innovation activities and different focus of innovation being the key discussion areas. Successful innovation management entails around the classic paradox of organizational focus on two distinctive innovation processes: exploitative and explorative, giving birth to further concepts of innovation portfolio management which advocates to have a set ratio of incremental, breakthrough and radical innovation processes in line with the organizational strategy (Goffin and Mitchell, 2017).

Throughout time, the way of organizing innovation and R&D has been a key research area of management studies. For an organization, the development of R&D practices is an ongoing, continuous activity. Miller and Morris (1999) jotted down several models or generations of R&D concepts that got endorsed by both academia and businesses over time. These R&D generations focused on different contexts and aspects in the development process within an organization. Tidd et al. (2001) and Nobelius (2004) later took the attention to the ecosystem the organization operates in and suggested model of innovation that are based on collaboration and networking among organizations.

The latest school of thought around R&D and innovation process corresponds with the open innovation paradigm introduced by Chesbrough (2003). Open innovation concept introduced a new discourse in innovation management, acknowledging the importance of inter-organizational collaborations and highlighted the necessity of mutual exchange of ideas, knowledge, and resources as sources of innovation. This paradigm shift calls for rethinking of the organizational processes – how to organize innovation across the organizational boundary and also cognitive changes in innovation management thinking (Lampella, 2009). Undoubtedly, this open innovation concept and the open innovation process emphasizes the need for more collaborative form of innovations, fostering external and inter-organizational partnership (ibid).

In order to remain competitive in the long run, an organization needs to harness its capability to innovate, which is a prerequisite of bringing in innovations to the market and also renew organizational operations (Tidd et al. 2001). Nonaka and Teece (2011) considers learning as a key process in innovation and renewal, while Slater and Narver (1995) sees learning as a source and facilitator of sustainable competitive advantage. Again, collaborations and networks are another source of competitiveness, enabling organizations to come up with complex and advanced products or services by focusing on their respective core capabilities (Noteboom, 1999). Collaboration and networking are a way of learning and again, learning can be a key motive for innovation collaborations (Lampela, 2009). Learning from innovation collaboration can further strengthen the organizational insights on its core capabilities, help to develop new competences, question the key logics of doing things in a certain way and equip to change those inherent beliefs and logics (Dodgson, 2014).

The next section will discuss innovation collaborations and networks, their objectives and benefits and the inherent challenges they face.

2.3 Innovation Collaboration and Networks

Similar to the concept of innovation and innovation process, the understanding of an organization's relationship with its environment has evolved over time. Porter (1985) coined the term value chain, where an organization is seen to participate in a 'value creating supply chain' either as a buyer or supplier. Alle (2003) argues that organizations are evolving from that concept to 'value network' where organizations collaborate to co-create value for the customers. Learning plays a significant role in these networks, since value is created through knowledge and information sharing during interactions, rather than conventional physical transaction of products (Knight, 2000).

The necessity and motivation for collaboration and networking has been explained in the academia through different concepts, predominantly with transaction cost theory and resource-based theory (Lampela, 2009). While the transaction cost theory focuses on efficiency and cost-savings, resource-based theory explains networks being the source of complementary resources, knowledge, and learning (ibid). Taking cues from both theories, Noteboom (2004) argues, interfirm collaborations and networks are inspired by the availability of wider knowledge and resources, ability to concentrate on core competencies, access to new markets or technologies, economies of scale, opportunity of cost and risk sharing and above all, the possibility of tapping into new knowledge and learning resulting in innovation in the form of differentiated products.

When the collaboration is directed towards innovation, the positive effect of networking arises from the very intricate nature of innovation itself. Customer requirements are becoming more complex and product features are becoming more advanced and complicated mirroring those needs (Calia et al. 2007). On the other hand, evolving uncertainties and risks are inherent characteristics of innovation and product management (ibid). Thus, it is very logical that organizations seek network partners to complement the resources and capabilities that they do not possess to meet the customer demand, along with the intention of spreading the risk of developing those (ibid). Innovation collaboration is also influenced by the globalization of markets and advancement of technologies. Oxley and Sampson (2004) argue that the pressure for faster time to market and minimising the associated risk are rather forcing organizations to collaborate and network more.

Over time, the nature of collaborations between organizations and their impact on businesses have evolved. The collaboration continuum started with alliances between two separate organizations willing to co-operate due to their complementary needs and capabilities; joint venture was one of the forms of such 'strategic alliances' that got substantial amount of attention both by the businesses and academia (Inkpen, 1998). Inkpen & Crossan (1995) studied the learning aspects of such strategic collaborations, defining them as a source of knowledge and an avenue to access the skills and capabilities of the partner. Lubatkin et al. (2001) studied inter-organizational alliances from learning perspectives and proposed four types of learning alliances – indirect learning alliances, knowledge absorption alliances, mergers and acquisitions and reciprocal learning alliances. The last form of alliances is now the focus of innovation management researcher these days, due to their inclination to joint innovation, creating new knowledge together and thus, co-learning involving multiple partners (Easterby-Smith et al., 2008). R&D consortia, university-industry and government- academia -industry partnership commonly referred to as Triple Helix model of collaboration are now common form of innovation collaborations that have gained popularity in innovation management research (Dodgson et al., 2014).

While the positive outcomes of different sorts of innovation collaborations are well established along with the necessity and benefits of learning within and by the participants, collaboration requires careful orchestration and management to reap the benefits especially in the form of learning (Dodgson, 2014). Partner selection is deemed as a critical factor, due to the paradox that organizations learn more from the partners that are difficult to work with (ibid). Also learning in collaborations work best when there is mutual respect and trust among the participating organization peers, which is why we see researchers and technologists prefer to work with partners with similar level knowledge and expertise (ibid). Dodgson (2014) argues that who is on the managerial seat of a collaboration and their mindset is an important determinant of the collaboration success. Last but not the least, the objective and the review procedure of the collaboration might be different among the partners, which may result into different timeline and parameter of success (ibid). Thus, connecting the action and result becomes difficult in innovation collaborations, which eventually impacts the common learning from them.

2.4 Learning within innovation collaborations

While exploring learning within different organization, it is necessary to understand how an individual organization learns. In the literature, it is widely accepted that organizations are capable of learning and the phenomenon or concept has been termed as 'organizational learning' *and later on as 'learning organisation'*. The root of organizational learning concept can be found as early as 1965 since Cangelosi and Dill discussed the topic (Crossan, Lane & White, 1999). Since then, organizational learning has been explored by different disciples of academia from a multitude of perspectives. And may be for this very reason, there seems to be a lack of convergence or consensus on the definition or the nature of the concepts (Easterby-Smith et al., 2000).

Though rooted in individual learning, organizational learning differs from individual learning (Crossan et al.,1995; Easterby-Smith, 1997) and the learning entity can be group, organization or a group of organizations or network, other than the individuals (Easterby-Smith et al., 2000). Another school of thought argues that organizations learn through individuals, since only individuals have the cognitive ability for learning (Simon, 1991). Apart from having a varied set of definitions, the concept of organizational learning shares some common characteristics: 'it is more than the sum of the individuals' learning and it includes both cognitive processes and activities within organizations' (Lampela, 2009).

According to Argyris & Schön (1996), organizational learning is 'the acquisition of know-how, understanding, techniques and practices which are new to the organization, and as a result of this acquisition, the rules and processes, i.e., the behaviour of the organization is changed' (Lampela, 2009, pg 31). However, Fiol and Lyles (1985) insisted that 'it is essential to note the difference between cognition and behaviour, for not only do they represent two different phenomena, but also one is not necessarily an accurate reflection of the other' (pg 806). This is the premise of the other school of thought that learning is not necessarily always depicted through the change of behaviour but can also happen through change in cognition. Huber (1991) argued in similar notion and stated that an organization has learned if the array of its prospective behaviour is changed.

Based on how the organizational learning has been described, related literature can be divided into two broad categories: one category is focused on different types of learning i.e. single-

loop and double loop learning or cognitive and behavioural learning (Lampela, 2009). The other one is focused on the learning entity, learner or the learning context i.e. individuals, groups, organizations, group of organizations or networks (ibid). More recent studies have their focus on knowledge, knowledge management (which has rather become a parallel concept to organizational learning if not an alternative) and social factors that impact the exchange, creation, and combination of knowledge within and among groups and organizations (Phelps, Heidl & Wadhwa, 2012).

Undoubtedly, the existing literature on organizational learning is extensive, reflecting the constantly changing focus and interest of the researchers. The objective of this study is to understand the concept of organizational learning in innovation collaboration context, where the participating organizations are the learners. Among the vast array of literature around this topic, relevant types and concepts of learnings pertaining to the objective of this study will be discussed in the next sub-sections.

2.4.1 Types of Learning

2.4.1.1 Single loop and Double loop learning

Among many organizational learning models that have been developed over time, probably the most celebrated model is the 'single loop and double loop learning' developed by Argyris & Schön (1976). According to this model, organizations can go through two levels of learning – single loop and double loop learning. The basic proposition of this model is that organizations learn through feedback process (and thus feedback loops are necessary preconditions for learning) and the level of learning is depicted through the decisions and adjustments that have been made in various organizational contexts.

Single loop learning happens when an error is detected and corrected without questioning the basic premise, or value system of the organization (Argyris, 1999). Double loop learning can be said has happened when the same errors are corrected through analysing and altering the underlying assumptions and value system, resulting in changes in the organizational structure and process (ibid). Argyris (1999) argues that both types of learning are necessary in an organization. While single loop learning facilitates efficiency in routine operational activities, double loop learning is necessary for the organization to examine its environment in a new way and address complex strategic issues, which often calls for change in 'what the organization is doing' or 'the way we do things around here' (Argyris, 1999; McKee, 1992).

Now what type of learning happens /is required in an innovation is context specific since different level of development requirement / innovation will lead to different sorts of learning. Lampela & Kärkkäinen (2009) argues that radical innovation can be achieved with double loop learning given that they might change the organizational norms and system, but sometimes even single loop learning might be enough for achieving that. Again, learning is not automatic; it needs to be managed at each of these levels to achieve its desired outcome in terms of innovation (McKee, 1992). Thus, organizations need to identify the degree of innovation and define the optimal level of learning in a specific scenario in order to facilitate learning consciously.

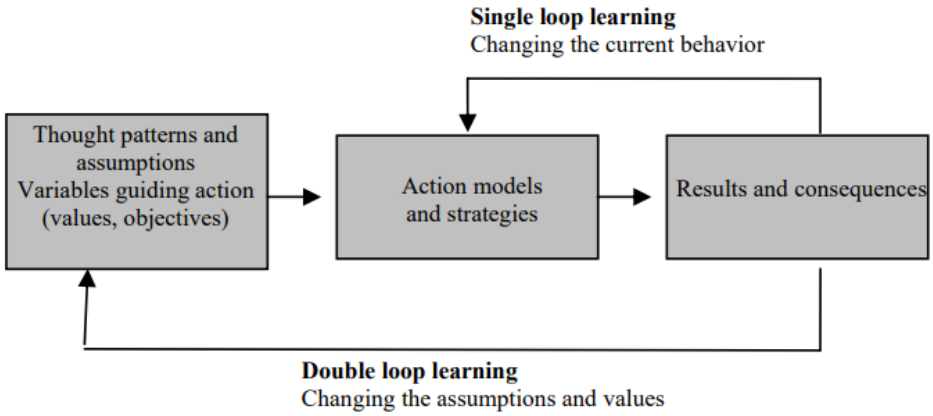


Figure 1: Single and double loop level learning

(Source: Lampela & Kärkkäinen, 2009; adapted from *Argyris & Schön, 1976*)

It can be summarised that single loop learning is sufficient for incremental improvements, but the capability of double -loop learning is essential for organizations aiming to bring in radical or breakthrough innovations (McKee, 1992). In case of innovation collaboration or partnership, the idea of single loop and double learning has similar implications. The participating organizations should be able to amend their course of actions during an innovation project learning from the past and on-going experience (Lampela & Kärkkäinen, 2009). However, they should also be able to question the fundamental concepts behind the common norms and beliefs that are driving the collaboration objectives (ibid).

2.4.1.2 Cognitive and Behavioral Learning

Learning has also been classified having its premise on when an organization can be said to have learned. This concept has its root in pedagogical literature focused on learning on the individual level that have classified learning traditionally into two categories depending on how the learning is considered to take place (Lampela & Kärkkäinen, 2009). The behaviourist view opines that observable change in behaviour is necessary for learning to take place (ibid). The cognitive view has just the opposite opinion and suggests explicit changes in behaviour is not necessary to conclude for learning to have happened and that change in behaviour can only be part of adaptation to a situation instead of actual learning (ibid). The cognitive school of thought advocates that change on the cognitive level, leading to potential changes in behaviour, is enough evidence of learning to have been occurred.

Similar concepts have been applied to classify organizational learning. Argyris and Schön (1996) and Holmqvist (1999) have argued that organizations learn only when their visible behaviours such as rules and operating processes change. As already mentioned before, Fiyol and Lyles (1985) had a different view on this assumption and argued that behaviour and cognition is not always the correct reflection of one another. Based on this notion, Huber (1991) argued that an organization have learned if its potential behaviour changes through its processing of information and Sinkula (1997) concluded the same from decision making perspective too.

Inkpen and Crossan (1995) developed a framework to combining these two schools of thought to expand the understanding of different types of organizational learning. In this framework, different types of learning have been classified based on the level of behavioural and cognitive changes that have taken place. Figure 2 illustrates the framework.

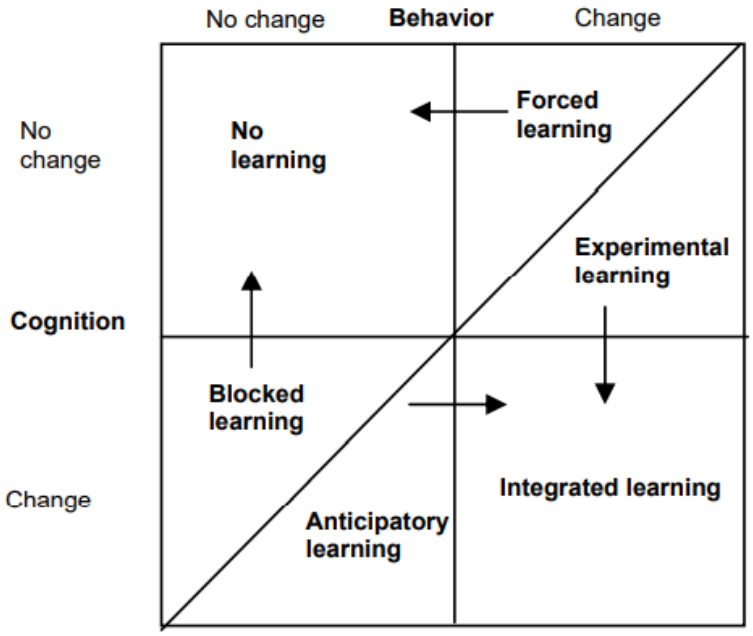


Figure 2: Cognition / behavior framework of organizational learning

(Source: Lampela & Kärkkäinen, 2009; adapted from *Crossan, 1991; Inkpen & Crossan, 1995*)

Inkpen and Crossan (1995) are of the view that when there is no behavioural or cognitive change, we can assume that no learning has occurred at all (top-left quadrant of the framework). Similarly, when both behavioural and cognitive change can be traced, the combination can be considered as integrated learning (bottom right quadrant of the framework). According to the authors, integrated learning is the most desirable in any scenario since its effects are considered to last for a relatively longer period of time.

In between these two ends, there are other forms of learning with varying degrees of behavioural and cognitive changes, with the potential of stepping up or down to any one of the extreme ends. Forced learning occurs when an organization is forced to change its behaviour without any cognitive change in its model. Experimental learning happens when the organization tests a new behaviour, keeping its beliefs on hold. If the experience from the new behaviour is positive, then there is a chance that the behavioural change will also bring in cognitive change, turning the experimental learning into an integrated one.

When cognitive changes do not lead to behavioural changes, the learning then is termed as blocked learning. Inkpen and Crossan (1995) argues that some conditions in the organization prevents the behavioural change in this scenario and thus such learning is often invisible from outside and mostly unconscious. Anticipatory learning on the other hand has changed the organization's cognition and may also bring in change in action later, turning the learning into an integrated one again. Organization at the stage with anticipatory learning has gathered some internalized knowledge which it considers potentially useful in the coming days.

The significance of this framework in innovation collaboration context is that learning can have different combination levels of cognitivism and behaviourism, and again a balance in between these two is necessary to achieve sustainable changes through learning in an organization (Lampela & Kärkkäinen, 2009). Also, an organization participating in innovation collaboration can decide to be in any of the learning quadrants given the context. Though integrated learning might seem to be the most desirable type of learning, forced learning or anticipatory learning might be more suitable for an organization while collaborating with partners to achieve the desired objective (Lampela & Kärkkäinen, 2009).

2.4.2 Learning concepts relevant to inter-organizational leaning

While the understanding of learning types is essential to investigate learning empirically, understanding of some learning views is also critical. Given one of the objectives of the study is to explore learning practices in innovation collaborations, identifying practices for facilitating learning in innovation collaborations from the literature is necessary here. Lampela and Kärkkäinen (2009) identified six different organizational learning concepts that are closely related to inter-organizational learning and have been referred to by many authors in innovation and collaboration context. These concepts have their roots long back in the academic discourse and have a significant amount of empirical research behind them, making them somewhat fundamental view of learning based on which several other learning perspectives have developed overtime (ibid). The selected learning concepts are:

1. The conversion of explicit and tacit knowledge
2. The exploitative and explorative learning view
3. Absorptive capacity and relative absorptive capacity
4. Organizational Memory
5. System thinking view
6. Dynamic capabilities view

The learning concepts and their implication in innovation collaboration will be discussed in the next sub-sections.

2.4.2.1 The conversion of explicit and tacit knowledge

The importance of knowledge conversion was emphasized by Nonaka and Takeuchi (1995) arguing that the mobilization of tacit knowledge within an organization is a key factor for knowledge creation and this mobilization requires conversion between tacit and explicit knowledge. Nonaka and Takeuchi (1995) explained this process as a four staged one: first an individual gains tacit knowledge from another individual through 'observation, imitation and practice' where the knowledge transmission happens through *socialization*. The usage of this acquired tacit knowledge by other members of the team requires proper *articulation* from the individual's part. The team then incorporate this knowledge into developing a product or standardize it in the form of a process, which depicts the *combination* of acquired knowledge with the existing ones. At the last stage, *internalization* happens within the team members due to this experience enriching their own tacit knowledge base.

In cases of inter-organization innovation collaborations, this knowledge creation process of converting tacit and explicit knowledge is needed. Knowledge intensive industries where a

significant amount of existing knowledge is tacit i.e., biotechnology or ICT, the 'Nonakan' approach should be of particular emphasis while organizing collaborations outside the organizational boundary (Lampela and Kärkkäinen, 2009). This approach can also be beneficial while collaborating with, for example, specialized small and medium enterprises with very few key experts or with startups where usually the founders are the experts possessing critically important and rare tacit knowledge (ibid).

The process of converting tacit and explicit knowledge should be consciously designed at the beginning stage of the collaboration. The participants in an innovation collaboration should be able to identify important tacit knowledge within the network and design both formal and informal practices to facilitate the information flow (Heikkilä et al., 2005). Some of the formal practices include pre-structured meetings, meeting minutes, information documents and instruction manuals (ibid). Informal processes include informal settings where information can be shared i.e., team building offsites and other events with an objective to get to know each other or very informal after work hangouts (ibid). Some forms of collaboration might experience challenges for transferring tacit knowledge for certain reasons i.e., collaborations in between international multicultural organizations (Möller and Svahn, 2004); virtual, cross border teams or 'imaginary' organizations (Holmqvist, 1999) and collaborations among organizations with large cultural and cognitive distance (Miettinen et al., 2008).

