LAPPEENRANTA-LAHTI UNIVERSITY OF TECHNOLOGY LUT
School of Engineering Science
Degree Program in Industrial Engineering Management

Topias Rantio

DYNAMIC INNOVATION CAPABILITY IMPROVEMENT AND FRONT END OF DISRUPTIVE INNOVATION MANAGEMENT

Examiners: Associate Professor Kalle Elfvengren
Professor Ville Ojanen

TIIVISTELMÄ

Tekijä: Topias Rantio

Työn nimi: Dynaamisen innovaatiokyvykkyyden kehittäminen sekä disruptiivisen innovaation alkuvaiheen johtaminen

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Työn tavoitteena oli selvittää yrityksen dynaamisen innovaatiokyvykkyyden nykytila taustatekijöiden avulla sekä mikä on disruptiivisen innovaation alkuvaiheen (front end) nykytila, prosessin ja johtamisen näkökulmasta. Tutkimuksen tarkoituksena oli luoda suunnitelma, jonka avulla voidaan kehittää yrityksen dynaamista innovaatiokyvykkyyttä sekä vahvistaa disruptiivisen innovaation alkuvaiheen merkitystä yrityksen innovaatioprosessissa. Nykyään yritysten tulee etsiä entistä voimakkaammin innovatiivisia ratkaisuja pärjätäkseen kovenevassa kilpailussa sekä lisätäkseen kilpailukykyään, minkä vuoksi dynaamisen innovaatiokyvykkyyden kehittäminen nähtiin tarpeellisena. Sen lisäksi tunnistetaan laajasti yritysten kyvyttömyys johtaa innovaatioprosessin alkuvaihetta, johon haettiin selvennystä suunnitelman avulla.

Teemahaastatteluissa tulkittuja kehityskohteita hyödyntäen tutkimuksen tuloksena syntyi kehityssuunnitelma yritykselle. Kehityssuunnitelma on kolmivuotinen ja huomioi tarkasti kirjallisuudessa esiin nousseita asioita dynaamisesta innovaatiokyvykkyydestä sekä front end-vaiheen tärkeyden sisäistämisestä yrityksen innovaatioprosessissa. Kehityssuunnitelman järkevän toteuttamisen kannalta, suunnittelussa on huomioitu erityisesti taustatekijöiden yhteneväisyys sekä kehitysvaiheiden johdonmukaisuus.

ABSTRACT

Author: Topias Rantio

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The aim for the thesis is firstly to analyze the current state of a company dynamic innovation capability by utilizing its subcategories. Secondly, the aim is to analyze the current state of the first phase (front end) of the disruptive innovation in the company from a process and management point of view. The purpose for the thesis is to create a development plan which will assist in improving dynamic innovation capability and reinforce the front end of disruptive innovation. Nowadays, companies have to look for innovative solutions to gain a competitive advantage over their rivals. This is the reason why improving dynamic innovation capability is considered important for a company. In addition, it is recognized widely that many companies are struggling to manage front end of disruptive innovation. Due to this, a secondary goal for the development plan was to clarify the front end of disruptive innovation.

In theme interviews key development targets were recognized, forming the base of the development plan for the company. The development plan was designed for three years utilizing characteristics of dynamic innovation capability in literature but also recognizing the importance of front end in the whole innovation process. In addition, it was carefully considered that all subcategories are evolved in parallel each year in a way that ensures a comprehensive and coherent development plan, which eases the implementation for the company.

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1 INTRODUCTION

1.1 Background

Innovation is a key for success and achieving a competitive advantage for a company. This is not a new concept for any company aiming to be profitable and is looking for growth in the future. What comes to innovation, companies tend to choose quite easily the way to innovate incrementally where risks are low but also growth expectations are modest. It increases rigidity for companies as dominant design means that only small improvements and small adjustments are done for existing products or processes. Thus, it can be said that a company is locked in for incremental innovation. However, what worked before is not necessarily working in the modern environment anymore. Focusing merely on core competencies known as 'where we are good at' increases the risk to be overtaken by entrepreneurial companies which have disruptive innovation capability to affect markets. So the keys for keeping companies alive nowadays are capability of being radical to sustain competitive advantage, offer unprecedented customer benefits, and achieve substantial cost reduction.

Moreover, it is not enough to only generate radical innovation ideas as those are non-valuable if not processed and evolved correctly through an innovation process. Current literature presents three main phases in the innovation process. The first one is called Front End which is usually less known and precedes New Product Development (NPD) and commercialization. As being less known it does not mean that its role is insignificant in the innovation process. In contrast, literature recognizes that the more radical the innovation, the more important front end phase is in the whole innovation process. The importance of front end is to run all activities and decisions to comprise a new business concept which is the starting point for a successful NPD process. Well-conducted and managed front end enables gates where the idea either continues for the NPD process or will be killed in early stages. At this point deciding to continue or not with an idea is the cheapest and will save time and resources in later innovation phases.

Company X is a Finnish food manufacturing company that provides healthy and responsibly produced products in domestic and international markets. Due to disruptive innovation occurring rarely in the traditional food industry there lies a general assumption to focus mainly on incremental innovation but not on disruptive innovation. Despite the fact that disruptive innovation happens rarely, the existing risk cannot be denied. In other words, it is better to act

than wait to see what will happen. Therefore, company X is looking to strengthen its dynamic innovation capability to innovate radically, which would allow it to reinforce its position in the market.

As mentioned earlier, front end is crucial and important in the entire innovation process but has attracted less attention than NPD and commercialization phases, not only in the academic world but also in the industry. This research is conducted to make a clearer view of how dynamic innovation capability could be improved and secondly how to clarify, implement and manage front end process efficiently in the company.

1.2 Aims and frames of thesis

This work aims to develop dynamic innovation capability and front end of the innovation process for company X. Aim is to draw a holistic point of view on what is the current status of dynamic innovation capability and front end process in the company. Based on the results from interviews, the purpose is to make a three-year development plan for the company. Firstly, the aim for the development plan is that the company can improve its dynamic innovation capability and thus execute disruptive innovation. Secondly, the aim is to clarify front end of disruptive innovation and its management, resulting in clear business concepts for NPD development process.

Due to this, the research problem is defined as follows: *How to improve dynamic innovation capability and front end process of disruptive innovation for the company in a short-term development plan to maximize its long-term sustainability?*

As an attempt to answer this question, both literature and interviews of personnel in the company are used to recognize development targets that are improved in a three-year development plan. As an effort to find a solution for the research problem, the following three research questions are presented in Table 1, which the thesis is aiming to answer.