2.4.2.2 The exploitative and explorative learning view

According to Levinthal and March (1993), organizational learning happens through organizational routines, i.e., models, norms, procedures, actions. These routines can have either of the two focuses: exploration or exploitation. Exploitative activities, as the name suggests, exploit the information, knowledge, and the competencies that an organization has already gathered for being competitive and generating cashflows in the short run. Exploratory activities are aimed for gathering new information, developing new knowledge and eventually build new competencies in the organization to remain competitive and relevant in future. These two streams are often competing for the scarce resources i.e., investment, human resources, management time, focus. Organizational learning '*has to cope with confusing experience and the complicated problem of balancing the competing goals of developing new knowledge (i.e., exploring) and exploiting current competencies in the face of dynamic tendencies to emphasize one or the other*.' (Levinthal and March, 1993, pg 95).

Though it is a paradoxical task to balance between exploitation and exploration, Noteboom (2000) argued that exploitation and exploration are mutually related and proposed a heuristic 'cycle of discovery' to explain how these two builds on each other. The main argument of this model is the changes in the *variety of content* and *the variety of context*. A novel innovation goes through the stage of consolidation through the process of selection and emergence of dominant design that eventually reduces the variety of content in related technology and organization, leading towards exploitation or incremental adaptations. In novel contexts, incremental adaptations become insufficient; experimentation starts taking new elements from novel contexts combining them with existing logic and models. When new elements are found to suit the new context better, the existing principles are being questioned, giving in scope for exploration.

This mutual relationship between these two focuses is an important characteristic to be aware of in innovation collaborations as at different stages of the relationship, the importance of

exploration and exploitation within the collaboration partners varies 'dynamically and dialectically' due to this very reason (Lampela, 2009). Similarly, organizational routines needed for learning will change according to the changing balance of exploration and exploitation. Thus, constant re-evaluation is needed to maintain the balance between exploitative and explorative learning and their related practices in collaborations, especially if the business, the market, or the product in context is subject to rapid change (ibid).

Exploitation happens in formal, stable, and delocalized collaborations with codified knowledge facilitating incremental innovation (Gilsing and Noteboom, 2006). Exploration for radical innovation requires informal, flexible, and relatively more localized collaborations driven by tacit knowledge (ibid). Gilsing and Noteboom (2006) are of the opinion that organizational and inter-organizational learning activities should be strong representative of these two focus areas. Exploitation can sustain comparatively lower amount of interaction and trust between partners and mostly requires single loop learning; exploration on the other hand demands higher frequency of interaction, a certain level of mutual trust among the partners and double loop learning (ibid). Relationship is an important factor here since learning demands commitments from the partners to keep the relationship alive (Lampela, 2009).

2.4.2.3 Absorptive capacity

Cohen and Levinthal (1990) defined absorptive capacity as 'the ability of the firm to recognize the value of new, external information, assimilate it and apply it to commercial ends' (pg.128). This ability of evaluating and utilizing outside knowledge has its root in the similarity of prior knowledge to the knowledge. As Cohen and Levinthal (1990) explains – 'prior knowledge permits assimilation and exploitation of new knowledge. Some portion of that prior knowledge should be very closely related to the new knowledge to facilitate assimilation, and some fraction of that knowledge must be fairly diverse, although still related, to permit effective, creative utilization of the new knowledge' (pg.138). Thus, in a collaboration, participating organizations have the potential to learn when they possess similar basic knowledge along with some specialized knowledge in their field of business.

This commonality of potential partners is particularly important when an organization is outsourcing some of its R&D activities i.e., while looking to cooperate or collaborate with new close partners either from its existing network or outside (Lampela and Kärkkäinen, 2009). Thus, the starting point should be identifying an organization's own basic and specialized knowledge; the evaluation of similarity of potential partners should follow (ibid). Learning practices around this concept are expressed through selecting known partners with complementary capabilities, different target markets or different specialization areas (Heikkilä et al., 2004). Dyer and Sing (1998) expanded the concept further to relative absorptive capacity and argued that partner specific absorptive capacity should be enhanced by making inter-organizational routines more effective.

2.4.2.4 Organizational Memory

According to this view, organizations are capable of creating, using and storing knowledge and information similarly as an individual (Walsh and Ungson, 1991). Learning happens by doing and learning is stored in organizational works, processes, products, services, artefacts and constitutes organizational memory. Organizational memory facilitates to ask better questions, define problems, generate different alternatives, and help to evaluate and choose drawing from the history (Walsh and Ungson, 1991). Thus, organizational memory needs to exist 'to store communicable, consensual and integrated knowledge' in an organization (ibid).

Similar notion is true for organizations collaborating - creation of formal and informal inter-organizational routines, common databases, and other forms of storing knowledge is necessary (Lampela and Kärkkäinen, 2009). Koistinen (2003) argues that with the rise of complexity in the developed product in a collaboration, the necessity of developing business and social routines as form of organizational memory increases to facilitate the exploitation of the common learning and knowledge. On the contrary, in an exploration collaboration setup where the roles and core competencies are not yet or hard defined explicitly, the transactive memory i.e. who knows what becomes crucial in organizing and managing the collaboration (ibid). While it is important for all partners to be able to identify and describe current practices within an innovation collaboration, such practices should not be mere duplication of the perceived 'best practices', rather they should be newly developed one to represent the overall culture of the collaboration (ibid).

2.4.2.5 System thinking

Senge (1990, 2006) considered system thinking being at the core of a learning organization. System thinking can be defined as 'a set of knowledge, tools and principles which helps to see the wider connections and things influencing them in a holistic way' (Lampela and Kärkkäinen, 2008, pg 192). This understanding is based on the belief that a structure or principle dictates the way events and decisions follow and it needs to be found (ibid). The importance of this concept is in the fact that organizations now must deal with dynamic complexity that are posed by its environment, 'where cause and effect are not closely related in time and space' (Kim and Senge, 1994, pg 277). System thinking methodologies have been designed 'to help understand this dynamic reality and see the structures and models behind the real-world events' (Lampela and Kärkkäinen, 2008, pg 192).

System thinking is a necessary learning skill to be able to combine information from different sources and have a holistic view of the situation (Senge, 2006). This view of learning has its focus on the interactions and interdependencies of different factors in an environment, and feedback is considered as the key prerequisite of learning (ibid). Feedback loops reveals the relationship and dependencies of different factors in an environment; these feedback loops can again be connected to other feedback loops, helping to understand the dynamic complexities that exists in the environment and see it from a holistic point of view (ibid).

The key objective of leaning in an organization is to achieve competitive advantage, through interpreting the events around it, predicting changes and influencing those changes in the short and long run (Lampela and Kärkkäinen, 2008). The thinking and actions of an organization is influenced by the changes in the environment; again, the organization effects the environment with its thinking and actions (ibid). System thinking is required to understand this interaction

and the opportunities that it presents, to see the big picture and to be able to identify the factors that needs to be influenced in order to influence the environment or system (ibid). Very often, changes in existing mental model are necessary to understand this 'dynamic complexity', which is again the prerequisite for double loop learning (Kim and Senge, 1994). So it can be argued that system thinking can help achieve generative learning.

Lampela and Kärkkäinen (2009) argue that in the innovation collaboration context, 'it is important to recognize the whole structure of an organizational system and also to identify the virtuous and vicious loops' (pg 138). They emphasize that the partners need to have a collective and comprehensive understanding of the larger system they are part of and how they are interdependent in that system. Thus regular, continuous feedback from different stakeholders at different stages of the innovation process and proper structure to utilize those feedback is important to facilitate learning (Heikkilä et al., 2004). Identifying virtuous loop is of particular importance when the competitive environment of the collaboration is hard and multiple avenues of sustainable competitive advantage should be worked on (Lampela and Kärkkäinen, 2009). On the other hand, vicious loops in forms of fire-fighting and short-term focus jeopardize the innovation activities and should be identified and fixed (ibid).

Shorter time to market is a critical criterion of competitiveness these days and system thinking can play a critical role here too. More and more innovation collaborations are geographically dispersed, the collaboration partners being located even in different countries (Holmqvist, 1999). In such scenarios the partners need to shorten the development time by adopting more parallel innovation processes, often requiring modularization of the product and process architecture to minimize the need of interactions and interdependencies during the innovation process (Lampela and Kärkkäinen, 2009). Without the system thinking concept instilled among the participating partners, such collaborations remain a challenge (ibid).

2.4.2.6 Dynamic Capabilities

Dynamic capabilities view (Teece et al.,1997) has its roots in the resource-based view of the firm and complementary assets (Grant, 1991) and emphasizes on the continuous renewal and adaptation of the same through effective learning. Teece et al. (1997) defined dynamic capabilities as 'the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments.'(pg.516). This definition positions dynamic capabilities as a coordinative management process with an opportunity of inter-organizational learning (ibid). Collaborations and partnerships can be a source of organizational learning, helping organizations to recognize dysfunctional routines and strategic blind spots and eventually develop them (ibid).

While collaborating with other organizations, the critical resources of an organization (that are valuable, rare, inimitable, and non-substitutable) can be extended beyond the organizational boundary (Dyer and Singh, 1998). Also, organizations that combine their critical resources in unique ways may again have higher competitive advantage over those organizations who are not being able to do so (ibid). Based on this premises, Teece et al. (2007) argued that the learning view of dynamic capabilities is of critical importance when an innovation collaboration or network face highly unpredictable, turbulent, and fast changing business environment. Identifying the critical resources of each partner in the innovation process, strategic integration of their complementary capabilities and periodic re-evaluation for necessary changes should be an integral part of managing an innovation collaboration

(Lampela and Kärkkäinen, 2009). Learning happens through designing, improving, and implementing common organizational routines together (ibid).

It is necessary to note that, the last two concepts – system thinking, and dynamic capabilities are not directly related to organizational learning theories. However, these two concepts provide useful insights to investigate and understand learning in inter-organizational setup. Table 1 in the next page summarizes the selected concepts, their main features and practices important in the context of inter-organizational learning and innovation. It is hard to classify any one of the concepts relevant for learning in a particular scenario of innovation collaboration. Rather, the concepts are context independent; all the concepts can be used in different scenarios and they need to be considered simultaneously to obtain a complementary perspective towards inter-organizational learning in innovation collaborations.

Table 1: Different viewpoints of learning, their implication for inter-organizational learning and supporting practices in innovation collaboration

(adapted from Hallikas et al. 2009 and Lampela & Kärkkäinen, 2009)

Learning View (key author)	**Factors emphasized for effective learning in the literature**	**Implication for inter-organizational learning** (and organizational leaning from collaborations)	**Example of typical / specialized practices** in innovation collaborations for learning facilitation
Conversion of explicit and tacit knowledge (Nonaka & Takeuchi, 1995)	Key to knowledge creation is in the mobilisation of organizational tacit knowledge and in the conversion of different knowledge types – the tacit and explicit.	Knowledge creation process are needed in between organizations.	Formal practices: meetings, written documents and instructions, objectives for learning Informal practises: possibility to share knowledge in an informal setting, employee-organised activities Identification and mobilization of important tacit knowledge within the organization
Exploitative and explorative learning (Levinthal and March, 1991; Noteboom 2004)	Organizational learning occurs primarily via organizational routines i.e. actions, procedures, norms and models. The routines can be divided according to their purpose for improving the existing operations of the system (exploitation) and for the purpose of increasing the capacity to create (exploration). These activities should be properly balanced.	Both routines for exploitation and exploration are needed for continuity of the lifecycle of the inter-organizational relationships. Proper balance between exploitation and exploration is important and it varies in the different stages of the collaboration relationship.	Identifying explorative and exploitative relationships for efficient learning management. Identifying and evaluating the needed balance between explorative and exploitative routines in different stages of the relationship. Learning requires commitment, keeping the relationship alive on personal and organizational level.
Absorptive Capacity (Cohen & Levinthal, 1990; Dyer and Singh, 1998)	Previous knowledge enhances the learning of similar knowledge. Learning is most effective when the new knowledge to be assimilated is related to the existing knowledge.	Greatest potential comes from learning from teachers with similar knowledge but different specialized knowledge. Partner specific absorptive capacity should be enhanced by making inter-organizational routines more effective.	Identifying basic and specialized knowledge to evaluate the similarity and dissimilarity of knowledge within the partners. Selecting suitable participants from each partner organizations to ensure maximum learning.

Organizational Memory (Walsh and Ungson 1991, Koistinen 2003)	Organizations are assumed to create, use and store information and knowledge in a similar way as individuals, Learning occurs through doing and experiencing and is stored in organizational work and core processes, as well as products and services.	Efforts should be focused on creation of interorganizational routines and work processes, formal databases, and formal and informal networks.	Creation of common organizational memory for the collaboration partners. Creating new processes together with partners instead of copying from others. Formal databases, transactive memory to learn 'who knows what'.
System Thinking (Senge 1990; Argyris 1977, 1999; Sterman 2000,2001)	Interactions and interdependencies are an important focus of interest in learning. Feedback is an essential prerequisite for effective learning. It is important to recognize the whole structure of an organization system. Identification of virtuous and vicious loops. Capability of system learning increases the capability of double loop learning.	Common and in-depth understanding of mutual interdependencies and the larger system the companies are part of. Continuous, regular feedback and approaches that support the utilization of the feedback are important.	Describing the collaboration (network) and its objective together to establish a shared view of each participant's role within. Recognition and description of interdependencies of participants. Establishing feedback processes in different stages of the innovation processes. Identification of virtuous and vicious loops.
Dynamic capabilities (Teece, Pisano and Shuen 1997, Dyer and Singh, 1998)	Based on the idea of complementary assets and continuous ability to renew and adapt competencies through learning.	Firm's critical resources may extend beyond firm boundaries. Partnerships enable inter-firm learning by helping to recognize dysfunctional routines and develop them.	Recognising and describing own capabilities and critical recourses, especially knowledge-based resources from the collaboration (network) point of view. Continuous re-evaluation of firm's critical resources.

2.5 Organizational Learning Model

While different views of learning help us to identify several practices that can facilitate the learning process, these practices themselves are not enough to create a holistic picture of the environment that is required in an organization for it to learn. Rooting in several early literatures, Holmqvist (2003) argued that organizational learning, though different from individual learning, is conceptualized as individual learning taking place in a social context. Again, organizational learning has aspects of learning that are organized, formal and explicitly political that make it distinct from individual learning (ibid). Thus, learning is considered a social affair and can be seen as 'an integral and inseparable aspect of social practice' (Holmqvist, 2003; pg 97).

Since learning is not an isolated activity rather it happens in a social context, the question remains 'under what conditions are organizations more likely to learn?' The same question is relevant while investigating learning from innovation collaborations. While the selected learning views along with their suggested practices for effective learning can be considered as the tools or mechanisms for learning from innovation collaborations, an understanding of the conditions under which an organization is likely to learn is necessary. Based on this same premises, Lipshitz, Popper and Friedman (2002) is of the opinion that learning mechanisms are structural facets that are necessary for learning by organization, however they are not sufficient for generating productive organizational learning that leads to implementation. Organizational learning (and its quality) depends on additional facets of learning that facilitate or inhibit the learning process – cultural, psychological, policy and contextual facet (ibid). In this section, the multi-facet model of organizational leaning developed by Lipshitz et. al., (2002) will be discussed. This model provides the theoretical framework while investigating the challenges of learning by organizations from innovation collaborations.

The Structural Facet

The structural facet of learning effectively connects organizations to the concept of learning. Learning is a human cognitive capacity of information processing and organizational learning talks about giving this human attribute to a non-human entity. Thus, 'for learning to become organizational, there must be roles, functions and procedures that enable organizational members to systematically collect, analyze, store, disseminate, and use information relevant to their own and other members' performance' (Lipshitz et al., 2002 pg 82). The structural facet comprises of tools and practices that facilitates learning and are termed as Organizational Learning Mechanisms (OLMs) by the authors of the model.

Organizational Learning Mechanisms or OLMs can be categorized according to two dimensions: by whom and when they are operated. Integrated OLMs are those where the same organizational members process the information and apply the acquired knowledge; they are non-integrated when the knowledge acquired is used by different organizational members. An OLM is considered 'dual purpose' when the learning happens at the same time when the task is carried out and it is 'designated' when learning and task performance happen at different times and places. Strategic planning, auditing, quality control mechanisms are common examples of non-integrated and designated organizational learning. Formal performance review jointly carried out by relevant members of a team is an integrated and designated OLM.

Post project review or after-action review is one of the most frequently discussed OLMs in literature; some other examples of OLMs can be weekly management review meetings, seminars, training sessions, targeted workshops, e-learning etc.

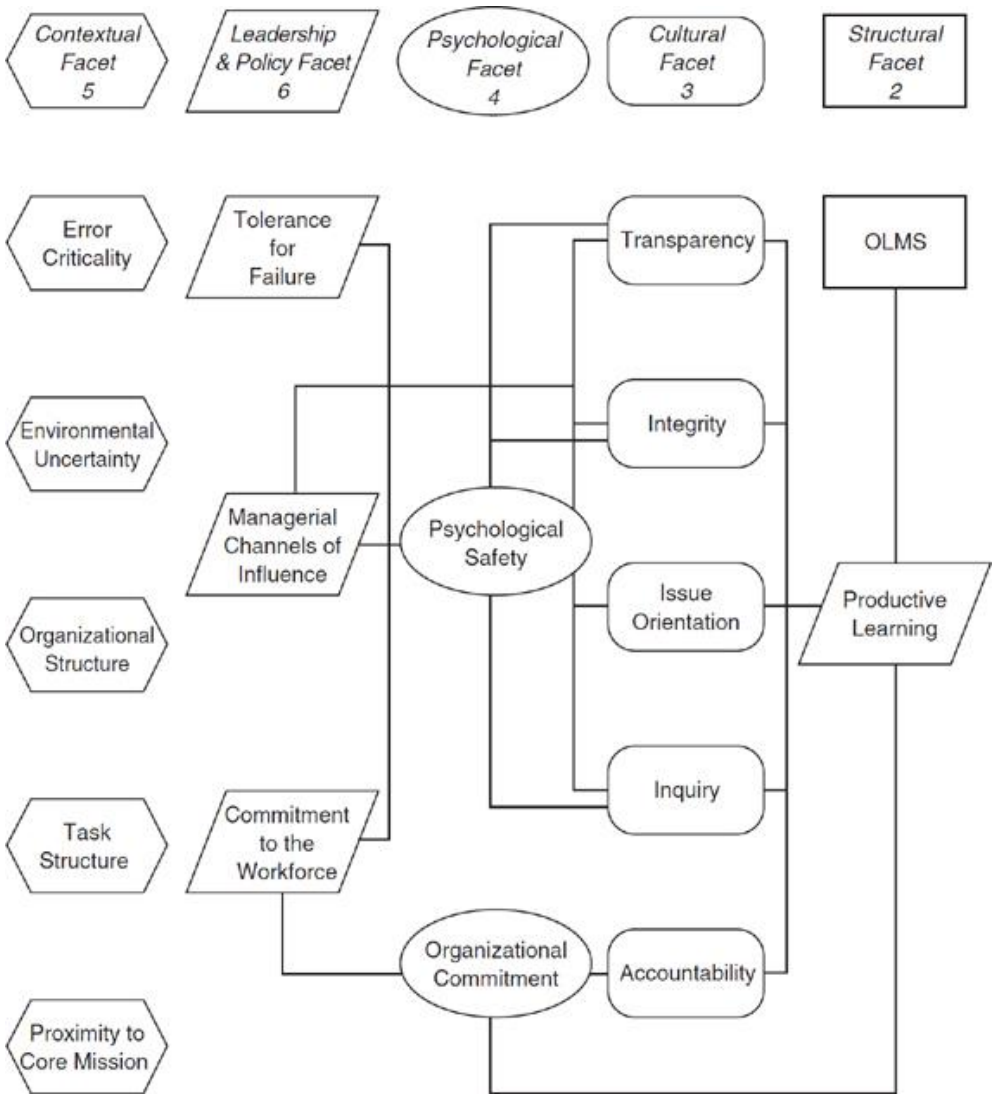


Figure 3: Multi-facet model of organizational learning

(Source: Lipshitz et al., 2002)

The Cultural Facet

Prominent scholars i.e., Argyris and Schön, 1978 have acknowledged the importance of a culture within the organization to facilitate learning. Lipshitz et al. (2002) identified five norms that constitute the cultural facet of organizational learning – *transparency, integrity, issue orientation*, *inquiry*, and *accountability*. According to the definitions of the authors, *transparency* is presenting one's thoughts and actions to others for feedback. *Integrity* calls for collecting and providing information regardless of its implications, being open to give and receive accurate and full feedback. *Issue orientation* is referred to the relevance of the

information in a context irrespective of the source of information. Continuing investigation to understand a context is defined as *inquiry* and *accountability* is assuming the responsibility of this understanding and implementing the lessons that have been learnt.

Lipshitz et al. (2002) argue that 'Inquiry, transparency, issue orientation and integrity support understanding, whereas accountability supports both understanding and action' (pg 86). Implementing these norms within an organization implies that the organization is willing to incur some 'costs' to support learning (ibid). Inquiry and accountability require transparency from different internal partners which is risky since it can expose failures and limitations (ibid) and the anxiety arising from this exposure creates defensive routines in the organization that can hinder the inquiry (Argyris, 1991). Presence of integrity and issue orientation can come in rescue here; integrity pushes the willingness to learn from the failures even though it may result in face losing or other costs, whereas issue orientation restricts defensive behavior arising from revealing information that are considered derogatory or harmful (Argyris, 1991).

The Psychological facet

The psychological facet of the model comprises of two psychological states in the organization –*psychological safety* and *organizational commitment*. 'Psychological safety is a state in which people feel safe to make errors and honestly discuss what they think and how they feel' (Lipshitz et al. 2002, pg 87). This state is closely related with the previously discussed norms of the cultural facet – inquiry, integrity, transparency, issue orientation and accountability (ibid). As the authors of the model explains, integrity and issue orientation reduce threat and promote *psychological safety* in an organization, which in turn helps an individual to face potential negative outcome of an enquiry, shields from the exposure of transparency and manage the burden of accountability. This notion is also empirically backed in academia; a series of studies conducted by Edmondson (1997, 1999a, 1999b) have shown that psychological safety has positive relationship with team learning in organizational setting and increases the willingness to report mistakes, paving the way for accepting feedbacks and learn from them.

Organizational commitment refers to the degree up to which the organizational members subscribe to the values and goals of the organization and do not differentiate or feel conflicted between promoting organizational and personal interests (Lipshitz et al. 2002). Organizational commitment can play a critical role specially to address the political concerns that the managers consider while promoting transparency, enquiry, and accountability (ibid). Strong sense of organizational commitment has been seen to create a strong urge and contentment of doing 'the right thing' rather than doing 'the easy thing' or 'the political thing' among managers, even when organizations failed to reward their transformative, learning initiatives (ibid).

Organizational learning is depended on the individuals and their willingness to share knowledge with others is a critical criterion to keep the learning process in an organization alive (Lipshitz et al. 2002). This notion along with the understanding of organizational commitment made researchers argue that individuals do not need to be rewarded materialistically to remain motivated to share their knowledge; rather they only need to feel committed to the organization, believing that they are working towards a common goal that jointly benefits themselves, their colleagues, and the organization (ibid).

The Policy Facet

The formal and informal steps taken by the management to promote learning constitute the policy facet of organizational learning (Lipshitz et al. 2002). This facet is manifested through organizational policies, rules, processes, budgets, and other concrete steps taken by the management (ibid). The authors emphasize three policy aspects for facilitating learning in their paper: *Commitment to learning*, *tolerance for error* and *commitment towards workforce.*

The *commitment to learning* needs to be expressed both in 'rhetoric and action', since being a learning organization is a strategic decision. Rhetoric will express the organizational belief that learning is the key to its success, whereas actions like dedicated time allocation for debrief, investment in employee training, efforts for required cultural change, environment for experimentation, structures for information dissemination, recognition and reward system will express commitment explicitly. Learning creates errors and management's *tolerance for error* gives the signal to the employees that making error will not be punished but rather valued as learning opportunities, creating the psychological safety. However, the authors also emphasize that a delicate balance is required between this tolerance for error and accountability. *Commitment to workforce* is manifested through status-unbiased, fair treatment to subordinates and employment security. Such policies create psychological safety, which in turn creates organizational commitment through the norm of reciprocity, implying that favors are returned, and social obligations are repaid through reciprocal commitment and fairness.

Probably the most important factor of the policy facet is leadership. Lipshitz et al.,(2002) argue that since leaders set the organizational policies, the presence or absence of leadership commitment towards organizational learning can offset the absence or presence of all other contextual factors. Leadership commitment and support are crucial for rooting in the cultural changes needed for creating a learning organization through the implementation of the facets (ibid). Managers can make organizational learning central to the organization's strategy, install and institutionalize organizational learning mechanisms and create the culture of psychological safety and organizational commitment to facilitate the whole process.

The Contextual Facet

This facet of organizational learning draws attention to the factors that the management has very little or no control at all. Lipshitz et al.,(2002) discussed five factors of this facet that has the potential to impact the organizational learning. *Error criticality* can be measured by the immediacy and seriousness of an error; the costlier the error or the more serious a crisis, the higher is the probability of learning from that situation. The rate of change in the industry and the intensity of competition together creates *environmental uncertainty* and again, the higher the uncertainty, the greater the chance and requirement of organizational learning. The feasibility of gathering valid information and subsequently the motivation of working on those for collective improvement are influenced by the *task structure*. If a particular task is considered *close to core mission* of an organization, the likelihood of learning in conjunction of that task is considered higher. The proximity to core mission is also tied to error criticality since errors in core activities are usually costly to an organization than those of non-core activities, increasing the learning opportunities from them.

2.6 Inter-organizational Learning Model

In order to understand how organizations learn in a specific scenario or context, it is necessary to investigate the factors that influence the context too. The context of this research is learning from innovation collaborations, where an organization learns from and with another organization. Thus, the concepts of inter-organizational learning demand thoughtful consideration and attention. As has been discussed in in the theoretical background and problem discussion section of the thesis, inter-organizational learning concepts have been extended from those of organizational learning, with a shifting focus to group of organizations and network from individual organizations as learners (Anand et al., 2020). Having said that, since the learning unit in this thesis is large organizations themselves, the process of inter-organizational knowledge transfer should be of especial focus.

Considering the importance of knowledge sharing within organizations and the possible factors that may influence it, Easterby-Smith, Lyles and Tsang (2008) proposed a framework of inter-organizational knowledge transfer to guide the existing and future research around the topic, expanding on the work of Grant (1996) and Argote et al.(2003). The framework is shown in Figure 4 and will be discussed in this section. While Lipshitz et al., (2002) model discussed in the previous section provides the theoretical framework while investigating the challenges of learning by organizations *from* innovation collaborations, the Easterby-Smith et al., (2008) model will be used to identify the challenges of learning *within* the innovation collaborations.

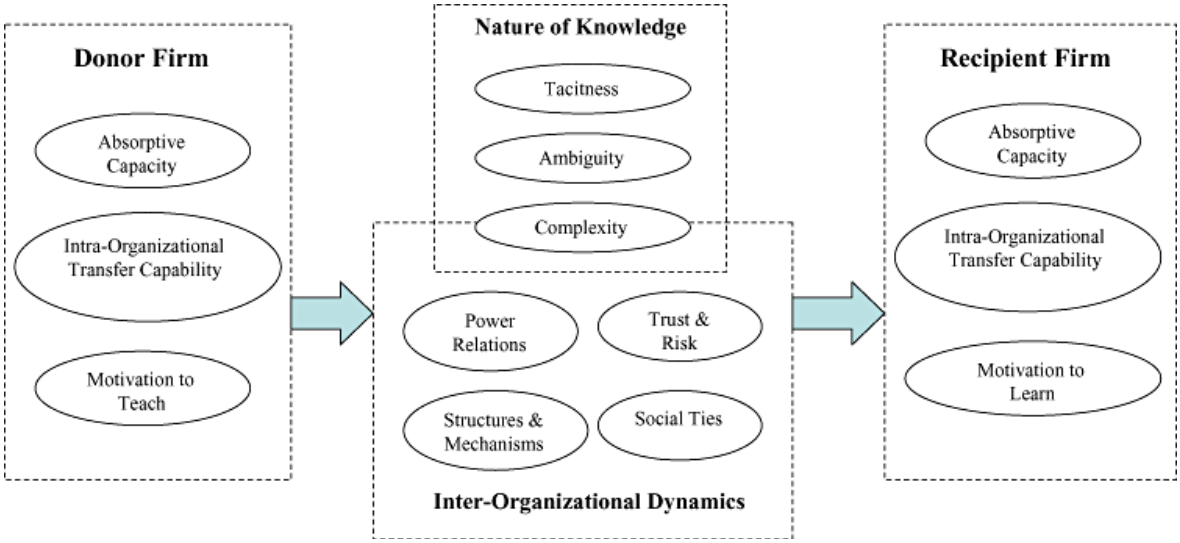


Figure 4: Factors influencing inter-organizational knowledge transfer

(Source: Easterby-Smith et al., 2008)

The characteristics of donor and recipient firm is the first point of attention in this model. The key factor here is absorptive capacity of the firms, which has been discussed in detail previously in the learning concept subsection. While the donor firm needs absorptive capacity to anticipate the potential value of an information and intra-firm knowledge transfer capability to effectively transfer it to the donor firm, the donor firm's absorptive capacity along with its capacity of intra-firm knowledge transfer will determine how much of that knowledge will be diffused for assimilation and utilization (Easterby-Smith et al., 2008). Motivation to learn by the recipient and the motivation to teach by the donor – both are key determinants of the extent

of knowledge transfer (Hamel, 1991; Ko et al., 2005) and the level of one's motivation may affect the same of the other one (Larsson et al., 1998).

Inter-organizational knowledge transfer requires at least two organizations and thus the inter-organizational dynamics also play an important role. Easterby-Smith et al. (2008) identified four broad factors here – power relations, trust and risk, structure and mechanisms and social ties. *Power asymmetry* in a collaboration might emerge due to the difference in size and influence of the organizations, their relationship basis and also the way the organizations operate (ibid). Unintended knowledge transfer is perceived as a *risk* to the donor firm's competitive advantage, whereas the recipient firm faces the risk that the received knowledge is no longer useful or of high quality (Ko et al., 2005). The inter-organizational *trust* facilitates knowledge transfer with the understanding that the transferred knowledge will not be exploited beyond the level of which it was intended for (Dhanaraj et al., 2004).

The *structure* of inter-organizational relationship creates the context of knowledge transfer and defines the *mechanism* through which the transfer will take place in the specific context (Easterby-Smith et al., 2008). Some level of alliance is a pre-requisite of knowledge transfer in between two organizations and the alliance structure may take many forms, ranging from non-equity-based model of licensing to equity arrangements like joint ventures (ibid). Hagedoorn and Narula (1996) argues that the nature and intension of these alliances influence how organizations interact and how knowledge is being transferred.

However, Bell and Zaheer (2007) argues that informal *social ties* in between members of different organizations may influence superior knowledge transfer irrespective of the structure of the alliance. This factor is also argued to alleviate the cultural differences within organizations that is believed to have implications within the collaborations (Easterby-Smith et al., 2008).

Lastly, the authors of the models argue that nature of knowledge itself, its ambiguity, tacit-ness and complexity, will also impact its transfer. This argument is in line with the argument posed by Nonaka and Takeuchi (1995) that tacit knowledge is difficult to transfer even within the organization itself. Similarly, ambiguity of knowledge, which is more related to tacit knowledge, is directly and negatively related to knowledge transfer (Simonin, 2004).

3. Methodology

This chapter first presents the research strategy and the research design. Subsequently, the methods for the primary and secondary data collection are explained that consist of the literature review and semi-structured interviews. Then the the method of data analysis for the research is presented. Lastly, the quality considerations for the chosen research strategy are discussed in connection to this study.

3.1 Research Strategy

Research strategy refers to the general approach applied along the research process of the thesis (Bell, Bryman and Harley, 2019). Alternatively, it can be said that research strategy explains the method of how to reach the answers to the research questions (Saunders, Lewis and Thornhill, 2016) There are two main strategies that can be adopted for any research - quantitative and qualitative strategy. According to Bell et al. (2019), the quantitative research is suitable to test a hypothesis that emerges from existing literature, through numbers and statistical inferences conducted on data gathered from a large number of observations. On the contrary, the qualitative research strategy aims to establish or explain a theory, focusing on words, images, and expressions, gathered from comparatively a smaller number of samples (ibid). Therefore, qualitative research is focused on human experiences and perspectives and enables the researcher for in-depth exploration of a phenomenon (ibid). As this study aims to establish an understanding of how organizations learn from innovation collaborations through the exploration of leaning concepts, learning practices, and challenges of innovation collaborations from the perspective of the respondents, the qualitative research strategy was considered as the most suitable for this study.

Bell et al. (2019) also highlights different research approaches that are related to qualitative and quantitative research strategies. A qualitative research is usually connected to an inductive approach, the aim of which is to construct a theory in a 'data-driven manner', often taking a grounded theory approach (ibid). The limitation of this approach is in the limitation of data based on which the theory is built, since that might not be enough to establish the theory (ibid). At the opposite end of the spectrum, deductive approach requires to establish hypothesis based on existing theory that will be tested through the study (ibid). This approach again has its limitation since it is dependent on the selection of the existing theory, can only substantiate or nullify derived hypotheses and cannot take emerging phenomenon into account (ibid). Given the contrasting limitations of both the approaches, the somewhat middle ground of abductive approach was established. Bell et al. (2019) argues that the abductive approach solves the paradox or puzzle which may originate from the empirical evidence that could not be explained properly with existing theory. This approach calls for iterating between theory and empirics to make the phenomenon less puzzling (ibid). Since literature specific to learning practices and challenges in innovation collaboration is limited, the abductive approach was considered most suitable for the study. The empirical data on learning practices and challenges were analyzed in light of the found literature and the research question was answered in combination of existing and data driven theory. Therefore, abductive method was most suitable for this study. The epistemological consideration for the study was interpretivism rather than positivism, since the study required interpretation of the reality shared by the respondents through words, stories and analogies (Bell et al., 2019). The ontology of the study was constructionism, as it defines reality as a result of interactions among various individuals (ibid). Learning in innovation

collaborations is a result of interaction among individual participants in a specialized setting, thus the selected ontology was appropriate for the research project.

3.2 Research design

While research strategy provides a general approach for the study, research design establishes the pathway to answer the research question (Bell et al., 2019). In another words, research design provides a guideline or framework for data collection and data analysis (ibid). In regard to this study, a cross-sectional design was chosen to be most appropriate.

However, while selecting the research design, the implication of both cross-sectional and multiple case study design for this study was weighted. Case study is focused on intensive investigation of a setting and multiple case study is appropriate when the researcher is interested in comparing and contrasting the finding of such investigation in two or more similar settings (Bell et al., 2019). The major difference in between cross-sectional design and multiple case study is in the research focus; if the focus is on producing general phenomenon, then cross-sectional design is more suitable since the emphasis in multiple case study design is still on the individual cases (ibid). The objective of this study was to explore and produce a general finding of learning practices and challenges in innovation collaboration, through identification of patterns and adaptations across the data collected from the respondents. Therefore, a cross-sectional design was considered more suitable compared to the multiple case study design.

3.3 Data collection

3.3.1 Secondary Data Collection

3.3.1.1 Literature review

For this research, a narrative approach was considered to be most appropriate for the literature review. However, some elements of systematic literature review approach were also included. Given the abductive approach of research which aims to understand and develop explanation of the observed phenomenon, it appeared to be challenging to converge the previous theoretical contributions before primary data collection, as has been argued by Bell et al. (2019). However, the iterating between data and theory provided greater flexibility, helping to address several issues and limitations that came up during the thesis process. As Bell et al. (2019) suggests, the narrative review helped to understand the research area and allowed the researcher to modify the research periphery along the process of data collection. The narrative review also helped the researcher to investigate a broader research area of organizational and inter-organizational learning and have an open mind to understand related phenomenon throughout the thesis.

At the first stage of the literature review, the author used online databases to explore around the topics related to learning from inter-organizational collaboration and innovation network. The purpose of this stage was to have an initial understanding of the topic, identify some core research in this area, derive keywords and formulate interview guide. The second stage had similar strategy, conducted in parallel to conducting interviews to iterate between data and theory. At this stage, the keywords derived at the first stage was used to search online databases. While reviewing the literature, some references kept on coming continuously, especially for the learning concepts and theories, and they were further reviewed. While relevant multiple

articles from the same author were found, their list of articles were also checked for further understanding of the topic. The heuristic evaluation was based on the content of the article rather than the title or the keywords.

Keywords
Innovation collaboration
Innovation network
Learning in innovation collaboration
Inter-organizational Learning in innovation collaboration
Organizational learning concepts
Inter-organizational learning concepts
Organizational learning models
Inter-organizational learning models
Organizational learning *and* practices
Inter-organizational learning *and* practices
Organizational learning *and* challenges
Inter-organizational learning *and* challenges
Innovation collaboration *and* challenges
Innovation network *and* challenges

Table 2: Keywords and additional search words used in the secondary data collection

3.3.1.2 Databases, Inclusion, and exclusion criteria

The databases used for the literature review were the library of Gothenburg University, Web of Science and Google Scholar. By using multiple databases, a sufficient number of articles were found. All these sources - the university database, Google Scholar, and Web of Science are well trusted (Bell et al., 2018), and ensured the reliability of the data. The quality aspect was ensured by selecting only peer reviewed article, published in academic journals with high impact factors. Though recent publications were emphasized, conceptual articles related to the research topic were published mostly before 2000 and publications with empirical evidence rose during the year 2000 – 2019 (Anand et al., 2020). Conceptual articles were considered more relevant for the research and thus most articles referred for this study were published between 1990 – 2010. Some articles were also consulted which were published prior to the selected cutoff date.

The following inclusion and exclusion criteria were followed:

Inclusion criteria
Peer reviewed articles
Articles published primarily in high impact journals
Articles with citation >10, preferably >100
Articles that address learning concepts in organizational and inter-organizational level
Articles that address core learning concepts
Articles published in English
Articles mainly published between 1990 – 2021

Exclusion criteria
Unpublished articles
Articles focused on public organizations
Articles focused on small companies and startups
Articles focused on individual and group level learning

Table 3: Inclusion and exclusion criteria in literature review

3.3.2 Primary data collection

The primary data is the empirical data collected by the researchers (Bell et al., 2019). In qualitative research, the collection of primary data is important, and the method used for data collection is a necessary quality aspect (ibid). As the chosen research strategy for this study is qualitative to ensure an in-depth understanding of the chosen research topic, interviews were chosen as the method of primary data collection. The logical decision that followed was to choose between unstructured or semi-structured interviews. Unstructured interviews are similar to free-flowing conversation where the respondent expresses their views of the topic with little or no guidance from the interviewer (Bell et al., 2019). On the other hand, semi structured interviews allow the researcher to guide the respondent around different aspect of the research topic, which in fact supports the abductive design of the research (ibid). Since one part of the research was based on selected learning views, there were some clear topics to be addressed and this interview method was considered most suitable for that. The researcher thus conducted semi-structured interviews, which provided enough flexibility to dig dipper into the topic with follow up questions along with covering all the main aspects of the research topic with the help of an interview guide. The interview guide gave a flow during the interviews along the line of pre-determined themes, while still giving enough room to the respondents to elaborate, sharing their views and experiences. The key topics focused on the semi-structured interview is presented later in this section and the interview guide is added in appendix 1.