Table 1. Research question and objectives

Research question	Objective
1. What is a dynamic innovation capability?	Define and clarify the meaning of dynamic innovation capability and its subcategories from literature
2. How to improve dynamic innovation capability in company X?	Execute interviews for personnel in company X and create a development plan to enhance dynamic innovation capability
3. How to improve front end of disruptive innovation in company X?	Execute interviews for personnel in company X and create a development plan to enhance front end of disruptive innovation capability

In this thesis, dynamic innovation capability is limited to encompass organization-related subcategories which in turn affect different types of disruptive innovation. The author has chosen widely acknowledged subcategories of dynamic innovation capability which are discussed in the theory part. Those subcategories are Organizational culture and climate, Individual creativity and know-how, Collaboration and external links, Leadership and decision-making process, Organizational structures and communication. Moreover, the viewpoint of front end process is limited to concern disruptive innovation. As literature recognizes weakly how disruptive innovation should be managed in the front end phase, the author has chosen an entrepreneurial approach to support that standpoint. However, it can be seen as a suitable viewpoint as literature recognizes that creative thinking and entrepreneurship abilities are highly involved when aiming for disruptive innovation results. Moreover, interviews in this thesis concern only the B2C organization in company X, leaving outside B2B which is another division of the company. Therefore, only B2C is considered in the three-year development plan and all its results.

1.3 Methodology

Research can be divided into theoretical and empirical research. Regarding empirical research, gathering of material can be divided into qualitative and quantitative methods. As it is clear that there is some distinction between qualitative and quantitative methods it does not mean that they constrain each other. In contrast, the same research can utilize both methodologies. (Goertz & Mahoney, 2012)

Goertz & Mahoney (2012) recognize two main differences between quantitative and qualitative approaches: conceptualization and measurement. Firstly, qualitative approach pursues to define a concept and what is the purpose of the concept. Quantitative approach on the other hand focuses mainly on the measuring of latent variables to indicate which latent variables are correlated with the latent variable under survey. Secondly, concerning measurements, the qualitative approach has high confidence on values that can be recognized as ideal in a certain situation. Quantitative measurements on the other hand are more confident when values are in the middle of a full range of values. In other words, the qualitative approach is optimal when measurements yield extreme values, whereas the quantitative approach is optimal in a situation where measurements are at the average value of a distribution of values. For this reason, it can be concluded that quantitative research is suitable when a large amount of data needs to be analyzed. As opposed to this, qualitative research does not need large datasets but instead knowledge from participants who know a lot about certain themes and have experience of these themes. (Eskola & Suoranta, 1996, p. 34, Hirsjärvi & Hurme, 2000, p. 22-25)

Research strategy can be divided into three categories: experimental research, survey research, and case research. In experimental research, the purpose is to measure a certain variable in relation to another variable. In survey research, the aim is to gather standardized information from a group. In case research, the aim is to gather information from a certain case or a small number of cases which are closely related to each other. In general, case research is a process where material is gathered by utilizing different methods, for example, interviews in a natural environment. (Hirsjärvi et al., 2007) In qualitative research, the aim is to interpret interviewees' and understand their points of view. Close interaction between interviewer and interviewee is required in order to interpret the situation as well as possible. In addition, qualitative research is remarkable for often not having initial hypotheses. In contrast, interviewer should focus on analyzing the material without any expectations, thus not influencing the results. However, when analyzing results the interviewer must show clearly when he/she has made interpretations concerning not only the analyzed case but a more general situation. Therefore it can be said that qualitative research ends up with hypotheses and anchored theory where results can be seen as developing theory further. (Hirsjärvi & Hurme, 2000, p. 22-25; Eskola & Suoranta, 1996, p. 12-14; Alasuutari, 1999, p. 250-251) Regarding this thesis, a qualitative approach is selected together with case research where interview is used as the methodology.

In this thesis literature review is utilized to identify subcategories of dynamic innovation capability and how to manage front end of disruptive innovation. In addition, development targets for the company are interpreted from theme interviews. Based on this, a three-year development plan has been created in an attempt to improve the current status of the company. The progression of the research process is presented below in Figure 1.

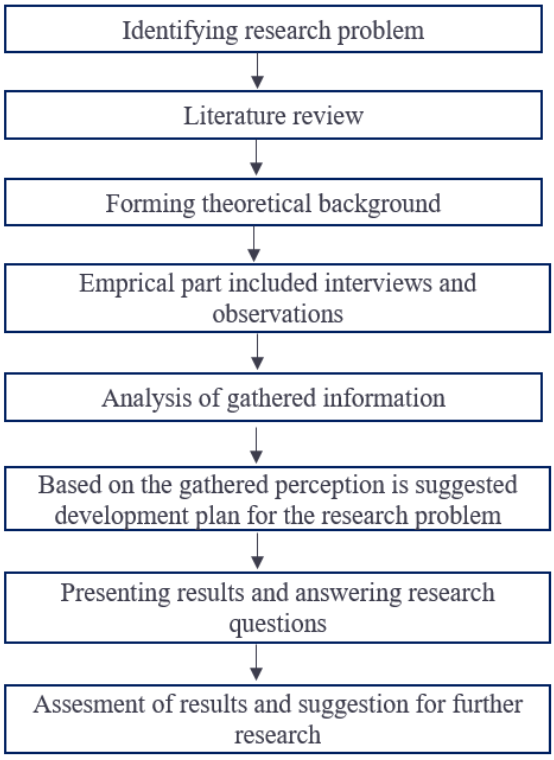

Figure 1. Progression of the research process

1.4 Structure

The structure of this thesis is depicted in Figure 2. The first chapter is the introduction which describes the background, aims and frames, chosen methodology, and structure of the thesis. Chapter two is the theoretical part. In this chapter, the discussion focuses on managerial challenges related to managing both disruptive and sustainable innovation. After this follows the definition of dynamic innovation capability and what subcategories it contains that can either enable or disable innovativeness in a company. Lastly in the theoretical part front end of disruptive innovation is elaborated. It consists of managerial challenges to reduce uncertainty in the front end which will increase the probability for successful business concept development.

The third chapter consists of the research process and analysis of the current state of the company based on theme interviews. In chapter four, recognized development targets are broken down into pieces, and suggestions for improvements are introduced in a development plan for 2021-2023. Chapter five concludes the answered research questions, evaluates reliability and validity, but also considers ideas for future research. Chapter six is the summary of the thesis.