3.3.2.1 Selection of the respondents

A purposive sampling method was adopted for selecting the sampling for this thesis, where respondents have been selected for their qualifications to be able to answer the research question (Yin, 2009). As the chosen research design for the study is qualitative method, the respondents were chosen on the basis of having competencies within product development and innovation management at their companies. The research aim was to identify learning practices in innovation collaborations and challenges of learning during the collaboration process; hence, three criteria were set to choose the respondents.

The first criterion was the company size of the respondents. Given the time length of the research, the author decided to explore the research topic only from the perspectives of the large organizations established in the Scandinavian market. According to European Commission (2015), a large company has above 250 full time employees and either an annual turnover of more than 50 million Euro or an annual balance sheet of over 43 million Euro. Keeping this definition in mind, the author initially chose 15 companies that are well recognized and impactful organizations across Scandinavia. The objective of selecting these organizations was their reputation for innovation and availability of higher number of respondents compared to small ones, which eventually increases the chance of getting a more comprehensive view of the research topic.

The second criterion for respondents was experience in innovation management or product development since these tasks are regarded as most knowledge intensive in an organization. This criterion was chosen to ensure an optimum level of understanding of the respondents regarding innovation, different learning concepts and how the learning concepts are relevant to innovation activities. And lastly, respondents needed to have experience of external product development or similar collaboration. This criterion was chosen to ensure that the respondents will be able to reflect and share their views and experience on different aspects of learning in the context of innovation collaboration. Based on these three criteria, 55 potential respondents were contacted directly by the researcher through LinkedIn and also email, where the contact was available. These criteria made the sample to be considered as informative, which is an important aspect of purposive sampling method (Saunders et al., 2016). The respondents represented predominantly manufacturing organizations spanning different industries. Different industry representation among the respondents was a conscious choice of the researcher to ensure inclusion of varied perspectives.

There is no direct rule on determining sample size for non-probability sampling technique. Saunders et al. (2016) argued that the importance is rather on credibility, especially when the data is collected in the form of interviews. Insight from interviews depends on the analytical skills of the researchers rather than the sample size (Bell et al., 2019). Given these arguments, there are some suggestions available for sample size. Saunders et al. (2016) suggested a sample size ranging from 5 to 25 respondents while conducting semi-structured interviews. Saunders et al. (2016) also suggested that the data collection should continue till little or no new information is gathered from the additional respondent. Following these two guidelines, the sample size for this thesis were nine; the respondents' role, industry and other information of the interviews are presented in table 4 below.

Respondent	Industry	Destination	Experience	Duration	Program	Date
R1	Aerospace & Defense	Startup collaboration & Innovation Corporate	12 yrs	50 mins	Zoom	2021-02-22
R2	Pharmaceuticals and Biotechnology	Senior Product Manager	15 yrs	55 mins	Zoom	2021-03-04
R3	Automotive	Leader, Open Innovation Arena	10 yrs	65 mins	Zoom	2021-03-08
R4	Logistics & Transport	Innovation Portfolio Manager	14 yrs	54 mins	Zoom	2021-03-30
R5	Electronic Technology	Senior Innovation manager	13 yrs	66 mins	Teams	2021-04-08
R6	Food packaging and processing	Senior Product Manager	20 yrs	80 mins	Zoom	2021-05-14
R7	Energy	Customer Experience Manager	17 yrs	50 mins	Zoom	2021-06-02
R8	Automotive, Logistics and Transport	Innovation Project Manager	5 yrs	55 mins	Zoom	2021-06-18
R9	Retail	Senior Product Manager	21 yrs	45 mins	Zoom	2021-06-11

Table 4: Information about interviews and interviewees

3.3.2.2 Interview guide

An interview guide consists of list of topics to be covered during an interview along with some main questions about the research topic (Bell et al., 2019). Given the interviews were semi-structured, the interview guide helped to ensure that the respondents were asked all the main questions, along with those additional follow up ones that were deemed necessary to understand the respondents' views more clearly. The follow up questioned varied respondent to respondent, based on their given answers. The interview guide began with an introductory question where the respondents were asked to briefly explain their current role and previous experience to ensure that they would be answering from the context of this research. Then the respondents were asked how they perceived the innovation collaborations of their organizations and learning from them. The second section of the interview was about different learning practices in the innovation collaborations. The main questions in this section were formulated based on the six selected learning approaches and their key impacts on inter-organizational learning. In the third section, the respondents were asked to reflect on the challenges of learning by their respective organizations from these innovation collaborations. Thus, the interview questions actually followed the theme of the research questions, which is argued to be beneficial (Bell et al., 2019). The interview guide is presented in Appendix 1. The interview guide was developed taking inspiration from the PhD dissertation from Lampela (2009), since the author conducted a similar study to explore learning practices and challenges in Finnis innovation networks.

3.3.2.3 Interview process

Interviewees were directly contacted through LinkedIn and email (where the email address was available) with the request to interview. A brief background of the research topic and purpose of the thesis was shared to the participants along with the request. Upon acceptance, a convenient time for the interview was set through mutual agreement and practical information about the interview i.e., time of the interview and software link was shared. Given the ongoing Covid-19 pandemic, all the interviews were held through digital media i.e., Zoom and Microsoft Teams. Though there is an argument that audio or video conferences decreases the interview quality, there is not much evidence to support the argument (Bell et al., 2019). However, there are some limitations that should be considered. With any technology, there is a possibility of technical disruption and same can happen during the interviews. The quality of the software used, or internet connection may also vary during the interviews, impacting the interview quality. Saunders et al. (2016) argued that the biggest downside would be the respondents not being present similarly as face-to-face, physical interview. Also given that almost all the respondents were working full time from home, screen-fatigue during the interviews was a real concern. However, given these concerns, it was only possible to conduct interviews digitally to ensure safety of both the interviewer and the respondents given the pandemic situation at the time of data collection.

All the interviews were conducted in English since that was the common language for both the researcher and the respondents. Since none of the respondents were known to the researcher before, initial couple of minutes were taken to introduce the researcher to the respondents and explain the research topic and objective in order to instill trust and credibility of the thesis. The respondents were informed that the interviews will be anonymous with only their professional position being disclosed, and permission were taken if the interviews could be recorded. Though notes were taken during each interview, the recording was done to ensure that potential important data for the analysis does not get missing. While recording helps the researcher to

focus on listening and asking follow-up questions to the respondents, it has its disadvantage too. The respondents might hold back information due to being recorded and also lose concentration in presence of a recorder, (Saunders et al., 2016). While the first risk was tried to mitigate through giving anonymity to the respondents, the second one could be avoided completely due to the presence of auto recording tool in the conferencing software. The recordings were transcribed in English after the interview for analysis.

3.4 Data analysis

Thematic analysis method was used for data analysis for this research, as this method is appropriate for qualitative data analysis (Bell et al., 2019). From the collected data, themes related to the second sub-research questions were identified from the literature while for the first and third sub-research questions, emerging codes generated from the data were considered since the pre-determined ones proved to be insufficient. Thus, the interview transcripts were the basis of data analysis, and the first stage of that transcribing the interviews. Transcribing interviews as a continuous process throughout the time of primary data collection and the transcriptions were made within close immediacy to the interviews, as that enabled better understanding of the collected data throughout the research process (ibid). Bell et al., emphasized having an interview summary as the first point of data analysis. The process was followed for each interview to highlight the main points identified.

The data analysis was conducted in two parts: first order and second order analysis. For both the learning practices and challenges, the first order analysis was conducted through identification of small expressions and deriving codes from those. Then the codes generated for learning practices were matched with the themes identified from the literature and the ones generated for challenges were further analyzed to construct themes through second order analysis. The interview transcripts were color coded with notes using the comments function by common first order findings. The next stage was to combine the color codes and group them in second order themes analyzing their nature. The second order themes were the basis for identification and analysis of the learning challenges. This identification of second order theme is added in the appendix 2. The first order themes were considered ideal for investigating learning practices.

The advantage of thematic analysis is that it is flexible, easy to understand, can be used for most types of research question and is particularly useful to analyze data gathered from interviews (Bell et al., 2019). The disadvantage is it can be subjective to some extent through the choice of codes and themes by the researcher (ibid). To avoid this weakness, first order theme analysis was done following certain criteria. Repetitions of expressions were identified, and color coded at the beginning of the analysis. Though repetitions are not enough to construct a theme, they provide a crucial direction for identifying patterns within the data (ibid). Analogies and metaphors were the other elements that were identified and similarly color coded. Following a cross-analysis of the interviews, they were compared with the theory for identifying similarities and differences in learning practices in between theory and practice. For the challenges, the codes were grouped together in relevant themes for second order analysis. The method of thematic analysis used for this study was inspired by Gioia et al (2013). The literature does not provide a concrete guideline to conduct a thematic analysis; however, according to Bell et al. (2019), a theme should describe a category identified from the data, should be connected to the research question, and should add to the theoretical understanding of the data contributing to the research topic. These criteria of themes were kept in consciousness during the data analysis.

3.5 Quality of Research

Business and management research is usually evaluated based on reliability, replicability, and validity (Bell et al., 2019). However, these criteria are most suitable for quantitative research and the adaptation of them for qualitative research is a bit different (ibid). For this research, the alternative criteria for qualitative research – trustworthiness and authenticity, proposed by Lincoln and Guba (1985) were followed. Trustworthiness is again proposed to have four sub-categories: credibility, transferability, dependability, and conformability (ibid). All these quality criteria are discussed below in light of this thesis.

3.5.1 Credibility

Credibility is the alternate criterion of internal validity in quantitative research; thus, credibility entails that the research is conducted properly and the findings from the research are plausible (Bell et al., 2019). According to Shenton (2004), credibility can be formed by developing an understanding of the concept along with the respondents. The primary selection of the respondents was made based on their role and experience in their respective organizations, with the thoughtful assumption that they will be able to contribute best in connection to the research topic. While contacting primarily selected persons for this research, all of them were given a small brief about the research topic and the areas to be covered during the interview along with the interview request. As a result, it was a choice of the selected individuals whether to participate in the study and only the interested ones attended the interviews with some prior thoughts and preparation about the research topic to share their opinion. This increased the credibility of the data collected from the respondents. Another credibility criterion was using multiple sources of data in connection to the research topic (Shenton, 2004). Both primary and secondary data had been collected from various reliable sources and analyzed in line with the most suitable research strategy and design, which eventually ensures the plausibility of the findings.

3.5.2 Transferability

According to Bell et al. (2019), transferability pivots external validity and identifies if the research finding is applicable to other studies. However, they argue that in qualitative research, transferability attributes cannot be judged in a similar way of quantitative research. A quantitative study aims toward analyzing a broader perspective and generalizing, whereas qualitative study focuses on smaller samples to explain a social phenomenon (ibid). In other words, qualitative study narrows down the findings to specific situations; therefore, the application is limited to that particular situation and readers make transferability judgement based on their individual settings (Shenton, 2004). Thus Shenton (2014) suggests sharing the boundaries of the research i.e., the number of organizations, rationale of respondents' selection, respondent contact process, interview details, method of data collection, duration of the data collection process etc. so that readers can make appropriate judgement about the applicability of the research in certain scenario. These boundaries have been presented throughout this section of the thesis to establish transferability in similar situation.

3.5.3 Dependability

The aspects of dependability illustrate the reliability of research. It includes follow up on the process of analysis in comparison with the standards for the selected study design (Bell et al, 2019). Dependability can be considered as an alternative to reliability in qualitative research

which can build trustworthiness (ibid). To exhibit the reliability aspect of a research, Shenton (2004) suggests that a detail description of the research process i.e., research strategy and design, decision making throughout the research process and their consequences, operational activities related to data collection and analysis should be documented. Chapter 3 of this thesis documents all these aspects including the thoughts and actions regarding to the quality criteria. This increased the dependability of the research. All the interviews were also transcribed to ensure dependability of the collected data as argued by Bell et al., (2019). The thematic analysis of the challenges is presented in appendix 2, which is the outcome of the data analysis process.

3.5.4 Confirmability

The confirmability of research focuses on the neutrality in collected data and its interpretation (Bell et al, 2019). The possibility of getting biased from literature or primary data or other external influences is undeniable in qualitative research (ibid). Confirmability demands that the researcher accepts this fact and act in good faith throughout the research process not to get too biased to make the process and result represent personal beliefs and values (ibid). According to Shenton, (2004), to show that the decision made during the research were unbiased, a clear representation of reasons for making any decision and what decision has been made is crucial. Therefore, by presenting the decisions taken throughout the research in detail, the author tried to remain objective and act in good faith. Collected primary data was analyzed based on a certified method which helped to avoid bias in data sorting. The interview questions were selected considering understanding and indications from the literature review, which was again gathered from multiple sources and had a culmination of different perspectives on the research topic. Semi-structured interviews gave time and scope to the respondents to be neutral in their expression and explanation of events, as they knew the topic beforehand but answered open questions, which facilitated the empirical findings to remain unbiased from the researcher's beliefs and valued. Lastly, the structure of the research also would have made it tremendously laborious for the researcher to enforce her imagination than showing accurate data.

3.5.5 Authenticity

To maintain the quality of research, authenticity is one of the aspects that examine realistic and natural research. It also seeks if the research would be worthwhile from the social and community perspective that the study aims to serve (Bell et al., 2019). The authenticity of the research also shows that the conducted and evaluated research has a substantial and credible enrichment to the industry of the study (ibid). The authenticity of this research can be considered from different perspectives, particularly since the respondents and their organizations are actively engaged in innovation collaboration as part of their strategy. Based on the answer collected from respondents working in different organizations has given the empirical data both collective and different perspectives. As the organizations and participants are part of collaborative or network learning, this research will help meet the community perspective and could be useful. Also, the combined understanding from literature review and primary data shows the study has authenticity due to constant progress and increasing demand for collaborative learning in the business world.

3.6 Research Ethics

Ethical consideration is evaluated as a significant aspect and researchers should be transparent and avoid unethical practices to make the study trustworthy for its readers and participants to whom it may concern (Bell et al, 2019). There are principles that a researcher must take care of, such as consent, harm avoidance, avoid deception and privacy (ibid).

According to Bell et al, (2019), consent is a crucial ethical principle to conduct interviews where the participant should agree without any stress or pressure or without any influence. To exhibit consent, the participants must be well informed of the research beforehand and their unbiased decision to participate is necessary (ibid). The participants must also give consent about the use of generated data from the interviews afterwards (ibid). In this research, all the participants were well informed about the research topic and discussion area beforehand, along with the objective of the interviews. They were also informed that interview data will be kept personally by the author and will be used only for this academic research purpose. Only the participants who expressed interest and gave consent to attend interviews were interviewed and no information were documented from any participant without his or her consent. The author, based on personal and professional ethics, did not and will not use or disclose any information that the participants did not consent to.

Ensuring physical and mental security of all participants has to be mandated by the researcher during the study which includes avoiding any kind of stress, physical harm, threat to their future employment etc. (Bell et al., 2019). Asking for confidential information is prohibited and sensitive information or emotion that has been exposed during the interviews must be handled with care and confidentiality must be maintained (ibid). All the participants have the right to remain anonymous and seek for confidentiality regarding personal and professional identity (ibid). This research has maintained the anonymity of the interviewees by not mentioning their name or the organizations they work for; rather they were simply mentioned as respondent 1, respondent 2 and so on. All the interviews were done online which diminished any possibility of physical harm to the interviewees. Alongside, confidentiality has been maintained and identities are secured to ensure the stress and harm reducing ethics.

As information is collected from various resources, there is a possibility of repetition which can breach research ethics which is considered as deception (Bell et al, 2019). To avoid plagiarism, all the sources have been referred to as in-text citations throughout the paper and the list of bibliography is included at the end. The author was cautious about avoiding any kind of actions that show deception toward the aim of the study and the research findings. Information provided to the participants was also according to the research plan, concise and clear. Background information about the author was given to all participants both at times of initial contact and the interviews and it was also mentioned that the purpose of conducting the interviews was entirely academic.

The principle of privacy indicates all the participants should have the liberty to decide and inform how their given information will be handled (Bell et al, 2019). It also includes any information given during interviews that could be omitted if the participant is not comfortable sharing. To maintain privacy ethics in this research, the author ensured all the participants before conducting the interviews that all the interview recordings and transcripts will be kept private, and they were given the choice to mention how they want their given information to be used for the research. No other individual will process or use the given data as the data has been collected solely for this research purpose.

4. Empirical Findings

In this chapter, the empirical findings from the primary data collected in the form of semi-structured interviews will be presented. To facilitate easy understanding of the thesis content, this section will also follow the similar structure as the literature review. First respondents' view and perception of innovation collaboration will be presented. Then the learning practices in collaboration will be presented according to the selected learning concepts, followed by the challenges of learning at both organizational and partnership level.

4.1 Perception of innovation collaboration and learning

In the first section of the interview, respondents were asked about their views on innovation collaborations and the importance of learning from such collaborations. All the respondents identified the presence of innovation collaborations happening within their organizations. However, depending on the industry they are engaged in, the level of major collaborations reported by the respondents were different. The respondents categorized their ongoing collaborations as distinctively in three categories - as buyer-supplier collaboration, project-based collaboration, and strategic or network level collaboration. While the buyer-supplier and project-based collaborations were mostly identified as dyadic, the description of strategic collaborations had some network characteristics and revealed that they are mostly industry-university research collaboration or industry-government-academia collaboration. The below table summarizes the respondents' different level of collaboration relationships reported:

Respondent	**Industry**	**Identified level of Innovation Collaborations**		
		Buyer-Supplier	Project-based Collaboration	Strategic Collaboration
R1	Aerospace & Defense	☑	☑	☑
R2	Pharmaceuticals and Biotechnology	☑	☑	☑
R3	Automotive	☑	☑	☑
R4	Logistics & Transport	☑	☑	☑
R5	Electronic Technology	☑	☑	
R6	Food packaging and processing	☑	☑	
R7	Energy	☑	☑	
R8	Automotive, Logistics and Transport	☑	☑	☑
R9	Retail	☑	☑	☑

Table 5: Perception of innovation collaboration

R1 explicitly identified and gave example of three different levels of collaborations that the company was taking part at the time of interview. However, R1 also emphasized on that point that the objective of most of the collaborations was ultimately to develop a supplier at the end.

'*When we collaborate, we are looking for mainly innovative new suppliers. We are not looking to buy companies; we are not looking towards joint ventures. If we think that it (the technology) is core, then we usually develop it ourselves or with universities.*' – R1

Given the usefulness of the technology that was being developed with the collaboration partner, the relationship might last for a long time and end up being a strategic alliance without any equity investment.

If they survive, we could probably be a customer to them for 10 or 20 years ahead depending on how the market goes, so it is a very long period after the initial one or two years of collaboration. – R1

R2 expresses the level of collaborations in a slightly different way, based on the level of innovation in those and objectives.

There is also a range of collaborations, some are very procurement-ish, you buy a thing [...] Then there are the blue-sky collaborations which are really very, very different and then there's everything in between. – R2

While identifying different level of collaborations that the respondent's organization is engaged with, R3 emphasized that the relationship remains mostly as 'buyer-seller' in their mind. The same phenomenon in OEMs (original equipment manufacturers) is expressed by R4, and in some way by the other respondents too.

So when we then go out and collaborate the way we have been used to, and many manufacturing companies fall into the same, is that our relationship to other companies is traditionally 'we manufacture and they supply' – R3

They [the OEMs] see the Big Brother themselves, managing everything and others are simply selling to them. – R4

R5, R6 and R7 identified their collaborations mostly as project-based innovation collaborations, away from the usual buyer-supplier relationship. However, they could not identify themselves as part of a long-term network collaboration. R5 categorized start-up collaborations particularly as innovation collaborations and the way of introducing new technology that the company invests in through buying equity in the startups.

our aim is to create new business for the company bringing in a startup and finding the synergies, or, you know, having someone having an idea, just one tiny idea and then building it into a new business. So that's the overall goal [...] we sort of find the synergies between various startups and eventually invest in them. – R5

R7 talked about the breadth of collaboration that they have within the organization for innovation work.

I don't think that we do any type of initiatives anymore without any partners. I'm just trying to think if there is something that we are doing at the moment, without a partner, I don't think we are. I think there is a partner within the most like 95% of the development projects, I would say, especially in the innovation part. – R7

R8 and R9 identified some projects that they manage and take part in as long term, network level innovation collaboration projects. R8 was part of an innovation collaboration that was in its third stage at the time of interview, with several participant organizations constantly being involved from 2015 when the collaboration first started with a feasibility study. R9 was also managing multiple similar collaboration projects, one of which had participants across Europe. Both termed these collaborations as 'Triple Helix' model collaborations, since one or multiple public organizations, several private organizations and academia were involved in these projects, trying to find out innovative solution for some ongoing social problems.

How we are working with this [issue] is through Triple Helix kind of collaboration. – R8

While being asked about learning from these innovation projects for their respective organizations (or individual participants from the organizations, that most of them highlighted), all the respondents mentioned that there is obviously some sort of learning from every collaboration projects. R4 even mentioned that the major objective of some collaborations can only be learning about the market, a certain technology or even a certain partner and its capabilities. From the examples shared, evidence of both single loop and double loop learning along with different level of cognitive-behavioral learning could be identified. However, most of the respondents felt that the learning from such collaborations is not very structured and were skeptical about how much of that learning is planned or conscious than being natural.

The objective of the entire collaboration could be that you simply want to learn, you want to get to know the other company perhaps, or you want to get to know or learn more about the technology or the ecosystem that companies are involved in. And that is of course beneficial in itself. – R4

There's different kinds of learnings. Learnings from a technical perspective: we learned that this works, and this doesn't. There is also learning from a relational perspective: next time we need to work with a partner who can do and cannot do this and that etc. Learning about the type of partner, if the parter is compatible. That learning is not structured learning because every relationship is so unique it is difficult to say how much of those learnings are transferable to the others. - R2

Learning is definitely happening. The question is I think sometimes to what degree it's causality versus planned – R3

4.2 Learning views and associated practices

In the second part of the interview, the respondents were asked to describe the recent innovation collaborations that they had taken or were taking part in and reflect on their role, the activities that were carried out before, during and after the project. From the respondents' interviews, a content analysis was conducted to identify and categorize different practices of learning related to the selected learning views. Initially the original expression or short description of the practices were identified, then they were classified in related practice groups. Then main themes were taken from the literature based on deductive content analysis of the selected learning viewpoints. The related practice groups were then organized according to the learning concepts they represent. Table 6 at the end of this section summarizes these finding.

Most of the learning practices selected here were reported to be carried out during innovations collaborations by the respondents, facilitating inter-organizational learning. Some practices were also rather individual organization centric, but these practices were expressed to be relevant and as rather prerequisite in the context of innovation collaboration and learning. Five of the six selected learning viewpoints - organizational memory, tacit and explicit knowledge, exploitative and explorative learning, absorptive capacity, and system thinking, were emphasized by the respondents by their expression of learning practices. The dynamic capabilities concept turned out to be more beneficial at the strategy stage of the collaborations, while learning from collaborations can however play a role to further strategize. The identified learning practices will be discussed next.

4.2.1 Organizational Memory

The practices related to organizational memory was divided into two broad categories – formal storage and informal storage. As for formal storages, the *usage of database and information system* was reported by the respondents. Usage of common drive to work on same documents and emails to share and transfer documents were expressed by R2, R7 and R8. Finally, all the respondent except R7 shared the existence of one or multiple online library or depository within their organizations, where at least designated employees can access different documents and reports related to old innovation projects for information and insights.

It is very rudimentary, you have an agenda and you write minutes. We have a discussion on what people should do and when it should be done by. Hopefully we put it on a shared drive where one can see the minutes, or email as sometimes sharing drives across organisatioal wall can be difficult. We are talking pretty basic which is fit for purpose. – R2

A lot of emailing. We work for instance in Google Drive. This sharing so everyone can see what everyones doing. I can maybe share that folder to them, so we have a collaboration tool. We really go for transparency here and with the project partners. – R8

Usage of different project management tools, circulating meeting minutes were identified as *shared processes,* aimed to build part of formal storage. All the respondents also talked about some final *standards and documents* produced as a result of the collaboration or after the collaboration - process documents, product design specifications, product codes or post-project review reports. While partner organizations created their own routines through the usage of these using different project management tools, the documentations expressed the level of standards for the partners.

We are supposed to use our own tools. But we don't use them much; we use the basics like Trello, Basecamp, not preferred by our company but preferred by us working with it. Because they are like simple tools. It's super easy to use together with partners. – R7

The post project review report is an important document I would say. It gives us a history of what we did well and what went wrong in those partnership. – R6

The final product specification or process document becomes part of the final project documents. So are the minutes of different meetings. – R4

The respondent also opined that a significant part of the organizational memory is linked to the individuals. This individual memory and experience from different past projects, along with the acquired knowledge of 'who knows what' among the organization's partner along with within itself was categorized as informal storage.

4.2.2 Exploitative and explorative learning

A number of learning practices were identified corresponding to the exploitative and explorative learning views from the interviews. Some of the collaboration activities can be directly linked with the learning practices of exploration. R1 explicitly expressed the inherent motive of startup collaboration in the respondent's organization is to explore the technologies that is out there and can be relevant for future business. R5 expressed similar objective behind organizing extensive bootcamp across Europe and Asia, focusing on new technologies that can be potentially disruptive for the existing business. R3 and R4 talked about participating in industry talks and being connected with different science parks to remain updated about new technologies and development within the industry.

Being in emerging technologies, it has to do with some kind of business intelligence, you have to know what is out there to be able to find these things because the internal needs might not be that specific […] Collaborating with startups for us is somewhere in the middle of business intelligence, looking at what is out there and sometimes finding the needle in the haystack. – R1

We scout for startups; we are looking for technologies or ideas what [the company] might want which it doesn't have now. We bring them in, organize boot camps, and we then try to find the synergies between various startups and our business. Treasure hunting you can say! – R5

We are always connected with different regions and other players in the market, we meet them during industry forums, seminars etc. We are also connected with science parks to know what's new is out there. – R4

Exploitative practices were expressed by either existing *knowledge expansion* or *joint development* activities. Respondents talked about incidents where they partnered up with startups with expertise in similar fields or collaborated with university researchers to develop a core technology or improve an existing product, that resulted in their knowledge expansion. R9 talked about a collaboration project where the respondent was appointed as an independent consultant to help the partners design a sustainable packaging and incorporating it within the production process, given his previous experience within the field. The partners already had

knowledge about both since they are in the business for long and aimed to expand their knowledgebase through the consultation. Brainstorming or problem-solving sessions with partners, weekly project review meetings, regular feedback sessions were identified as *joint development* activities for exploiting existing knowledge.

Got the idea about it from a startup, realized it can actually improve our process line. After some initial talk and a short visit to the factory, we decided to work on it together. – R6

They appointed me to bring in some real-life experience with transitioning to sustainable packaging. Of course, they knew the basics, they were already selling packaged coffee. – R9

4.2.3 Tacit and explicit knowledge

The difficulty in sharing tacit knowledge, especially between organizations, had been acknowledged by all the respondents. Respondents' expression of different practices facilitating the transfer of tacit knowledge were categorized into events, shared experience and organizational process and structure. While formal events i.e., meetings at regular intervals for review and feedback creates opportunity for sharing valuable tacit knowledge about the innovation problem at hand, respondents emphasized the benefit of more informal interactions. The respondents argued that events help the participants know each other as persons or individuals rather than job titles and build relationship and trusts, which eventually helps sharing tacit knowledge.

Conferences, meetings, workshops - the big thing is not what's done around table, it is getting to know people, getting to trust people, working with that. – R1

Virtual may increase attendance. Disadvantages of virtual is the long term relationship building, that off the record conversation that may happen with your partner in the coffee room or bathroom. Then you share some thoughts or insights you haven't before. – R2

R6 also emphasized relationship building crucial and shared two interesting practices that they followed before and during the Covid era, while the collaboration project was happening online.

When we would meet with our partners, sometimes we took walks instead of sitting like this. So you had to start talking about other things instead of work as you don't have the computer in front of you. […] I took people around the tour of the house. So that when people sit in a meeting like this and laugh, they know each other, they know the paintings behind, their kids - things like that, these things do not happen on its own. – R6

R8 and R9 talked about participating or organizing joint activities with partners argued that *Ideating with partners* i.e., joint brainstorming or problem-solving sessions, joint workshop or training create shared experience among collaboration partners. According to the respondents, such shared experience facilitates participants to share and learn from tacit knowledge and turning it into explicit knowledge up to a certain level through the decisions made or task achieved together.

You ask them to dig into the problem together, they keep working on it, then suddenly you discover that person from XYZ organization knows something that is beneficial. – R8

I am a big advocate of co-creation workshops with partners. You sit together for 2-3 days, have lunch and coffee together, you get to know each other's strengths and weaknesses, you test some hypothesis together. You learn a bit better how you two think and what you know. – R9

Bringing in the collaboration partner in the operation premises to show how things are done was considered an effective way of tacit knowledge sharing by R1. The respondents also emphasized the importance of transferring the acquired tacit knowledge from collaboration within the organization too. While exploring ways to transfer the acquired tacit knowledge within the organization, R3 and R8 shared specific organizational practices i.e., role rotation in different collaborations and employee movement within different departments.

I was project manager in one collaboration and the software development team in the other. The experience from project management helped me a lot to see things from other angle while I was coding. – R8

You are not in one role for more than 3 years usually. It is a conscious policy to move to a different role so that you take your learnings with you. – R3

4.2.4 Absorptive Capacity

A number of respondents emphasized the point that it is actually an individual or a couple of individuals who collaborate, not the whole organization. Thus, individuals play a big role in case of sharing knowledge and learning from such collaborations. So does the absorptive capacity of those individuals. R4 opined that much of the learning success depends on the absorptive capacity of the person who is taking part in the collaboration project on behalf of the organization.

It [learning] very much also depends on who was the person participating from our side in such a collaboration, is that person already very knowledgeable in that area or not - that itself impacts how much do you learn and what do you do with that experience afterwards.- R4

Though the other respondents could not explicitly identify practices that relates to the concept of absorptive capacity, they expressed evidence of some practices that supports the inherent idea of this concept. R8 mentioned that while approaching different organizations for a national innovation program, the respondent prioritized the ones he had experience working with before. R7 mentioned that his organization usually select the person with adequate knowledge on the subject matter. R9 also mentioned that partners with similar product or market segment usually understand each other better. Past collaboration experience, adequate knowledge, and similarity in between organizations have been perceived to facilitate learning within the partners.

I wish I could say we do it [the selection of collaboration partners] in a very objective and neutral way.. often what happens is that there are some companies that from the beginning

showed some interest in taking part in and they have been part of one project before. We have good contacts with some names and some people, we knock them first. – R8

If it is about expanding the grid business, we send someone usually the best knowledge, but most often who has knowledge and time, from the grid business. Same goes for all other areas. – R7

However, respondents also showed to give importance of certain differences in between partners to gain from the collaboration in terms of learning. R1 mentioned that his organization collaborated with a startup specializing in some complementary technology of AI, since the startup knowledge and expertise in that technology was superior to that of their own. R8 talked about a project where local transport manufacturer collaborated with logistics service providers, which proved to be beneficial for the transport company to make some improvements in their vehicle design later on. In both cases, the organization learned from other organizations due to their differences in capabilities.

4.2.5 System thinking

In the light of system thinking and learning from feedback, respondents prioritized agile way of working. R1, R6 and R7 argued that agile working and iteration helped to get customer feedback early in the innovation process and the partners learned through collectively assessing those feedbacks, identifying mistakes, incorporating changes based on their assessments and sometimes drop off the total idea. R7 also mentioned that often these assessments lead to rethinking product or process rationale and joint decision for the next stages of the collaboration. Project review meetings, feedback sessions and other partner meetings were reported to be breeding grounds for sharing feedback and learning.

We work agile, go to the customers fast with a prototype to test the assumptions. If they (the customers) say that it is ok, then we go to next stage. If they say no, then we ask why. With that answer, we go back to the board together and try to find out what needs to be done. – R6

Feedback helps us to kill the project early, before we fall in love with the idea too much – R1

Often, they [the feedbacks] make us think hard, […] make us go back to the core of the assumptions, and we discuss the next stage together with the partner – how to proceed. – R7

4.2.6 Dynamic capabilities

Practices related to dynamic capabilities were identified at the preparation stages of the collaboration. R1 and R5 emphasized the importance for pinpointing the objective of a collaboration and the expectation from the partners before starting the journey. R1 opined that it is important to have a concrete strategy and need for collaboration within the company and being aware of the dynamic capabilities of own and others is necessary to formulate that strategy. R5 expressed that a clear understanding of the existing capabilities and the strategic objective of developing others for the future is the underlying logic for her organization for

collaborating with tech startups. However, none of the respondents talked about developing shared objectives or future strategies together with collaboration partners as literature suggested.

[After explaining the logic of the company's internal and external R&D strategy] This is how we try right now to divide and put the division somewhere on when it's interesting for us to collaborate with innovative startups. It's when they fit some kind of strategic differentiating spot for emerging technologies. This is quite a heavy internal assessment work […] This is a strategic alignment that has to be done when we find the difference between the two, i.e differentiating between strategic partnerships externally and core capability internally. – R1

Our aim is to create new business for [the company]. So we look deep into what we are doing today, what we can do tomorrow – then bring in a startup that has new technology. We then find the synergies between us and them and then build it into a new business. So that's the overall goal of the collaboration program itself. – R5

Table 6: Learning viewpoints and related practices in innovation collaborations

Learning viewpoints	Category of practices	Practices related to learning	Short description of learning practices / activities
Organizational memory	Formal storage	Database and information system	Shared drive with documents
			Shared documents through emails
			Organizational library, project depository
		Shared Processes	Project Management Tools - Teams, Trello
			Meeting Minutes
			Shared Learning Activities - Bootcamp
		Documents and Standards	Process documents
			Product design specifications
			Product coding
			Post-project review reports
	Informal Storage	Memory and history	Individual memory and experience
			Shared experience from different projects
			Knowledge of who knows what
Explorative and Exploitative Learning	Acquiring new knowledge	Looking for new opportunities	Participating in start-up events and conferences
			Organizing start-up bootcamps
			Membership of related industry forums
			Sponsoring Science Parks
	Exploiting existing knowledge	Existing knowledge expansion	Partnering with start-ups with expertise in similar fields
			Appointing expert consultants or specialists
			Partnering up with universities
		Joint Development	Joint brainstorming or problem-solving sessions
			Weekly Project review meetings
			Scheduled fortnightly / monthly feedback sessions

Tacit and Explicit knowledge	Events	Meeting with partners	Weekly Project review meetings
			Scheduled fortnightly / monthly feedback sessions
			Post-project review meetings
		Informal events	Walking meeting, ‘show your room’ in COVID era
			After work, Virtual after work
	Shared Experience	Ideating with partners	Joint brain storming sessions
			Joint problem-solving sessions
			Joint workshops and trainings
	Organizational process & structure	People movement	Role rotation in different collaboration
			Inviting collaboration partners to the factory for first-hand operation experience
Absorptive Capacity	Similarity between partner organizations	Partners with past experience	Selecting partners with previous collaboration experience
		Prior Individual knowledge	Engaging personnel with extensive knowledge within the collaboration field
		Partners with common interest	Similar customer or market segment
	Difference between partner organizations	Complementary capabilities	Partnering with start-ups with expertise in complementary areas i.e., online sales, specific technology
			Appointing expert consultants in specialized area
System thinking	Acquiring Feedback	Feedback from partners	Weekly Project review meetings
			Scheduled fortnightly / monthly feedback sessions
		Feedback from customers	User interview, prototyping
			Working agile, iteration
	Actions taken	Feedback handling with partners	Assessing customer feedback together
			Identifying mistakes together
			Incorporating changes in products and processes
		Problem Solving with partners	Rethinking product / process rationale
			Joint decision for correction and next stage of product development
Dynamic Capabilities	Understanding own capabilities	Internal & External Assessment	Identifying core operational areas
			Assessing collaboration areas
			Knowing others' expertise
			Comparative analysis of capabilities

4.3 Challenges of learning in innovation collaboration

In the 3rd part of the interview, respondents were asked to describe the challenges they perceive hinder the learning process from innovation collaborations. Similar content analysis was conducted with the interview texts to identify and categorize the challenges that impede learning from innovation collaborations. Figure 5 presents a summary of the findings.

The respondents talked about two sorts of challenges – challenges for partnership and challenges at the organizational level. The partnership level challenges were grouped into three broad themes: challenges pertaining to the partnership pre-requisite, partnership development and management and knowledge transfer and communication. Similarly, the organization level challenges were grouped into strategic ambiguity, challenges inherent to large organizations and organizational culture. The respondents felt that challenges identified at both levels are intertwined and should be addressed together to facilitate the learning process.

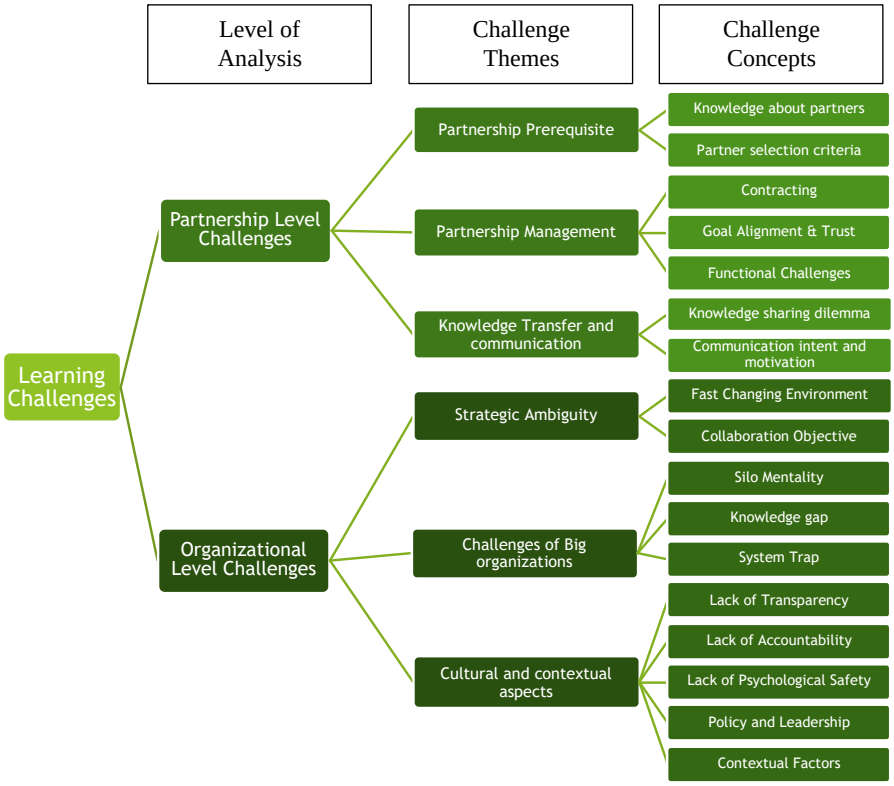


Figure 5: Learning challenges in the context of innovation collaborations

4.3.1 Challenges at partnership level

4.3.1.1 Partnership pre-requisites

Respondents talked about a number of challenges that has their root at the initial stage of planning. While R3 referred *knowledge gap* in between partners as a challenge for reaching a common understanding of the problem or task at hand by all the partners, R1 put more emphasis

on the fact that the collaboration partners, especially the small organizations, usually do not have a thorough *idea about each other's capability and need*, either due to lack of intelligence or homework at their end.

in the world where we have to collaborate, we will collaborate better with a common idea of the problem at hand, if our level of understanding is equal. Unfortunately, that is not the world we live in, the knowledge level is not shared within and across organizations, and the initial effort goes into aligning the understanding. - R3

the really crucial thing and the thing we are working the hardest with is to find an actual need within [the company]. There are thousands of smart start ups out there and they can usually see things that we need. If you are a startup, you can say 'this is what you need' because you do not know the inside of the company. And the reality might be quite different. – R1

Even when this problem of common understanding is sorted out, the next level of problem arises for large organizations while making the selection. Respondents talked about company policies that can make the selection criteria very complex and lengthy. Also, regulatory requirements in certain industry may limit the possibility of collaborating with certain people or organizations or companies operating in certain countries. On the other hand, regulatory requirement in some countries may also force organization to collaborate with local partners, even when that might not be of best learning interest for the organization.