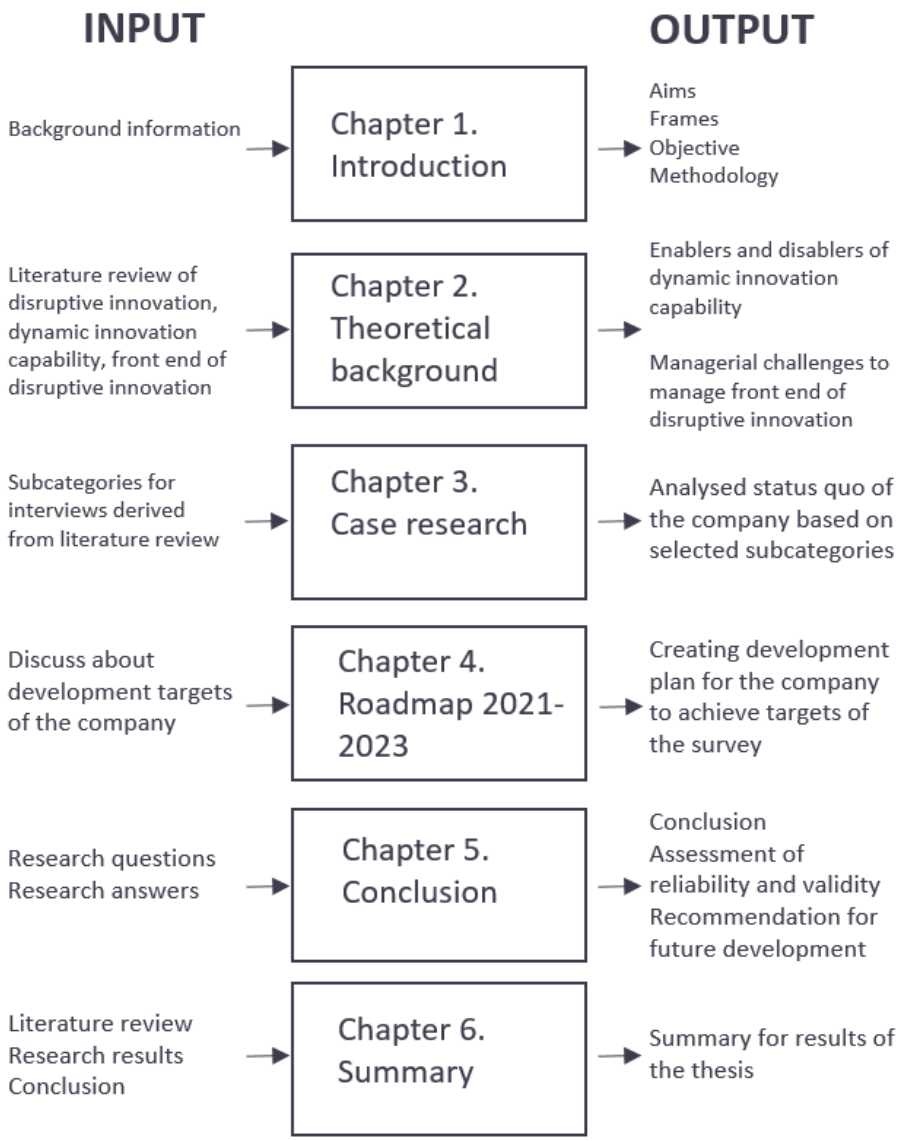

Figure 2. The structure of the thesis

2 THEORETICAL BACKGROUND

"*If there is one topic that has obsessed senior executives in the past decade, it is that of innovation*" (O'Reilly & Binns, 2019). A McKinsey survey found that 70% of the senior executives recognized innovation as a major concern in the organization. It is not a surprise as markets being more complex, competition has widely transformed from internal to global markets, and customers being hungrier to satisfy demands (Blocker et al. 2011). Therefore, can be said that organizations meet higher expectations to accomplish. It conducts the threat that company will be disrupted if different innovation, both incremental and radical innovation is not managed appropriately. According to Tushman & Nadler (1986, p. 92) recognized that only way to meet these high expectations is to manage performance today and at the same time creating innovation tomorrow. This is now more accurate than it has been never before.

2.1 Revolution of innovation

As mentioned above, many companies are struggling with how to compete experienced rivals, fulfill satisfied markets and follow customers changing habits (Chou, 2009). This forces companies to look for competitive advantage such as differentiation by managing innovation (Buckley & Casson, 1998; Porter 1990). Can be said that innovation have a function to meet new customers but also help sell more for current customers (Schmitt, 2003). Innovation are typically classified by *types* as product, process, organizational, and market innovation but also by *extension* as incremental/radical and sustainable/disruptive innovation. Latter can also be categorized as evolutionary (sustaining) innovation where small process adaptation happens gradually over time or as revolutionary (disruptive) innovation which affects rapid change and discontinues for the market (Tushman & O'Reilly, 2004). In this chapter is also discussed and defined what is dynamic innovation capability and what are subcategories of dynamic innovation capability which are impacting disruptive innovation.

2.1.1 Classification of innovation

The word *innovation* is originated from the Latin word *innovare* which refers to a new idea, design, product, etc., and its development (Cambridge Dictionaries, 2014; Oxford Dictionaries, 2014). Moreover, Roberts (1988, p. 13) defines innovation as innovation= invention + exploitation, like European Commission (1995) defines it the same way innovation= process

and its result. As, Yalcin (2009) refers that by understanding this dual terminology of innovation means ultimately differentiation and therefore should include for all companies core strategy not only making competitive advantage but increasing the well-being of companies stakeholders like shareholders, employees, customers, suppliers, etc.

It is clear that companies must make innovation but what innovation companies should consider depends on individually. There lay many types of innovation where to choose according to resources companies have and strategies which companies decide to execute. Schumpeter (1934) identified different innovation types and subsequently, OECD (2005) derived four types of innovation, i.e. product, process, organizational, and marketing innovation. Following is discussed more precisely of these four types of innovation and which characteristic distinguishes them.

Product innovation is defined to be new or significantly improved a good or a service which characteristics like technologic specification, material, components are amended. Product innovation can hold a new technology or its creation might have included a new knowledge or a mixed combination of technology and knowledge. Often it holds true, that it requires extensive input for the whole organization to output successful product innovation but also intensive cooperation with stakeholders, like customers and suppliers. Whether a product innovation extension is incremental or radical, its effectiveness for markets and customers varies. (Henderson & Clark, 1990; Karlsson & Tavassoli, 2015, p. 1485)

Process innovation is defined to be a new or significantly improved production or delivery method which techniques, equipment, and/or distribution methods are amended. Improvements are typically aimed at lowering the unit cost of a product or delivery by increasing its quality. As process innovation and organizational innovation are close to each other, the first one is considered an investment for something physical like a machine in production rather than changes for intangible structures as organizational innovation. (Karlsson & Tavassoli, 2015, p. 1485)

Organizational innovation is the new way of practices inside of organization or external relations. (Karlsson & Tavassoli, 2015, p. 1485) As Damanpour & Aravind (2012) define it is as a “strategy*”* by mean of resource alignment for long-term goals, and “structure” which refers

to all organization's activities to achieve its best performance. Slightly differently, Sahaya & Sahaya (2017) define business model innovation as a new practice to create and capture value (i.e. for customers) utilizing new resource allocation.