This is one of the other big challenges because there is a really really difficult tender process that needs to be handled, once you start working with a partner. I think it's 20 pages of stuff you need to fill in. There is risk of course, maturity level of the company is another one. And who else are they working with, where do they manufacture the materials as they come from. Fair trade is something that is evaluated by developing the value chain. Where does it come from, the hardware, for example, these kinds of things are really important […] This is a really, really painful process. So what I tell a lot of the companies or our partners that we work with is that, getting in is a pain but once you're in, it's usually beneficial. – R7

we also have the problem of dependency. We have had several startups that we have had to turn down due to security measures that we cannot collaborate with people from certain areas. […] if there is a possible dependency within the organization to Russia or China, we do not want to get involved with them either no matter how perfect they are. – R1

We have a sometimes strange situation where we need to be a part of a country to be able to deliver […] Which means that for many years, we have been pushed into joint ventures in countries where we need to sell to govt customers. – R6

Respondents also expressed tensions between choosing the best and choosing the right partner, with the awareness that the decision may have conflicting impact on effective collaboration management and learning.

Then there is the classical debate that might be worth sharing, should we work with the closest or the best? Let's say we want to develop some kind of IT technology, the best research group happens to be in Singapore, should we collaborate with that group in Singapore, which they are really good at, but they have 20 other collaborations because everyone knows they are the best. Their loyalty towards us might be limited. But on the other hand, there is a group in Stockholm that is reasonably good. We could collaborate with them and help them build their skills. We could walk with them as they develop and we can actually have physical meetings and we can nudge nudge and build relationships better. But they are not the best, so who should we work with? The best from whom we can learn better? Or the ones we can build better relations with? Do you see the sort of ambivalence? – R3

4.3.1.2 Partnership Development & Management

The second category of challenges were grouped under the theme 'partnership development and management'. Here respondents talked about issues that usually come up during the early stage of the collaboration, impacting relationship building negatively during a collaboration and eventually hinders the learning process. ***Contracting*** or formulating win-win contract terms was considered tricky while the partners were co-creating something in an agile way. While there always remains a debate about Intellectual Property Rights (IPR) management and profit sharing, large organizations also fear about partner organizations selling off the developed technology to competitors. And in case of working agile, the respondents talked about the necessity of formulating sort of open and flexible contracts that does not dictate stage by stage delivery and payment, since it is hard to predict the definite outcome at a specific time of the development while you keep on testing and incorporating changes drawn from feedbacks.

Risk is the biggest factor in contracting. Like, what are the risks of working with a partner? Can they like, keep the technology that we developed together to themselves? will they steal it and sell it? Of course, intellectual property issues are there and also for example, who else are they working with? Do they have interest in what we are building together? – R3

This iterative development process, working real Scrum, tracking you - It's a new world for some people that work within our company. It's like they are used to: here's a fixed contract, so this will cost 100k and we will get this. But if you're working, developing together with customers you're trying to get releases, there might be changes. I mean, things might not take the path that is written. We try to say we're agile but the contracts with our contractors are waterfall, like you need to develop this with this cost. This needs to change. – R7

Respondents shed light on ***goal alignment*** as an impediment to learning while talking about diversified inherent objectives of different types of organizations i.e., Private vs Public, Private vs Academia, Private vs Private. Usually, private organizations are profit driven and comes to the table with some financial numbers in mind, whereas public organizations have citizen wellbeing as top priority and academia joins the party for their own research interest. R8 talked about some private collaboration partners who participate in a lot of collaboration within the region with minimum investments and engagements, just to be aware of what is happening there and exploring possible business opportunities. Such lack of transparency about collaboration motives soon becomes problematic for building trust and relationship among the partners and impacts learning from each other.

Transparency in each and everyone's objective is also important. If I don't know what the collaborating partner's objective is, it becomes difficult to adjust my objectives because I do not know what they want. A key is to understand what your drivers are, what is important to you. It becomes very much a negotiation and an understanding of the counterparties and their drivers. – R2

Maybe on paper date is the same objective, but you realize after a while that they (the participating organizations) already know about this and this, and they have already saved the mind about this and this, but they're still taking part. Maybe because they didn't understand the project fully, but also, maybe because they simply want to make sure that they know what is going on. – R9

I don't want to name any actors, but we have some actors who prefer to be in many projects, have a small budget. So, then they can just listen in to find out if there is business there for them or not. - R8

The ***functional level differences*** among the partners create learning impediments during the time of collaboration. Respondents emphasized this point especially while collaborating with small companies and startups. Speed in decision making and implementation and being agile both in routine and important activities are some of the strengths of the startups that large organizations struggle to match while working together towards a common goal. Given that the startups are usually at the so called 'supplier' end and dependent on the larger organization for the payment, the slower pace of decision making and working in their partner larger organization turns out to be frustrating for them, which might also derail the potential of further collaboration and possible long-term relationship building. R6 talked about difference in level of risks perceived by the participants as a source of functional challenges. Large organizations have a larger share of risk for a decision or outcome of a collaboration, while for the startups the risk is usually much lower.

I will say the biggest challenge that we have when we co create something with a smaller company, and I think that is a challenge for all startups that are trying to cooperate with big corporations like ours, for example, they are so fast. They can change like from day to day, like if they want to change something they can just do that. We are so slow. We are like a big oil tanker, and to get a decision, it takes ages. If they can make a decision today, and then they execute tomorrow. For us it's more like three weeks, and then we might execute within the next month. So there is a collision. And that is super challenging and for us that is a big learning. – R4

Small companies and startups - they don't have legal departments, they don't have brand and marketing, and stuff like that and it's always a risk, because we are facing a non brand and if we work together with like a small startup, they don't have a brand to lose, for example. And the customers, they trust our brand. So, though it is okay that we do this initiative, this innovation project, with this product and it might not work, but there's always a calculation of risk that this might damage our brand. – R6

4.3.1.3 Knowledge transfer and sharing

The third category of challenges titled 'knowledge transfer and sharing' consists of challenges that are directly related to knowledge sharing mindset and practices. As per the respondents,

one of the major barriers of learning for large organizations is their attitude towards a collaboration and its partners. It is very common that the large organizations, especially the OEMs consider themselves as the '*big brother*' (a term used by all the respondents working in similar industries), knowing everything, and managing every aspect of the collaboration. This mindset usually results in *lack of openness to partners' ideas* and *exercising an upper hand on the partners* by the virtue of higher bargaining power. R3 called it simply a 'bully' attitude towards the partners that hinders the communication flow between the partners.

We have to collaborate in order to learn. I think that, however, that's an easy thing to say but it's very different to live by, especially when you perceive yourself as Big Brother. I think this is important - the identity lived by a company, how it expresses itself I think has a huge impact here. – R4

Like we go in and say: well if you want to sell us parts, put down the price. I want more parts, better quality, lower price. That's a bit of a bully tactic but it's the truth of most manufacturing companies. Classic five forces model - if you have bargaining power you're going to use your bargaining power […] So perhaps how you approach the world has to change [to learn]. You can no longer go in and say I'm Big Brother, use these sort of bargaining power / bully tactics. You have to look differently and start to listen more, and speak a little less, treat the world in a slightly nicer manner, perhaps. – R3

While sharing a particular collaboration incident, R7 highlighted similar *rigid and non-cooperative mindset of the middle managers* within the organization that often creates problem for down the line officials who actually do the work with the partners. The expression of such mindset hinders building the relationship with the partners in the long run.

We learned, like the people on the floor. But our management, they didn't learn anything. The middle layer of management, the one among us and the top management - they have this attitude like 'we are [the company name], we are the biggest, the best in the whole world. So you do what we say because we are paying you money'. That's kind of the attitude they have. They question the business model of these collaborating companies! And of course, don't try to understand the issues they face. These kinds of things are not good for a partnership. – R7

A common point that a number of respondents highlighted time and again is that it is individuals who actually participates in the collaboration, not the whole organization. Thus, the *motivation, attitude and the power position of that participating individual* or individuals are very critical for sharing knowledge and learning facilitation.

You have to remember A is 100,000 employees and we, B, are 17,000. So, there are a lot of collaborations going on, but you can not say that A and B are collaborating, because it is actually people within each project that we do. – R1

Sometimes people assume that Volvo talks to the city [Västra Götalandregionen]. But to be honest, there is no Volvo and there is no city. There are people in Volvo and there people in the city who talk. So, a lot of things depends on 'who' is coming and talking on behalf. – R8

this is again not the company who is coming. It's a person representing a company who is participating. If that person, depending on what he or she has for level or power, he or she might not gonna talk until we have a really good project progress. – R9

Even when the personal motivation is there, the *conflict of protecting and sharing information* can restrain the participating individuals from sharing. R6 mentioned that often the question that they have to deal with while collaborating is 'How much information is 'too much'?' As R1 and R9 mentioned, *industry context*, its complexity and regulation along with the customers the organizations serve, might also dictate the level of information flow in between the partners. And when these challenges are addressed, the *complex and high level of internal IT security standards* might be the next level challenge for sharing necessary detail information with partners.

All companies have secrets that they do not want to share. Above that, we are also restricted not to share certain things under the law. I would say that it is a pretty usual thing in cyber security and everything like that; it is a big instep to be able to get into the infrastructure and learn but it is not overcome able. – R1

When it comes to collaboration and sharing data and information, then it is always a lot of NDAs no matter what you are working on. – R5

It's kind of complicated in this field of business as well; because there's different regulations in each region. So for example, one thing that works in Romania is not legal in Sweden, you have do it differently. So people often think, what's the point [of sharing]. – R9

Now you want to work together, share documents and stuff - our security is ridiculous. I mean, inviting someone can take weeks, for example, to give them access to a Word document behind our firewall takes forever. That's frustrating. – R7

4.3.2 Challenges at the Organization Level

4.3.2.1 Strategic Ambiguity

The change in the external environment is rapid, especially on the technology side and respondents highlighted the difficulty of choosing and developing internal capabilities amid the changes as a crucial challenge both for deciding collaboration objective and learning. At the very beginning of the interview, R1 talked about the Research and Technology strategy of the organization and explained how the organization divides its research activities and technologies into four domains based on internal capabilities and their market competitiveness – internal basic and core, and external mainstream and strategic. However, it becomes problematic when they try to use the same logic for emerging technologies i.e., Artificial Intelligence, since it is hard to predict the breadth and roadmap of the technology. And even if they choose a couple of areas to focus, the question remains if they are supposed to be good at all those things. This strategic dilemma posed by the changing environment is seen as a challenge for developing dynamic capabilities and learning by the respondent. R3 further explained that, the knowledge about a particular technology is getting old and obsolete fast, so one company can no longer learn about and be good at every relevant technology. Also, not all companies in an industry are or will be capable of being part of all the technologies.

There are other kinds of technologies, sensor technologies, secure communications, secure cloud, the inventions are happening too fast for all companies to be a part of it or for one company to build all those things by themselves Look at the rise of AWS for example. Cloud storage suddenly became something that is too complex for a company to handle, we all started buying it off from companies then. – R3

Thus, a specific technology area to choose and take measures for learning remains a challenge especially for the large organization. Reflecting on this changing environment, R4 highlighted the necessity of more market centric, dynamic sort of collaboration. The respondent argued that Swedish companies are good at long term collaborations with academia, co-developing and learning from such collaboration; however, the challenge remains for collaborations that are not far away from market launch. The faster time to market poses a challenge towards large Swedish organizations to collaborate with a common objective, which is again a challenge itself, and learn fast and effectively from that.

I think that a lot of Swedish companies have relied very heavily on being supplied by universities in certain tech, and we need to get better at getting certain tech from new suppliers that are not Google or Microsoft or Honeywell or anything like that. – R4

Though having a common goal for the collaboration partners is important, respondents made it a point that every collaboration must also provide individual organizations with a purpose too. While the collective purpose may drive the innovation collaboration towards its finish line, the participating organizations, or rather the participating individuals, need their own purpose to make it a priority, invest in time and resources, and remain motivated throughout the process. R2 emphasized on this point particularly since the biotechnology and pharmaceutical industry is research heavy and usually have multiple partners from different backgrounds in an innovation project. R3 reflected on a previous project and expressed the similar notion.

People have conflicting priorities which is a difficult one.Find an agenda to drive that fulfils a common goal but also each individuals personal goal. Because everyone needs to sell it at home. – R2

Everybody had sort of their own purpose, but at the same time we had common goals that we were trying to achieve. – R3

Other respondents talked about the other side of the coin – the lack of collaboration objective for the individual organization. R1, R4 and R6 mentioned that in absence of a definite organizational objective, innovation collaboration with small organizations especially startups do not usually reap the benefit for either of the partners. R5 illustrated throughout the interview how the definite long-term objective of startup collaboration shapes the collaboration management and learning activities that are being carried out.

I know a lot of big companies that doesn't have that road map chalked out. If you want to be the best in a certain tech, then it's justified to look around the world. You have to clear about this objective before looking for a startup, or going into any collaboration whatsoever. – R1

Both sides need to do their homework better in addition to spending some time thinking about what's in it for them and what can they offer the other party. They also need to think about what to get out of this, and why do they want to do this. In some cases these things are not so clear and things do no end up well. – R4

Think hard what you want to do in the long run. Do you want them as your supplier only? Then how do you address selling the same to the competitors? Or do you want to buy the startup? Then what will be the role of these people running it now? Without the answers in your head, you will go nowhere. – R6

4.3.2.2 The inherent challenges of Large Organizations

While highlighting the challenges of learning from innovation collaborations, the respondents talked about a number of characteristics pertaining to large organizations. R4 reflected on the phenomenon of ***different units or divisions of a large organization considering other divisions as 'external'*** to a large extent. She explained that it is very common for the top leaders in an organization which she is part of to manage a division consisting of more than thousand people, which itself is like an organization within the organization. Eventually, the employees of one division start considering others as outsiders, like 'suppliers of a particular function or input' only losing the sight from interdependencies, even within themselves. This phenomenon leads to considerably less, ad hoc or need based communication within the divisions, obstructing knowledge flow within the organization.

It has something to do with human nature that's when it becomes too many people and too big, it's difficult to see how you are connected with each other. – R4

R9 explained this phenomenon from another perspective, saying that large organizations create special boxes and confines managers within their boxes with specific objectives and KPIs, forcing them to be the expert and best within their arena. And while doing that, mangers slowly become defenders of those areas only and less and less curious and absorptive about what, why and how things are happening in the other organizational areas.

Then people start to defend that box and they are valued for what they know from their box. So of course, it leads up to silos and conflicts as well, between the interfaces within the boxes. – R9

R2 also highlighted this problem and talked about the result of this very phenomenon. R2 shared an incident while a past collaboration run by one division eventually did not end up in a final offering due to some prevailing market dynamics. However, after couple of months another division was trying to create somewhat similar offering with some other partners, while those market conditions still prevailed, and the responsible manager was well aware of the past project. R2 opined that insights or learning from an innovation collaboration might not get shared or transferred or accepted by another division working on something similar due to the classic 'silo' approach.

This working in silo approach creates ***knowledge gap*** (and also conflict) within the organization itself and often gets evident in the early stages of a collaboration. While talking about the coordination part of his role in the latest collaboration he is taking part in, R8 again emphasized on the point that it is people who collaborate on behalf of the organization and almost always it is necessary for the participants to talk to other individuals in their respective organizations to have a clear idea where they stand and what they want to achieve before deciding on the collective objective with the other partners.

For example, there's a huge amount of things the city [Västra Götalandregionen] need to talk themselves internally about - talk to this or that person and so on. And usually I would coordinate so the city can speak to themselves first, so they themselves understand what they're talking about while talking to the other partners. – R8

R6 commented that large organizations in general do not sufficiently consider themselves as a culmination of systems, where different divisions or parts of the organization interact with and influence each other. Without this understanding, it becomes hard to see how the organization is also a part of the larger system, posing challenge to effective collaboration with partners and ultimately learning from them. R4 opined that large organizations, especially in the logistics and transport industry, have realized that they are part of the ecosystem where both big and small actors are interconnected, thanks to the challenges posed by the Covid. However, R4 also mentioned that these organizations still think they are at the top of the system, connecting it back to the 'big brother' mindset, which needs to be changed.

I also think that we are quickly learning that we have to be a little bit humble and that maybe it's not the question who's on top of that ecosystem, but rather then being in an ecosystem. You don't necessarily have someone being on top, it's a system. – R4

Respondents talked about other reasons of knowledge gap within their organizations too. Large organizations have employees with high level of tacit knowledge on various related tasks due to their long experience with the company which is hard to know and difficult to capture. R6 talked about an effort that his organization took some years back to develop an internal communication platform for its employees where all the employees will have a profile with a list of their competences and knowledge areas. The objective was to enable an employee working on an innovation project to find out another employee, both in country and in other country offices, to get ideas and learn from insights. The platform was not a total success since it was hard even for the employees themselves to jot down their knowledge and competences. Even when such knowledge is converted to explicit ones through processes, reports, and other form of digital documents, R9 talked about the almost impossible task of codifying them in a way that they pop up in searches effectively every time. As R8 mentioned in this context:

That knowledge ..it's a bit everywhere. They are carried within an individual, they are stored in local computers, even when they sit on a digitally accessible place - you don't know where to find them because they haven't been coded correctly. So I think that's sort of a non-solvable problem, it's just a degree of solution you can provide that is different. – R8

R3 talked about knowledge gap in the context of using prevailing information too. The respondent's organization accumulated large chunks of accident data over the time that they were not sure how to use, or more precisely whether they are allowed to use, for further innovation for a very long time. Due to this ambiguity within the organization, it restrained itself from collaborating with a number of interesting partners in different markets that was interested to co-create a software using the data. However, they are now using the data extensively for developing and incorporating different safety measures in their product. R2, R5 and R7 pointed out the knowledge gap within the organization about ongoing collaboration itself. In absence of proper collaboration portfolio management, ***who is working with whom*** and thus, ***who knows what*** is not clear given that these organizations collaborate quite extensively. R2 mentioned that at any given time, there are 700 – 1000 ongoing collaborations within the company and the lack of this knowledge proves to be costly sometimes.

R9 reflected on another unique problem of large organizations from his consultancy experience that the other respondents did not shed light upon on – ***system trap***. The respondent argued that organizations, by virtue of their nature, create a system within that governs how to assess events, learn from them, and implement that learning. In large, old organizations, that very system becomes an impediment towards learning. The respondent argued that mid-level managers are particularly prone to this phenomenon, given the bridging nature of their role within the organization through 'balance and execute'. From any interaction with the outside world, these managers learn though the lens of their organizational system, limiting the true potential of the knowledge or information. Also, even if these managers are successful in unlearning and create new mental mode, the organizational system makes it difficult for them to use that information in its current structure. Eventually that learning is lost being trapped in the system.

managers are that stuck in the system […] there is a lot of learning in innovation projects that that it's not possible to take further now cause it doesn't match the organizational system. And then you forget what you actually don't work on, with time. – R9

Though the other respondents did not talk about this system trap in large organizations, they however shed light on some other practices or challenges that prevents learning by the organization, especially in the context of innovation. These challenges were grouped as Organizational culture and will be discussed in the next point.

4.3.2.3 Organizational Culture

While talking about challenges of learning from innovation collaboration by the participating organization, the respondents insisted on the importance of having the cultural aspects instilled that promotes innovation and learning. ***Lack of transparency*** within the organization was highlighted as one of the aspects. Though R3 argued that the overall objective of innovation activities run by the organization he works for is learning, he later mentioned a practice of not sharing details of any project that was not deemed as 'successful' by the mass group of employees. Similar practice was shared by R4, R6, R7 also.

I think there needs to be like some kind of innovation portfolio management, that actually is like a bank of old ideas that has been tried, that didn't work and why didn't the work, that doesn't exist – R2

R7 mentioned this phenomenon across its regional offices too. The respondent's organization has around 80,000 employees in different counties within Europe and there have been incidents that multiple offices have worked with some similar ideas in different times. R7 highlighted that if there had been the culture and platform for all the offices to share their findings from such projects, the other teams working on similar projects could get a head start.

We're almost 90,000 employees across Europe. And to get the perspective, like portfolio management of all the initiatives within the regions, there is no one that has that perspective. Because all the different regions are like their own companies, kind of, and the transparency between the regions may not be the best. – R7

Organizational policy and leadership mantra is believed to have an influence in this aspect by the respondents. R3 mentioned that there are a bunch of innovation initiatives in his organization that the management does not consider as failure but believes to have 'made some shift to the uncertainties'. However, they usually share only the hardcore success stories in their keynotes in different forums and meetings. This gives a signal to the employees about company mindset towards failure and creates inhibition and fear among employees about being transparent. Similar organizational practice was shared by R4 and R6. R7 quoted his CEO in this context:

> *If it's successful, then our CEO will always bring it up with his keynote. But if it's not successful, if it fails then it's just forgotten. It is like you silently put it away in a box and try to forget as fast as possible. It is not like that 'okay, so we learnt this'. […] The CEO said 'it's allowed to fail but you can only fail once'. So that's like the culture, the failing and sharing culture is not in place.* – R7

When the leadership is not supportive of failure, the ***psychological safety*** net for learning gets dented. R3, R4 and R7 talked about the prevailing fear of taking the wrong decision in the organization, since a decision is only wrong when it leads to failure.

R4 talked about another aspect of psychological safety. The respondent argued that working with innovation means trying to create value by doing things differently and someone spending half of their working life responsible for a subsystem might not want to do things differently, since that might make his/her expertise obsolete or make him/her lose power within the domain. R6 echoed in this point, mentioning that having own domain and power is important for many people in large organizations. Thus, they will resist any sorts of learning that may result from or lead to innovation.

R8 talked about another angle of this phenomenon – keeping innovation tasks secluded within the organization among only a few people. The respondent argued that innovation is the new power tool and in the large organizations, some people will always try to capture and retain that power within the preferred group. This phenomenon hampers information dissemination and also the learning process within the organization. R3 commented that the hierarchy in any organization is based on knowing more than the others, and for retaining the higher position managers might deliberately hold onto critical information.

> *It can also be a problem that some people use it to gain and retain power by saying 'innovation is our task, it's not yours' and then it might stop the people that are really interested but do not have that type of formal role, so that can also be a barrier.* – R8

According to the respondents, the ***Key Performance Indicators (KPIs)*** method of assessing employee performance has failed to inspire the managers and the employees to focus on learning. As R9 has highlighted that employees and managers in large organizations are usually responsible for their own domain. Their day-to-day work and performance are driven, guided, and shaped by the pre-set KPIs. According to all the respondents, learning is hard to measure and thus, harder to build into the KPI. R4 explained that it is easier to measure the outcome of a collaboration if we are looking for an end product or service since it becomes binary. However, if the focus is on the learning part of it, then it becomes fuzzy since learning is hard to quantify. R9 argued that learning requires reflection and reflection calls for dedicated effort and time. In large organizations, there is little to no free time or unallocated time given that everyone is responsible for some strict deliverables. R6 and R7 reflected on different

organizational learning activities they have organized as innovation managers. However, both of them could not comment on the result of those initiatives, since their KPI revolved around the number of such activities and reach within the employees; the impact of those activities on learning was not or could not be measured. R8 reflected on the KPIs of his current innovation collaboration projects and echoed the same notion.

5. Discussion

In the first part of this section, the respondent's perception on innovation collaborations in their respective organizations and their views on learning from them will be discussed. The next part will discuss the learning practices in innovation collaborations according of the selected learning concepts. The final part will shed light into the challenges that has been brought forward by the respondents in light of the discussed learning models in the literature section.

5.1 Perception of innovation collaborations and learning

The respondents in the interviews described the innovation collaborations of their organizations having three distinctive characteristics or patterns: Buyer-supplier collaboration, Project based collaboration and Strategic collaboration.

The ***buyer-supplier collaborations*** were described as predominantly procurement-ish, involving incremental innovation and rather very structured and guided by established organizational rules and government regulations. The second type of collaboration – ***project-based collaborations*** were the dominant type of innovation collaborations reported by all the respondents. These collaborations were further expressed as 'ad-hoc', 'need-based', 'short-term' and 'market centric' collaborations. Though there had been evidence of some network level characteristics in these collaborations from the description and example shared by the respondents, the level of relationship or management expressed were mostly dyadic. From the description of the tasks being carried out, these collaborations seemed to deal with different ranges of radicality of innovation. The third type of collaboration was termed as **strategic collaborations** by the respondents. The respondents seemed to identify long -term, research-based collaborations with public organization and universities as strategic collaborations, which are effectively Triple-Helix model collaborations as defined in the literature. The objective of these collaborations were expressed to solve 'social problems' or develop disruptive products or services. The respondents rather considered these collaborations as 'high-level', which do not impact their day-to-day operations. Though three of the respondents could not identify any collaboration of that sort within their organizations, the possible explanation could be lack of information or geographical distance of the respondents from those collaborations.

However, the key take-away from this section is that, though the respondents described project-based innovation collaborations as a different type from the buyer-seller collaborations, the pre-dominant mindset or perception of the large organizations towards the collaboration partners remains 'we buy, they sell'. We will see in the later sections how this perception dictates various aspects of the collaboration dynamics which in turn is reflected in the learning practices and challenges reported by the respondents. Also, respondents were of the opinion that large organizations in Sweden have long tradition to get engaged in long term research collaboration with universities with a good success rate, however, struggles to manage and reap benefit from comparatively short-term, market centric innovation collaborations.

While reflecting to the learning aspect of these collaborations, all the respondents confirmed that there is always some learning from any collaborations. These learning can be technical, managerial, about the partners' capabilities and even contextual as how to collaborate better in future. From the examples of learning shared, there found to be evidence of both single-loop and double-loop learning (Argyris and Schön, 1976) and different combination of of cognitive and behavioural learning along the Inkpen and Crossan (1995) model, i.e., experimental learning, where the organization set aside their core assumption about a service and tested a new model and anticipatory learning, where the organization learned the downside of using a certain tactic with a certain partner that they intend not to repeat again in future. Having said that, it was observed in line with the notion of multiple researchers (i.e., Hallikas et al., 2009; Zhu et al., 2018) that learning from the collaborations are not structured, but they are more of causality than planned. The respondents considered that learning was embedded in day-to-day operations within the collaborations, rather than being a conscious or structured process.

5.2 Learning views and associated practices

In the previous section, it has been highlighted that learning is not much of a planned activity in innovation collaborations from the perspectives of large organizations. While talking to the respondents about different learning practices, the phenomenon was yet more evident since the respondents had difficulty to exactly pinpoint specific practices while being asked about them in connection with the selected learning views. However, while being asked about different collaboration practices, the respondent shared several practices that can be related back to one or more learning concepts.

The learning viewpoints that were most emphasized by the respondents during the interview were organizational memory, tacit and explicit knowledge, and explorative sand exploitative learning. Similarly, a lot of practices shared by the respondents could be related back to these three learning concepts. Absorptive capacity was comparatively a bit difficult to explain for the respondents, though some practices related to the concept could be identified from the interviews. System thinking practices was reflected in the agile form of working, especially in case of co-development activities. Practices related to dynamic capabilities was expressed to be more centred around the preparation stage of the collaboration.

Organizational Memory

According to the concept of organizational memory, learning happens through doing and experiencing and is stored in organizational work and processes along with products and services (Walsh and Ungson, 1991). The collaboration practices shared by the respondents were found to correspond with the very core idea of the concept. Respondents talked about working together with partners, through sharing information using rather basic but easy to use technological platforms i.e., shared drive and email, which were effectively formal storage system for the ongoing work. Evidence of creating shared processes were found through their usage of different project management tools. That along with pre-formatted, detailed meeting minutes describing feedback, common understanding on the feedbacks and action points for next stages were seen to have facilitated the development a common way of working together for the partners, which was highlighted to be important for exploitative practice by Koisten (2003). Process documents, product design specifications, post review reports and other final documents became part of formal memory. All the respondents except one reported that their

organization have some sort of online library which can be accessed by at least by designated employees for information and insights about past projects.

However, despite of having all these formal databases and processes, respondents commented in line with Koisten (2003) that informal storage in the form of individual memory and history form a critical part of the organizational memory, which is gathered by the participants through shared experience. Significant practices have been expressed to have existed to tap into this tacit knowledge gathered through such experiences, which have been discussed later. Though Koisten (2003) emphasized the importance of transactive memory that is 'who knows what' in case of explorative collaborations, respondents highlighted this factor for all sorts of collaborations.

Explorative and Exploitative Learning

While identifying practices related to explorative and exploitative learning, it was observed that the respondents expressed their innovation collaborations in a way that are either explorative or exploitative and the organizational practices follow the nature of the collaboration. R1 and R5 mentioned that their organizations have specific strategic focus on exploring new technologies and they collaborate with start-ups with the objective of developing and acquiring technologies that be radical or game changing within their respective industries, where the changes are rapid. Participating in technology events, organizing start-up bootcamps, partnership with science parks and alliance with industry forums were identified as explorative practices. Other respondents talked about more of exploitative practices i.e., partnering with start-ups with novel expertise in similar fields, appointing expert consultants during the collaboration or partnering up with universities. Joint development activities i.e., brainstorming and problem-solving sessions with partners, customer feedback review sessions were highlighted by all the respondents. It could be inferred from the interviews that there is presence of both explorative and exploitative routines in the organizations that the respondents were working for, which is in line with Levinthal and Marchs' (1993) argument that a balance of these two paradoxical notions is a necessary condition for organization learning. However, what was interesting to observe in this area that the respondents did not talk about practices evolving from exploration to exploitation with any specific collaboration partner, as argued by Lampela and Karkkainen (2009). Taking cues from other longitudinal studies conducted in this area (i.e., Holmqvist, 2003), the researcher will be of the opinion that the respondents might not have been engaged long enough with one specific partner to experience the shift in focus within the collaboration relationship, given that the employees usually keep on moving from one role to another every few years within the organization. However, R2 echoed with the notion of Gilsing and Noteboom (2006) that explorative collaborations are usually planned with high frequency of meeting but with less formalization, loose alliances and usually without a formal contract at the beginning compared to the exploitative ones, to allow more flexibility, informal relationship, and trust building.

The conversion of explicit and tacit knowledge

The respondents collectively highlighted the importance and difficulties of transferring tacit knowledge in between collaboration partners and also within their own organizations. Heikkila et al. (2005) suggested that both formal and informal practices need to be developed to facilitate flow of information within the collaboration partners. From the practices shared by the respondents, evidence of both formal and informal practices could be observed. R5, R8 and R9 reported of having ideation sessions with partners i.e., joint brain storming, problem solving

sessions and joint workshops and trainings. R1, R2 and R3 highlighted formal events i.e., regular partner meetings, feedback sessions and post-project review meetings to facilitate transfer of tacit knowledge and convert some of them into explicit ones through the task at hand. In agreement with the notion of informal practices argued by Heikkila et al. (2005), R1 put higher emphasis on informal interactions between partners and participants for information sharing. R6 shared the same view about informal practices, arguing that trust and relationship building in collaboration is crucial for information sharing, especially in today's virtual era when partners might not be in the same geographic location. The respondent shared practices like walking meetings and 'show your room' as conversation starters about topics outside work, that are believed to be necessary part of relationship building and trust.

While talking about practices and evidence of converting tacit knowledge to explicit ones, respondents shared organizational practices of inviting collaboration partners in factory premises to show the operational activity first-hand. These practices can be related back to the first two stages of the knowledge conversion approach suggested by Nonaka and Takeuchi (1995) – socialization and articulation. The indication of the latter two stages - combination and internalization, can be found by the practice of role rotation in different collaborations (R8 being project manager in one and software developer in another). R8 explained that due to this practice, the respondent could combine his multidimensional experience of project management from one collaboration with that of software development in another one, which had ultimately enriched his tacit knowledge base.

Absorptive Capacity

While being asked to give some examples of practices relating to absorptive capacity, the respondents showed difficulty for the same. However, practices that can be related back to absorptive capacity was observed in case of selecting partners and personnel for collaboration. From the shared examples of collaborations by the respondents, it could be understood that firms select partners based on some level of similarity. R8 mentioned that his organization first contacts partners that they have worked with before, since they already know about each other's capabilities, knowledge level and way of working. Similar practice was shared by R2, R3 and R4. R6 and R9 pointed out that collaborating with partners who have the same target market or use the same delivery channels usually understand each other's requirement well, which eventually leads to a better collaboration and learning opportunity. This view of the respondents corresponds with the opinion of Cohen and Levinthal (1990) that close relationship in between existing knowledge and new knowledge is beneficial for assimilating the new knowledge. The selection criteria of individual participants for collaborations confirms presence of this very notion of absorptive capacity in practice. From the respondents' comments, it can be assumed that organizations usually select the most knowledgeable person in the field for the task, who may later engage other team members based on the merit of the task. Similarity with prior knowledgebase of the participants can be assumed to have fostered learning within the collaboration.

The literature also suggests that a certain degree of difference is essential within the knowledgebase of the organizations for effective and creative utilization of the absorbed knowledge (Cohen and Levinthal, 1990). Respondents working for large organizations that are actively collaborating with the start-ups, R1 and R5 showed awareness of this phenomenon, while stating learning about the technology as one of the primary objectives of such collaborations. This practice, however, was not emphasized by the other respondents. The reason for this cannot be confirmed from this study, but it will be safe to assume that there is

presence of this practice in all organizations. However, the respondents had difficulty to notice and later on report that during the interview due to the difference not being very wide, or the technology of the partner company not being drastically game changing. The respondents also did not talk about any partner specific practices, as argued by Dyer and Singh (1998) that firms create partner specific practices and routines for partners to facilitate learning from that particular partner. The reason for that again might not be complete absence of such practices. The author will rather argue that the case study method would have unearthed such practice, since that would have allowed a deeper investigation of the learning practices within a set of specific collaboration partners, in comparison to the exploratory method of this research which focused on more general practices.

System thinking

In the literature, system thinking is defined as 'a set of knowledge, tools and principles that helps to see the wider connections and how things influence them in a holistic way' (Lampela and Kärkkäinen, 2008, pg 192). Senge (1990) considered system thinking at the core of learning organization and later argued that it is a necessary skill to be able to combine information from different sources and generate a holistic view (Senge, 2006). At the conceptual level, the literature suggests that organizations in a network or collaboration should have a common knowledge of the mutual intercedences and the larger system they are part of. At the operational level of a collaboration, this concept is backed by regular, continuous feedback and approaches that facilitate utilization of the feedback.

Not all the respondents could relate back to this concept from the point of view of learning though. Only three of the respondents, R3, R4 and R8 talked about the importance of system thinking approach, both at the organization and collaboration level. The possible explanation for this phenomenon might be the very industry they are engaged with. Gothenburg is a key port city in the Nordics, making it an interesting place for transport and logistics studies and houses the headquarter of the country's major automobile manufacturer along with country offices and factories of some other giant names within the industry. This very feature and presence of coopetition fostered by public-industry-academia engagement might have helped these three respondents to realize the importance of system thinking from the conceptual level and reflect on the same during the interviews. R9 talked about this concept with a similar point of view as Senge (1991) and highlighted the lack of system thinking within the organizations as a barrier to effective learning.

However, the other respondents shared practices related to system thinking at the operational level of collaborations. R1, R6 and R7 highlighted agile way of working with partners, that calls for joint customer feedback assessment and identification of mistakes. R7 also shared an incident where the participants questioned the core assumption of the task at hand based on the customer feedbacks at different stages of the project, and eventually redesigned the product concept. This example corresponds to the argument of Kim and Senge (1994) that change in the existing mental model is both a necessary prerequisite and an expected outcome system thinking, that can eventually lead to double-loop or generative learning.

Dynamic Capabilities

Again, similar to the concept of system thinking, the dynamic capabilities concept was found to be difficult to associate and relate to specific learning practices empirically. The respondents

rather associated this concept during the preparation phase of a collaboration. R1 and R5 emphasized the importance for gap analysis within the organizational capabilities and those needed for competitive advantage, which will eventually dictate the objective of a collaboration and the expectation from the partners. The finding corresponds to the argument of Dyer and Singh (1998) that the assessment of dynamic capabilities of the organization itself and the partner organizations is a critical precondition to combine them to achieve higher competitive advantage. The organizations R1 and R5 operates in (Aerospace & Defence and Electronic Technology respectively) is known for high uncertainly and fast pace of technological change. The industry factor can be argued to have an impact on the understanding and utilization of this concept more on R1 and R5 compared to the others, as Teece et al (2007) suggested. Though other respondents also touched upon the concept of dynamic capabilities through the lens of partner selection and setting common goal for collaboration, none of the respondents talked about periodic revaluation of the dynamic capabilities within the collaboration continuum as literature suggested. A possible answer might be again the explorative research method used for this study; a longitudinal case study on any of the particular organization might have shown evidence of this practice over the time in a long-term collaboration scenario.

5. 3 Challenges of learning in innovation collaboration

The respondents talked about a host of challenges of learning within and from innovation network that were analysed in two levels: partnership level and organizational level. The challenges were not explicitly mentioned by the respondents as related to the specific level of operation and some challenges have overarching characteristics that impact on both levels. Thus, the division is based on the researcher's interpretation and the segregation should not be considered as a hard-coded one.

At the partnership level, the challenges were grouped into three major themes – ***partnership pre-requisites*** or impediments that come up at preparation stage, challenges of ***partnership management*** and ***knowledge and information sharing hurdles*** between partners. Similarly, organization level barriers were also grouped under three themes – ***Strategic ambiguity***, ***inherent challenges of large organizations*** and ***cultural & contextual aspects***. As already been mentioned before, the respondents believed these challenges to have overarching impact on one another and thus should be seen as a set of factors creating the context that impedes learning within and from innovation collaborations.

Challenges noted under the theme of ***partnership pre-requisites*** i.e., *lack of adequate knowledge about partner capabilities* and *certain real-life barriers in case of choosing the best partner with optimum knowledge and capabilities* are not highlighted in the literature as challenges of learning; they rather can be seen as factors that impact the collaboration quality. However, the respondents in this study viewed them as kind of first level barriers to effective collaboration and learning, with the notion that organizations have a higher motivation and probability to learn from the partners when they are sure about the partner's capabilities and also do not feel that they are working with that particular partner because of their competences and not for other factors. In case of being forced to collaborate with a partner, due to complex company onboarding criteria or certain regulatory requirement as described the by respondents, the participants from the large organizations might start the collaboration with this understanding that they do not have much to learn from that partner and remain conservative about absorbing information and knowledge.