Marketing innovation is an improved marketing practice that changes e.g. product design/packaging or pricing strategy (Marketing's 4P). It aims to increase sales by utilizing economic of scale like re-segmentation to achieve more paying customers, exploitation of pricing strategy or changing product characteristic in terms to satisfy more customers. (Karlsson & Tavassoli, 2015, p. 1485)

Figure 3 represents S-curve where different innovation types tend to dominate. The first category concerns a product and a process innovation. As a new technology or market potential is evolving, product innovation has a relatively more important role since new entrants compete to the dominance of a product design. When the dominant design phase is achieved in a growth phase, there appears to be more a process innovation than a product innovation as competition has changed from design for process-related issues i.e. price, quality, and segmentation. In the third category, the mature phase is achieved where only process innovation and incremental innovation are possible, although they may be still very profitable. Incremental innovation means that there are only small changes for current products (Abbasi et al., 2012). In the fourth category new radical innovation creates a new S-curve which replaces the previous S-curve (technology or knowledge). Radical innovation requires a departure from existing capabilities from the organization to serve completely new products and services for emerging or novel customer needs. (Slater et al., 2014)

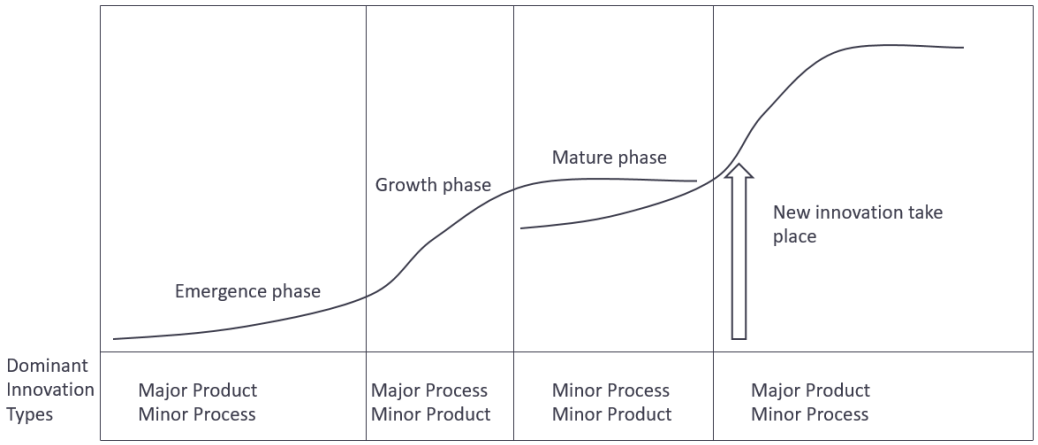

Figure 3. Types of innovation over the product life cycle (adapted from Tushman & Nadler, 1986, p. 78)

Despite incremental (also sustaining) innovation is considered small changes in product, process technologies, etc. it can affect although a high level of efficiency. However, focusing excessively on incremental innovation engages competencies to develop only a particular activity and therefore, increases competence and the opportunity cost of exploration which is called a competency trap. In contrast, focusing solely on radical innovation will run an organization an endless cycle of failure as radical innovation includes more uncertainty and a higher level of risk. Thus, it is to find a balance between incremental and radical innovation for a successful business. (Levinthal & March, 1993; (Chandy & Tellis, 1998)

As sustain innovation tends to have small improvements for the current product, process, or technologies disruptive innovations are game-changers. They disrupt an existing business and serve as a great opportunity for new profitable growth. Disruptive innovations are a key to competitive advantage but benefits do not come alone. What comes with disruptive innovation is high uncertainty and market pressure (Lettice & Thomond, 2002; van Ex, 1999; Hamel, 2003). Reasons which companies are struggling is to see new ideas as a chance, to identify trend-breaking moments in the market, to adapt quickly to changing market circumstances, or are causing market changes by themselves. As Markides (1999) says "*the more radical the innovation, the more difficult it is to estimate its market acceptance and potential.*" He continues that radical innovation has the complexity of its nature and together with hard predictable markets there lies a vast knowledge gap between theory and practice. The complexity of radical innovation tells the fact that approximately 10 % are considered as 'radical' among all innovation which seems to remain consistent over time. (Booz, et al. 1982; Griffin, 1997). In literature, disruptive innovation is defined many ways where few of them are presented in Table 2.

Table 2. Definition of disruptive innovation

Research	Definition of disruptive innovation
Damanpour (1996)	Major changes in the activities of an organization by attempting to disrupt existing practices in a market.
Lettice & Thomond (2002)	Changing demands and needs with new product, service, or business model in existing markets which in a result disrupt incumbents.
Assink (2006)	The radically new product, process, or concept which changes existing market practices and disrupts incumbents. Disruptive innovation has a societal impact.

As can be seen also in Figure 4, disruption can happen in either an existing market with a new technology or an existing technology that creates a new market. If both a technology and a market are new then the correct definition for innovation is a breakthrough innovation that requires even more capabilities than earlier mentioned disruptive innovation. The following chapter is discussed more precisely disruptive innovation as a sustainable growth factor for a company.

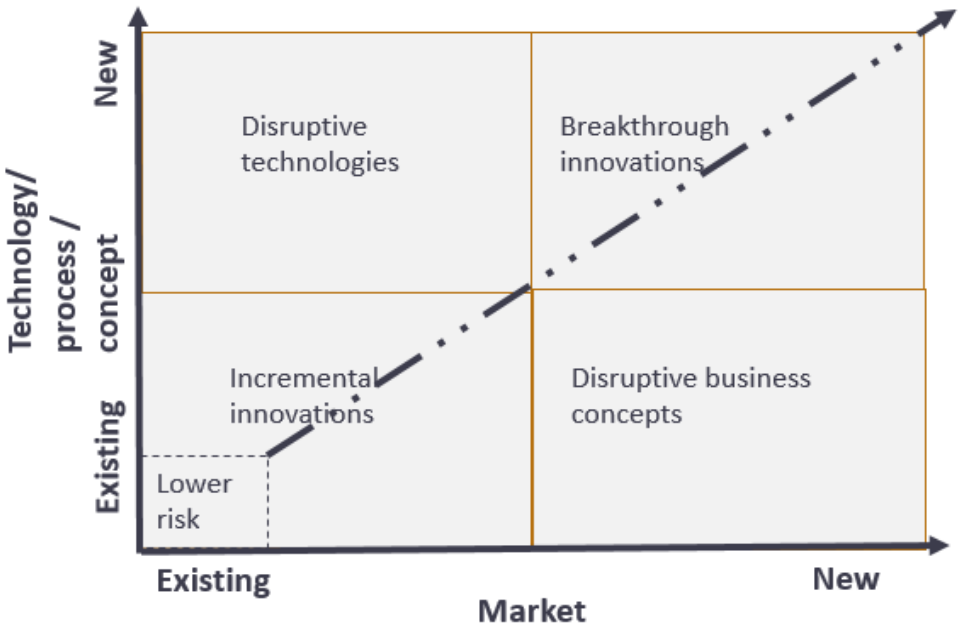

Figure 4. Innovation application space (adapted from Assink, 2006, p. 217)

2.1.2 Disruptive innovation – the heart of sustainable growth

Companies have awakened the needs of disruptive innovation and spent a lot of energy, time, and money on these innovation efforts but unfortunately, results are more or less fainted. There raise the question that why companies have not broken the code of disruptive innovation? One thing might be that disruptive and sustaining innovation should be managed differently due to their nature. As already discussed sustaining innovation's role is to extend the life of existing products and processes by improving them to become more efficient, discover new customer segments to add revenue growth. (Thomke & Reinersten, 1998; Calantone et al., 2003) Thus, it is justified to say that sustaining innovation exploit existing assets and capabilities whereas disruptive innovation creates and develop new capabilities and assets, often impacting in new markets and customers. (O'Reilly & Binns, 2019). Therefore, is needed to manage both sustaining and disruptive innovation in an ambidextrous way – to compete in existing markets where efficiency, control, and incremental improvement are essential (exploitation), and at the same time compete in new technologies and markets which tends to require flexibility, independence, and trial & error (exploration). The ambidextrous way of manage innovation holds three disciplines which are ideation (generate potential business ideas), incubation (validate and select ideas in the market) and scaling (to reconfigure competencies and capabilities in an order to succeed in new business). (O'Reilly & Tushman, 2013; Birkinshaw & Gibson, 2004)

Literature does not argue that aggressively pursuit of sustaining innovation would be really bad. In fact, literature presents numerous good sources on how to succeed in managing with sustaining innovation, and thus them contribution is very important (Hippel, 1988; Wheelwright & Clark, 1992; Thomke, 2003; Thomke, & Hippel, 2002). However, often companies that are on sustaining innovation trajectory forgot to exploit a disruptive opportunity. This is called innovator's dilemma as the companies which are very good with sustaining innovation constantly ignore disruptive threats and opportunities until the game is over. As simply they see sustaining innovation as more important and attractive compared to disruptive innovation. In fact, evidences proof that better companies are sustaining driven innovation, worse they are at disruptive innovation. As sustaining innovation strategy attempts and creates to sell improved products into an established market to capture high-end customers from established rivals, it is obvious that they are fighting back instead of fleeing. Thus, it can be argued that sustaining

innovation is not a viable way to build new-growth businesses (Christensen & Raynor, 2003, p. 44; Tushman, & Benner, 2003).

As discussed sustaining innovation have in common to improve the performance of established products to satisfy mainstream customers' demand, also called high-end customers. However, disruption happens by entrants providing inferior or lower performance attributes products such as simple, affordable, and smaller impacting a large market uncertainty around the established markets which are involved in disruption (in Figure 5). It will not make any action for incumbents as they find inferior product irrational to abandon their existing and profitable (high-end) customers. However, inferior products satisfy low-end customers which incumbents are not focusing so much. Sometimes new entrants are not initially starting a competition with incumbents which will however happen when entrants move up the market and start to satisfy high-end customers. Then it creates problems with incumbent companies. This is the point when traditionally incumbents recognize the threat of entrants but it is too late - disruption has happened. (Sandström et al., 2009; Gilbert, 2003)

Sometimes, even incumbents find a new market potential but they might see the entrance to new markets to be difficult as new markets lie outside of their core business. Besides that companies have the rigidity to change or move from their core competence, they rely on excessively high-end customers evaluation about emerging markets. Unfortunately, it is misleading as high-end customers will not see any potential for emerging markets as long as they are served well with current products. In reality, it is the fact that disruption potential originates in a space in the market not traditionally served by the established companies. Moreover, the current customers and the new potential are initially different why it might be difficult for incumbents to recognize the chance with their existing systems. (Sandström et al., 2009; Gilbert, 2003)

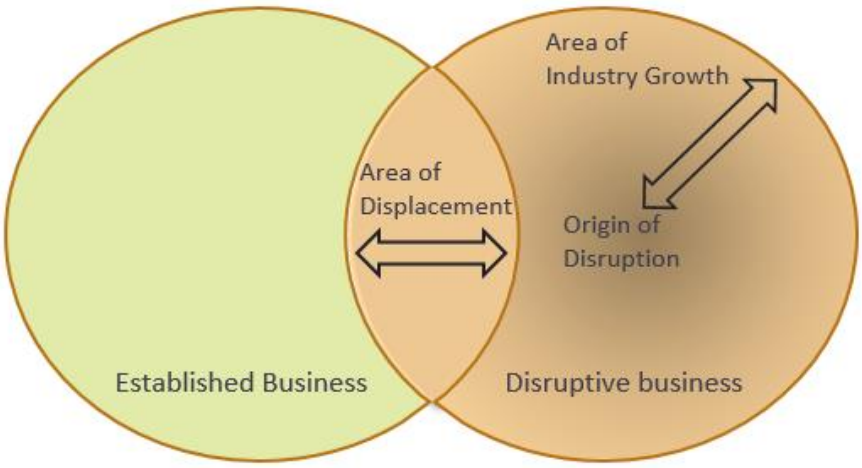

Figure 5. Disruption as an opportunity for growth (adapted from Gilbert, 2003)

A wide present of literature conduct the conclusion (Cooper & Schendel, 1976; Tushman & Anderson, 1986; Utterback, 1994) that entrants succeed in disruptive innovation whereas sustainable battles go to the incumbents. However, it is not so simple that the disruptee could not do anything other than flee and surrender away from the disruptor. In fact, literature recognizes numerous different management practices how incumbent can respond for disrupt innovation. According to Christensen & Raynold (2003) they derive three managerial solutions to how incumbent can act towards disruption:

1. *Change the processes and values of the current organization*, to adapt disruptive innovation, unfortunately, it has proven the weakest track record of success.
2. *Create an independent organization*, by mean of setting up an adjacent organization which develops new resources in order to attack disruptor. The established new organization is largely independent of its operational structure and is, therefore, able to evolve the new technology within the organization (Matcher & Richman, 2004). In fact, Christensen & Reynold see that this one is the best act towards disruption.
3. *Acquire a different organization*, when the incumbent does not see the ability to develop new disruptive innovation they pursue to acquire a company that has required competencies for developing disruptive innovation.