Recognizing partner's capability or *Lack of knowledge about partner's capability* can be connected back to the respondents' association of the dynamic capabilities concept by Teece et al (2007), for setting up collaboration strategy and objectives. As also argued by Dyer and Singh (2008), the assessment of dynamic capabilities of the organization itself and the partner organizations is a critical precondition to combine them to achieve higher competitive advantage. Thus, this partnership level impediment relates back to ***organizational strategic ambiguity***. Given the *fast-changing dynamics of the technological landscape*, large organizations face immense difficulty to decide which capabilities to develop internally and in which areas they should collaborate. The uncertainty around individual organizations' future capability leads up to a vague or ambiguous long-term collaboration objective for collaboration, if not complete lack of it, which eventually ends up in selection of 'not the right partners', ripping the benefit of learning from the collaboration.

The presence or absence of a definite collaboration objective and strategy might also impact the learning practices during the collaboration. This assumption is based on the differences of practices reported by the respondents along with their expression of explicit long-term objectives. Two of the respondents, R1 and R5, shared their company strategies for start-up collaboration during the interview. The distinct nature of their strategies seemed to guide the learning practices reported. While both the respondents reported more practices related to exploratory learning than the other respondents, since both share the strategy of scouting for technologies that can potentially disrupt the industry they operate in, R1 reported activities more geared to facilitation of transference of tacit knowledge towards the partners and R5 reported more joint practices i.e., joint brain storming sessions, joint boot camps and informal events that helped the large organization learn more about the start-up technology, key capabilities of the founders and their employees, and their management style. The practices seem to relate to the fact that the first organization is focused on developing long term suppliers only, while the later one collaborates with start-ups offering potential disruptive technologies with an intention to invest in. More rigour in joint activities were reported by R5 than the others, pointing to the argument of Hagedoorn and Narula (1996) that presence or intention of equity investment affect the interaction and knowledge transfer in between organizations.

The other two challenge themes at the partnership level – ***partnership management*** and ***knowledge transfer & communication hurdles*** can be connected back to the influencing factors suggested by Easterby-Smith et al., (2008) through their proposed model of the inter-organizational knowledge transfer. Easterby-Smith et al., (2008) argued that knowledge sharing within a collaboration involves at least two organizations; and thus, the interactive dynamics between these two organizations influences the information and knowledge sharing within the organizations. The respondents also shared the similar view and highlighted various dynamics of the partnership that impacts learning from these collaborations.

Contracting is a crucial part of ***partnership management*** that dictates how the organizations will co-operate during and after the collaboration. This is especially true while co-developing a technology or software together with the partner. Apart from the distribution of IPR management, the nitty gritty of co-development phases are hard to dictate during contract writing due to high level of uncertainty in innovation projects. This very practicality of agile development calls for mutual trust to have a loosely defined contract that is beneficial for both the collaborating partners. Respondents highlighted that their organizations have quite large legal teams who are in charge of formulating these contacts and one of the respondents shared an incident where one of their best partners were financially impacted due to the rigid clauses of delivery timeline and payment in the traditional formal contract. The respondent mentioned

that they lost the chance of building a long-term relationship with the partner since it decided not to work with the respondent's organization anymore. Another respondent highlighted that good start-ups are also picky about who they work with, and large organizations can no more be sure to be able to bring them in for collaboration and learning, without offering something substantial in return. The contracting defines part of the *structure and mechanism* factor of inter-organizational dynamics as suggested by Easterby-Smith et al., (2008) that can influence the knowledge transfer and thus, learning within the organizations. Another aspect of partnership management that are connected to structure and mechanism factor of the model is the *functional level differences* between the large organizations and their partners. Large organizations' traditional management is slow in decision making and implementation compared to start-up's agile management, which is also depicted in the difference of reward and recognition system of these two types of organizations. These functional aspects constitute other parts of the structure and mechanism that impacts learning within innovation collaborations.

Goal alignment and trust is another aspect of ***partnership management*** that keeps the organizations at bay while sharing information freely according to the respondents. Instead of developing a long-term strategic relationship, whether the partner company will sell off the developed product to another competitor is a considerable risk issue for the large organizations as reported by the respondents. The scenario can also depict the other side of the coin when the partner organization is hoping towards long term strategic relationship with the large organization; however, the large organization is considering the collaboration as a 'one off' or 'ad-hoc'. From the said risk and misaligned commitment for long term relationship building arises some of the ***knowledge transfer and communication hurdles***. The classic *conflict of protecting and sharing information* and also *the dilemma of 'how much sharing is 'too much'?'* – emerges from the perceived risk of unintended transfer of knowledge leading to erosion of competitive advantage. In such scenarios, the respondent commented that large organizations tend to restrain from sharing necessary but critical information to the partners. As Larsson et al. (1998) argued that a type of interaction behaviour by one company elicit certain responses from the other, the respondents also reported that such restraining attitude are reciprocated by the partner companies through withholding information. Information and knowledge transfer is a critical pre-requisite of learning which gets impacted in the process. These hurdles are classic examples of trust and risk factor of Easterby-Smith et al., (2008) model, which highlights them as an important factor of knowledge sharing in inter-organizational dynamics.

The other group of challenges under ***knowledge transfer and communication hurdles*** theme, the *communication and sharing mindset*, corresponds with the power relation factor of the Easterby-Smith et al., (2008) model. As per the respondents, the large organizations lack openness to outside ideas and most often have the 'Big Brother' attitude in innovation collaborations, having a sense of knowing everything and managing every aspect of the collaboration. Even though the functional level employees of large organization almost always feel the need to change this worldview when they collaborate, the mid and upper-level managers struggle to understand and accept the real-world fact. As a result, the participating officials from the large organizations are pushed to believe that there is power asymmetry between the collaborators where they have an upper hand. This imposed sense of superiority makes them less receptive to the outside world, impending the information absorption and learning process.

Though the respondents opined that some of these inter-organizational dynamics affecting knowledge sharing can be overcome up to a level through social ties in between participating

officials developed through informal events (with the intension of facilitating tacit knowledge transfer) as argued by Bell and Zaheer (2007), some ***inherent challenges of large organizations*** along with the ***cultural and contextual aspects*** were shared by the respondents that they perceived to impede the knowledge absorption, transmission and implementation within the organizations. These challenges were interpreted as organizational level challenges of learning from collaborations by the researchers.

The ***inherent challenges of large organizations*** seemed to be stemmed from the very structure of themselves. Separation of division and work arena is a common management structure in large organizations. Respondents were of the opinion that such segregation along with the reward and recognition system creates *silos* within the organization. Eventually, one division starts to consider another one similar to 'external' entities, significantly reducing communication and information sharing within the divisions. The traditional reward and recognition system again demands from the managers and employees to be expert within their own arena, which eventually makes them defenders of the same and less curious and absorptive about what's happening outside their domain. Respondents opined that this silo approach creates *knowledge gap* within the organization, which becomes evident in the collaboration table. Participants from large organizations are often uncertain about their own internal understanding of the situation and have different conflicting views of what they want to achieve from the collaboration. Another problem of working in silo is losing sight of the big picture. Respondents were of the opinion that large organizations do not sufficiently see themselves as culmination of systems, how they interact and influence each other, which is argued to be at the core of an learning organization by Senge (1990, 2006). Without the system view of self, it becomes hard to see how they are connected to the outer world, which eventually hinders their capacity to effectively collaborate and learn from them. Respondents also shed light on the *system trap* as an impediment to learning since established organizational system often shapes how one processes acquired information and also restrains implementation of learning.

The ***cultural and contextual aspects*** of an organization impacting learning can be explained by the multi facet model of Lipshitz et al. (2002). The model proposed some conditions under which an organization is likely to learn. According to this model, while different learning practices in collaboration constitute the structural facet of learning, the quality of that learning depends on the other organizational conditions – culture, psychology, policy & leadership and context, that either foster or inhibit learning. Similar arguments by the respondents were observed through their expression of the challenges of learning within their organizations.

Transparency calls for presenting the whole picture for feedback (Lipshitz et al., 2002), since feedback is one of primary tool for learning. A number of respondents reported *lack of transparency* about different innovation initiatives within their local and regional offices. The possible reason might again be related back to the model – the leadership and policy aspect of the organizations. CEOs highlighting only the success stories or declaring that one can fail only once do not create enough *psychological safety* for the employees to experiment, take the risk of making a wrong decision and adhere to it with open mind, which are argued to be necessary traits of innovation and learning for long in academia. Another psychological aspect respondent highlighted is the power impact of innovation in the organizations. While the fear of losing power due to new ways of doing things in a domain restricts employees to absorb learning generating from any innovation project, engagement with innovation activities itself is a new power tool that can help exert significance influence within the organization. The later phenomenon is a new angle in the psychological facet of the Lipshitz's model, that impacts transmission of knowledge gathered from innovation projects within the organization.

Lack of accountability for learning was mentioned as another aspect that did not encourage learning behaviour within the organizations. This phenomenon was related back to the reward and recognition system driven by Key performance Indicators (KPIs) of large organizations. Learning is hard to measure and quantify, compared to other outcomes of an innovation collaboration. Thus, the learning remains as a sub-head or a 'good to have' objective and a manager's evaluation does not depend on the ability and willingness to undertake the learning diagnosis within his or her unit. A critical part of learning is in reflection; and as respondents have highlighted, there is usually not much room for reflection when all the employees are busy checking out the KPI boxes. This can again be related to the leadership and policy facet of learning, since how the organizations allocate time for learning is a subtle reflection of organizational commitment towards learning itself. The reward and recognition system based on strict functional KPIs limits time for reflection, narrowing down the possibility of learning.

Some *contextual factors* were highlighted by the respondents that can either foster or inhibit learning, as was argued by Lipshitz et al. (2002). One of the respondents share an incident of a critical error in a product development, that he believed to have generated some crucial learning for the team which are later implemented as checkpoints in future developments. However, some industry dynamics might make it complex and risky to fail also i.e., the energy sector. The respondent shared this as one industry specific challenge of learning since failure might end up in risking life of people. Another factor that was shared by the respondents was task proximity to the core agenda of the company. Being part of the innovation projects that are core to the company's strategy is believed by the respondents to foster higher learning practices and motivation, than those being done around the support functions.

6. Conclusion

In this last section, the author answers the research question by providing answers to the sub-research questions, concluding from both literature and empirical evidence. The author also presents her recommendation and future research areas that should be investigated around the research topic.

6.1. Answering the research question

The thesis was aimed to explore how large companies captured value from innovation collaborations in the form of learning, through investigating the learning practices in the innovation collaborations and identifying the challenges that impedes the learning process. The following research question was formulated for this purpose:

How do large organizations learn from innovation collaborations?

The following three sub-research questions were drafted according to the objective:

I. *How do large organizations perceive innovation collaborations and learning from them?*
II. *What are the practices of learning within innovation collaborations?*
III. *What are the challenges of learning from innovation collaborations by the large organizations?*

Based on the literature and empirical findings, the author proposes the following answers to the sub-research questions:

6.1.1 Perception of innovation collaborations and learning

Large organizations segregate the innovation collaborations in broad three categories: ***Buyer-supplier***, ***Project based*** and ***Strategic***. The dominant type of collaboration is Project based collaborations, which are also termed as 'ad-hoc', 'need-based', 'short-term' and 'market centric' collaborations. Though the innovation activities in these collaborations ranges at different levels of radicality involving co-creation and co-development with partners, the respondents emphasised that their mindset towards the partners is always 'We buy, they sell'. These collaborations might have engagement from more than two partners, still the relationship with the partners is seen and managed as dyadic partner relationships. Different types of learning from these collaborations are well acknowledged within the organization; however, the learning and practices facilitating learning are embedded in day-to-day operational activities within the collaboration rather than structured or planned.

6.1.2 Learning practices in innovation collaborations

Six organizational learning concepts were identified from the literature review relevant in the context of inter-organizational learning in innovation collaborations: ***Organizational memory***, ***conversion of tacit and explicit knowledge***, ***explorative and exploitative learning***, ***absorptive capacity***, ***system thinking*** and ***dynamic capabilities***. All the six concepts proved to be relevant empirically, through the conditions and practices of effective collaboration shared by the respondents. Though the concepts turned out to be context independent, the associated learning practices proved to be depended on the collaboration objective and the nature of innovation task at hand. 'Individuals collaborate, not the whole organization'- and 'a major part of our knowledge is tacit' – these two mottos were echoed by all the respondents. Learning practices seemed to have the focus of relationship building and trust among the collaboration participants to facilitate transfer of tacit knowledge. Innovation collaborations along with the learning practices in them were found to be either explorative or exploitative rather than transitioning; industry impact seemed to be relevant in case of acknowledging the system view at the business environment level. Lastly, rigor in joint practices of learning was observed in cases where the ultimate collaboration objective was equity investment rather than suppler building.

6.1.3 Challenges of learning within and from innovation collaborations

The challenges of learning from innovation collaborations found to be dwelling in two levels – partnership level and organizational level. At the partnership level, the challenges were grouped into three major themes – ***partnership pre-requisites*** or impediments that come up at preparation stage, challenges of ***partnership management*** and ***knowledge and information sharing hurdles*** between partners. Similarly, organization level barriers were also grouped under three themes – ***Strategic ambiguity***, ***inherent challenges of large organizations*** and ***cultural & contextual aspects***. Partnership level challenges seemed to be connected more with collaboration management issues or Inter-organizational dynamics, which is identified as a factor of knowledge sharing and learning by Easterby-Smith et al. (2008). Organizational level challenges are more in-tuned with inherent challenges of both learning and innovation. While causal relationship cannot be ascertained from this study, it can be said that the Lipshitz et al.'s (2002) multi-facets – culture, psychology, policy & leadership and contexts - can be facilitators or impediments to overall learning.

6.1.4 Connecting perception, practices and challenges

Culminating the answers to the sub-research questions, it can be concluded that large organizations learn from innovation collaborations through a complex intertwining of individual, organizational and inter-organizational level learning practices and challenges. While the task at hand dictates the learning practices in day-to-day collaboration operations, presence or absence of long-term strategic objective define the rigor of these practices. Their perception towards the partners as 'suppliers' largely shapes the inter-organizational dynamics which impacts knowledge flow in between the collaboration participants. Internal organizational culture and context along with inherent challenges of these large organization shapes how the participants process, assimilate, internalize, and transfer the acquired learning within the organization.

6.2 Recommendation and future research

From the findings of this thesis, the author will echo with the respondents that learning in the innovation collaboration context is not a planned activity, rather it is embedded in day-to-day operations. And this phenomenon will remain somewhat as it is in the large organizations, given their structure and management dynamics. Having said that, the learning and management concepts highlighted in this thesis were found to be relevant in any type of innovation collaboration. The concepts are context independent, however, their associated practices might not be. Thus, product managers or innovation managers who are usually in charge of these collaborations from the large organizations' side would be benefitted if they are aware of the concepts and related practices and orchestrate them during collaboration management with the understanding how they are beneficial for learning.

A of the challenges of learning identified here stem from the large organizations' outlook towards innovation collaboration and their management of partners. Large organizations need to leave, if not drop off, the 'big brother' and 'know it all' attitude at the door before joining the collaboration table, since that mindset drives power dynamics of the collaboration all through impacting other areas of learning. Also in retrospect, there will always be some 'buyer-seller' aspect in innovation collaborations, since one party is buying the technological or subject matter expertise from the other, even when they are co-creating. Therefore, large organizations need to operationalize their understanding of the interdependence with other actors of the ecosystem through changing their outlook and mindset towards collaborations and their partners, which will eventually benefit them the most.

The research investigated the learning practices and challenges of learning within and from innovation collaboration from the perspective of large organizations operating in Sweden. Similar exploratory research conducted among the small and medium organizations or start-ups will complement the findings of this thesis and broaden our understanding of the phenomenon. A comparative study of learning practices in organizations with different strategic goals will help us to understand the connection in between these two factors more vividly, since that was an interesting finding in this research. Another possible research idea will be a longitudinal case study of a real time innovation collaboration, to identify learning practices and challenges evolving through time and how those relate back to the success or failure of the collaboration.

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Appendix 1: Interview Guide

Short introduction about the research and the student, Permission asked to record the interview

Background information of the respondent

1. What is your role and tasks within the organization?
2. How long have you been working for this organization?

Types of Innovation Collaboration & Learning from them

3. What are the types of innovation collaborations in your organizations? Give examples please.
4. What are the objectives of these innovation collaborations?
5. What are the learnings from these collaborations? Give example please.

Learning concepts and practices

6. What learning concepts do you think are relevant in innovation collaborations? Why?
7. Can you please give example of practices that facilitate learning within innovation collaborations?
8. How do you decide on collaboration partners?
9. How do you decide on the collaboration goal and objective?
10. How do you manage the collaboration? What are the usual activities that goes on in a collaboration?
11. How does the collaboration relationship evolve over time?

Learning challenges

12. What are the challenges for you to learn from these collaborations?
13. Can you share one / two example when you felt you have learned from partners? Why do you think that happened?
14. Can you share one / two example when you felt you did not learn from partners? Why do you think that happened?
15. Does learning depend on the success and failure of the collaboration? how?
16. What do you think about the ideal scenario to learn best from any innovation collaboration?

Concluding questions

17. Do you have any suggestion for us in relation to the research topic? What did we not ask you but should have?
18. Can you please think of anyone else who might be interested to give us an interview?

Appendix 2: Coding Chart for Challenges

Level of Analysis	Challenge Themes	Concepts	Code examples
Organizational	Strategic ambiguity	Collaboration objective	- Lack of long-term collaboration objective - Uncertain of individual organizational goal
		Changing environment	- Changing tech landscape making it difficult to choose and develop internal capabilities - Greater demand of market-centric innovation than research- collaboration
	Challenges of Big organization	Knowledge gap	- Now knowing 'who knows what' - Non utilization of available information - Absence of collaboration portfolio
		Silo mentality	- 'Not invented here' syndrome in the organization - Separation of functions and achievements - Lack of 'system view' of the organization
		System trap	- Complex and lengthy process of onboarding partners - Established and rigid way of doing things, difficulty of implementing learning
	Cultural and Psychological aspects	Lack of transparency	- Lack of transparency within the local offices - Lack of transparency across regional offices
		Accountability	- KPI for task completions only, not for learning practices - No measurement for learning!
		Psychological safety	- Fear of 'losing power' due to innovation - Fear of making wrong decisions
		Policy & Leadership aspects	- Management highlighting only success stories - CEO declaring 'you can fail only once'
		Contextual Aspects	- Critical error - Complex and risky industry to fail - Being from the support side of the business, not part of the core activity
Partnership Level	Partnership Pre-requisite	Knowledge about partners	- Recognize partner capabilities from both sides - Knowledge gap in between partners
		Partner selection	- Rigid and complex company criteria - Legal restriction for non-selecting certain people or country as partner - Legal restriction for local collaboration in certain countries / forced collaboration - Best partner vs right partner
	Partnership management	Contracting	- Intellectual property rights issues - Agreement issues relating to co-development
		Goal alignment & Trust	- Lack of transparency in between partners about objectives - Conflict of goals - Private vs Public, Private vs Academia - Absence of commitment for long term relationship
		Functional challenges	- Difference between partnership - Traditional vs Agile management - Difference of risk in between partners
	Knowledge transfer and communication	Knowledge sharing	- Knowledge and motivation level of participating official - Conflict of protecting and sharing information - Industry context, i.e. high level of security - How much sharing is 'too much'
		Communication & sharing intent	- Lack of openness to outside ideas of OEMs - Big Brother bully attitude - Mid management rigidity and hurdles