Whereas, Constantinos (2006) suggest incumbents respond to disruption by rather investing more in their existing business to make the traditional way of competing even more competitive than to find out a new way of competing. However, this is seen just to slow or delay the onset of disruption (Utterback, 1994). Secondly, Constantinos (2006) see the option to disrupt the disruptors like as latecomers use to scale up the market and steal it away from the company which initially disrupted the markets.

Besides what Christensen & Reynolds (2003) suggested how to respond against disruption Christensen (2003) also brought a new perspective on why it is difficult to respond to the change. A new perspective examines that due to resource dependency theory posits that incumbents' resources are controlled and limited by companies' surrounding environment (in this case customers) which are the source of survival for the company. However, it generalizes that all incumbents in established markets are homogenous and allocating the resources in the same way. But it is not true, as among incumbents there are a substantial amount of heterogeneity like companies operating in a high-end segment versus companies that are serving on the low-end of the market. Thus, this provides also companies with multiple and unique ways to respond to disruptive innovation. (Sandström, Magnusson & Jörnmark, 2009)

Two models of disruption

So far disruptive innovation is discussed as one but it is not fully accurate. Christensen & Raynor (2003) present two types of disruption innovation. In Figure 6, on the vertical axes is presented performance of the product and on the horizontal axis is presented time. This can be imagined as a market where customers buy and use a product. It forms a field where resides competition and consumption, it can be also called a value network. Inside the value network, each company choose its own competitive strategies like choices of markets and which customers to serve. This draws the conclusion where a company can prospect its opportunities but threats as well which it can experience through disruptive versus sustaining innovation. The third dimension (the arrow that comes toward us) illustrates non-consumers or non-consumption which is the point where disruptive innovation falls. (Christensen & Raynor, 2003)

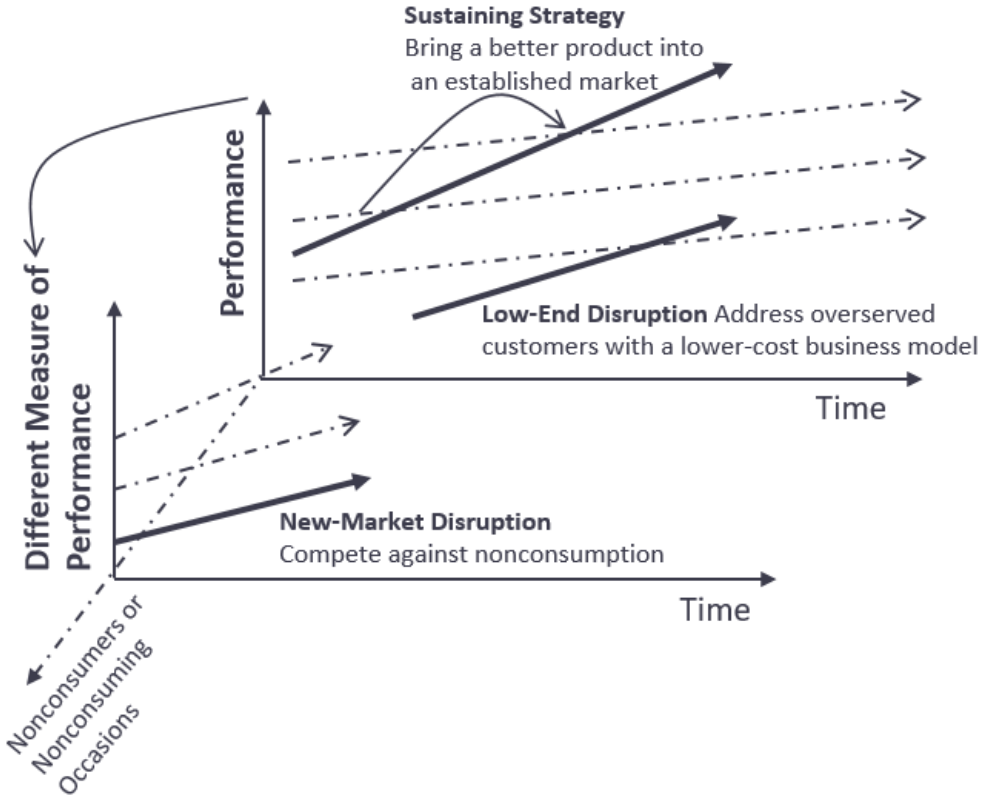

Figure 6. The disruptive innovation model (adapted from Christensen & Raynor, p. 44, 2003)

Low-end disruptions

Low-end disruption attack the least-profitable and the most over-shooted products (which performance exceeds the needs). These disruptive innovation products are inferior compared to existing i.e. missing key features or comparable lower prices i.e. new production method. It satisfies customers for example which earlier did not have money or have not a skill to use the established markets products. Thus, disruption innovation satisfies low-end customers and therefore, incumbents are not fighting back as they enhance to serve their products for high-end customers which are most profitable. (Christensen & Raynor, 2003)

New-market disruptions

New-market disruption competes with “non-consumption” as there are not served products at all by incumbents. Disruptive products are often more affordable, simpler to use, and therefore more convenient comparing existing products in a market. Therefore, they create totally new categories of use products. (Christensen & Raynor, 2003) In Table 3 is a summary of disruptive innovation which depicts what is discussed in this chapter.

Table 3. Summary of disruptive innovation

Questions of disruptive innovation	Answers for questions of disruptive innovation
How disruption happens generally?	1. Disruptive innovation creates new so-called "non-competitive" markets which are solely independent. 2. New market keeps growing and starts to stem established business expanding as new market "pull" consumers from established market to new market. 3. Disruptive innovation moves up the market substantially and significantly diminishes established markets.
How to respond to disruption?	1. Change the processes and values of the current organization 2. Create an independent organization 3. Acquire a different organization
Where are places to find disruptive innovation ideas?	1. Disruptive innovation tends to be underrated by current customers. 2. It serves people to do things they could not do in the past due to economic reasons or skills. 3. Identify what people would like to do but they are unable as non-existing products or services

2.1.3 Definition of dynamic innovation capability

As discussed earlier disruptive innovations are recognized as the engine of substantial growth for a company. But the questions might appears where these disruptive and world-class innovation come from? Which factors affect disruptive innovation? Explanation and answer lay down on dynamic innovation capability and its combination of knowledge and creativity in a favorable environment. Thus, the importance of innovation capability is playing an ever more crucial role in business organizations. (Kenney, 2001; Yliherva, 2004) First is discussed and explored innovation capability wherefrom is conducted dynamic innovation capability which is focal to born disruptive innovations.

At first sight, determining innovation capability might sound easy and simple, but unfortunately, it is not in reality. Pioneers such as Fiol (1996) and Wolfe (1994) executed both

extensive and depth, literature and empirical research to formalize the dominant theory of organizational innovation which consists of innovation capability. However, it seems to be very difficult or even undefinable. As Wolfe (1994, p. 405) summarized it well "*the most consistent theme found in the organizational innovation literature is that its research results have been inconsistent*". Consistency in this research field has been attempted to improve by institutional theory, cognitive theories, transaction cost economics, sociotechnical approaches, resource-based view, and market orientation but without a result of holistic view. As these theories and approaches are seen as just pieces of the whole thing. Therefore, it can be argued that due to the requirement of asset heterogeneity in companies, there is not just a generic frame of innovation capability (Tidd et al., 1997; Lawson & Samson, 2001).

Despite the lack of accurate definition of innovation capability some theories and definitions are being public due to approached more systematic company-level analysis by taking into account different resources and capabilities of the company rather than a bunch of product-market positions (Wernerfelt, 1984). For example, the resource-based view assumes that companies have specific resources and capabilities which are not easily imitated or substituted which assist to differentiate from other companies (Amit & Schoemaker, 1993; Barney, 1986, 1991; Dierickx & Cool, 1989; Hamel & Prahalad, 1994). In other words, the capability to innovate new products is a determinant factor but not just the new products itself to success (Prahalad & Hamel, 1990).

As can be seen, innovation capability definitions merely pursue small improvements of products/services due to competitive advantage is explained solely from an internal perspective (Wernefelt, 1984; Barney, 1991). However, it is not enough to ensure a company's survival in a current business environment because nowadays the environment keeps changing faster than ever before (Rosenkopf & Nerkar, 2001; Danneels, 2002; Schreyögg & Kliesch-Eberl, 2007). Therefore, new aspects were needed as (Tidd, 2006, p. 14) critics well existing definition of innovation capability "*it fails to address how firms cope when existing competencies become obsolete, or how firms acquire new competencies*". As discussed earlier sustain innovation just lead to a competence trap and in the end of destruction if not able to develop a highly novel or unique product/service to market. Therefore, are needed to develop new capabilities to respond to the demand. In other words, dynamic innovation capabilities aim to depart from current innovation capabilities and translate them to new capabilities and further new

products/processes (Tidd, 2006). Dynamic innovation capability has so far received less attention than innovation capability but is fortunately improved last decade (Zahra et. al, 2006; Wang & Ahmed, 2007; O'Reilly & Tushman, 2008; Pettus et. al, 2009; Schoenmakers & Duysters, 2010). Thus, it is reasonable to discuss dynamic innovation capability instead of innovation capability when analyzed a company's innovation capability to radicalness (Galende, 2006).

Therefore, Teece & Pisano (1994, p. 541) define dynamic innovation capability as "*a subset of the competencies/capabilities which allow the firm to create new products and processes and respond to changing market circumstances*" which represents the nature of disruptive innovation. It reflects a company's ability and need to assimilate, develop and reconfigure competencies in a continuously changing environment. The core in dynamic innovation capability is an inimitable combination of resources which cut across all the function in an organization and those resources management capabilities (Lawson & Samson, 2001). In addition, it is crucial to distinguish dynamic innovation capability from innovativeness. Panayides (2006) define innovativeness as the ability to make innovation and assist to solve business challenges in an organization. What earlier discussed can be derived that dynamic innovation capability is what enables the potential to innovate radically in the organization where innovativeness is the execution of dynamic innovation capability. Therefore, examining factors or subcategories which affect the output of radical innovativeness are imperative. These factors can act as enablers or disablers for innovativeness depending on how well these factors are managed.

2.1.4 Review of subcategories of dynamic innovation capability

It is obvious that defining dynamic innovation capability is challenging and sometimes even confusing. Thus, do subcategories or factors (the first one used in the thesis) are difficult to define clearly which affect innovativeness in an organization. Therefore, the best practice is to start at the general level and drill down for different subcategories which are present in the literature. Thus, generally 'the roof' of dynamic capability or in other words higher-order integration dynamic innovation capability can be identified to hold to basic sources of new organizational knowledge;

1. a company can explore new knowledge located outside the company boundaries which is known as external knowledge (suppliers, customers, competitors, universities, venture capital, alliances, etc.)
2. a company can conduct investigative learning from the unexplored knowledge which locates inside the company (employees' experiences and information which gathered previously e.g. tacit knowledge). (Bierly & Chacrabarti, 1996; Zollo & Winter, 2002; Zahra & Nielsen, 2002; Lavie, 2006)

It is then judged to say that both internal and external organizational learnings are required to generate new capabilities which is a widely acknowledge perception. However, what are the subcategories which relate to organizational innovativeness are presented differently in literature. One reason may be that different innovation types require a different set of attributes meaning that there are not a unitary set of attributes to affect all kinds of innovation. Therefore, can be seen innovation capability a multi-faceted phenomenon that includes different structures, internal and external factors, etc. (Francis & Bessant, 2005; Hauser et al., 2006; Nilsson et al., 2010)

As can be seen, subcategories of dynamic innovation capability have similarities but also nuances depending on the viewpoints of different authors (see Table 4). The reason for this is explained due to the nature of different types of innovations.

Table 4. Definition of subcategories of dynamic innovation capability

Research	Definition of subcategories of dynamic innovation capability
Skarzynski & Gibson (2008)	process and tools, leadership and organization, culture and values, people and skills
Ståhle et al. (2004)	human and relationship, physical environment, mental models and procedures, decision making and authority systems
Paalanen et al. (2009)	absorptive capacity and external knowledge, organizational structures and culture, leadership and communication, individual creativity and innovativeness
Lawson & Samson (2001)	vision and strategy, harnessing the competence base, organizational intelligence, creativity and idea management, organizational structure and systems, culture and climate, management of technology
Saunila & Ukko (2012)	leadership and decision-making processes, organizational structures and communication, collaboration and external links, organizational culture and climate, individual creativity, and know-how

In this thesis is selected subcategories of dynamic innovation capability by Saunila & Ukko (2012). These subcategories were seen as the most comprehensive and the most applicable into practice and were therefore suitable for theme interviews. In the next chapter is elaborated separately chosen five subcategories of dynamic innovation capability.

2.2 Subcategories of dynamic innovation capability

According to Deloitte Research (2004) companies are lost in terms of what they think their dynamic innovation capability is versus what it is in reality. Therefore, developing subcategories of dynamic innovation capability, and thus reducing the gap between intention and actual disruptive capability, must be an integral part of a company's strategy for growth. Therefore, a complementary approach is appropriate to identify barriers of disruptive innovation, their interrelationship or interdependence which stem vastly companies' dynamic

innovation capability. (Assink, 2006) Following this, can be recognized factors that positively affect innovativeness in the first phase of the innovation process called a front end. This chapter pursues to follow Assink (2006) definition of dynamic innovation capability "*The internal driving energy to generate and explore radical new ideas and concepts, to experiment with solutions for potential opportunity patterns detected in the market's white space and to develop them into marketable and effective innovations, leveraging internal and external resources and competencies*".

2.2.1 Organizational culture and climate

Experiences, observation, imagination, and discussion in an organization are forming mental models. These models have a major influence on how employees interpret, observe and perform in an organization. It is judged to say that these mental models are in a very deep organizational structure that contains values of organization, beliefs, myths, and norms (Juuti, 2003). Depending on the viewpoint, mental models can be seen as either promoters or barriers to disruptive innovation. As if mental models call the old way of doing things, discourage exploring new and not challenging existing assumptions, mental models restrict the company to innovate radically. To overcome this, ability to unlearn from old manners of doing is emphasized. Unless not doing so the inability to unlearn is a key barrier for disruptive innovations. (Senge, 1994; Argyris, 2000; Baker & Sinkula, 2002)

However, Nonaka et al. (Nonaka & Konno, 1998; Nonaka et al., 2000) argue that consciously built and shared mutual mental models (called also 'innovation architecture') across the company in contrast to above, is one of the most important methods to contribute new knowledge generation and therefore can promote disruptive innovation capability. It highlights the organization's role to support individuals and have a vision and goals which motivate employees, good experiences, and ideation. It will enhance cooperation across functions which creates an encouraging open working culture in the organization. In an innovative organization which continuously generate innovation, mutual mental models are typically cut across all the function in an organization in breadth and from bottom level up to top management level. These certain innovative organizations mental models relates how to create and assimilate knowledge among an organization, strong desire to learn more, and encouraging attitude for innovative

mindset. (Leonard-Barton, 1995; Amidon, 1997; Ståhle et al. 2004, p. 82-90; Skarzynski & Gibson 2008, p. 238-247)

It is noticed that usually companies unlearning is problem-driven (Sinkula, 2002), however more crucial is to sense when unlearning efforts should be initiated. Unlearning encourages to break the conventional way of thinking and try something fundamentally new to get rid of stagnation mental models. (Assink, 2006) For example, when a company is too deeply focused on certain business they might conduct the market's core assumption incorrectly and when doing so interpretations and actions are wrong as well. This happened for the music business where incumbents could not imagine that instead of selling albums can be sold single songs which was done when Apple Computer's disrupted the established market. (Wind & Crook, 2005)

A very close aspect of the inability to unlearn is when core competencies become rigidity. It hinders to explore disruptive business innovation opportunities which need efforts to change capabilities known also "capability-rigidity paradoxes" (Leonard-Barton, 1992; Levinthal & March, 1993; Johannessen et al., 2001) It recalls especially for large companies which tend to have a lack of management ability to adapt the necessary skills, utilize effectively new technologies and overcome challenges which are the basic elements in disruptive technology. (Assink, 2006) When exploring disruptive innovation where uncertainty is high Vanhaverbeke et al. (2003) note, that company might not even know what knowledge they lack which is a very difficult situation in managing wise. As lacking managerial and technical knowledge, it limits the capability of the double loop, organizational learning and unlearning (Baker & Sinkula, 2002).

2.2.2 Leadership and decision-making process

Individuals' creativity and ability to innovate are not solely enough for successful innovation. In addition, individuals need to feel themselves comfortable and supported by the organization. Leaders have a huge affection on how this kind of positive innovation culture is created. For example, leaders should show that they value creativity and all kind of business ideas. It will not be enough to send only the message of support of innovation but also it should be shown by concrete actions as well. Investing for innovation is good support and crucial but as important as are leaders support for the innovation creation process. If individuals feel that idea

creation and development should happen overtime work or spare time it is hardly believed that any innovation outcomes will occur. In fact, it has been shown that providing slack and other resources for innovation activity has resulted in extremely positive results. (Kanter, 1987; Amabile, 1997; Pöyhönen, 2002; Ståhle et al., 2004, p. 90)

Besides innovation support, Skarzynski & Gibson (2008) remind that leaders are expected to share a mutual understanding of innovation vision and innovation purpose to achieve business goals. As leaders have adopted innovation as part of their daily base performance it reflects the entire organization. This positive innovation performance enables to build up and support innovation capability. Moreover, it makes easier for leaders to manage innovation capability when the entire organization is engaged in innovation. In addition, well-understood innovation performance fundamentally aims that everyone in an organization can and need to innovate and not solely R&D and/or marketing which only reduces innovation capability (Skarzynski & Gibson, 2008, p. 232-237).

In an organization, decision-making and authority systems can either enable or disable innovativeness depending on how they are organized. It can be generalized that centralized organizations are less innovative than decentralized organizations where decision-making is spread across functions, teams, and individuals. Authority and decision-making are divided into three aspects *who have the rights to control resources and allocate them to projects?; How widely decision-making is diversified in an organization?; Are the future plans closed and decided already by executives or is there an opportunity to think creatively and generate a new future that will be considered appropriately.* Lateral is especially recognized as a characteristic of dynamic innovation capability which supplies innovation continuum and reconfiguration in an organization. All these aspects, however, highlights the importance of supporting and relying on individuals and diversification of decision-making in an organization. (Ståhle et al., 2004, p. 95-100)

As discussed earlier disruptive innovation holds a lot of uncertainty. Although disruptive innovation idea is accepted it does not mean yet that it will lead to any commercialization. In fact, it holds true that the failure rate of products of disruptive innovation projects is very high (Schilling & Hill, 1998; Lynn & Reilly, 2002). Due to this, there must be commitment, encourage and trust to support the long-term projects and their resource allocation from leaders

although it seems very difficult to maintain (Rice et al. (2000); Sandberg, 2002; Christensen, 2003; CBS, 2003). Unfortunately, often risks combined with high-cost product development scares leaders away from investing in disruptive innovation (Hamel, 2002). In opposite, when leaders create an appropriate innovation climate, encourage risk-taking, and projects are driven by highly motivated champions it has a very favorable chance to succeed in disruptive innovation. (Stringer, 2009; Perel, 2002; Assink, 2006)

Behind the risk and uncertainty under disruptive innovation especially market leaders are unwilling to foster innovation which can cannibalize their own investments. It holds true even there exist adjacent markets with substitute products but leaders will not see the disruption until it is too late. Especially, the decision to change current technology to another seems to be the hardest to accept by companies. (Brown, 1998; Christensen, 2003) In contrast, Chandy & Tellis (1998) notice that a company can overcome the negative effects which occur over cannibalization. They continue and highlight important organizational factors as influential product champions, presence of internal markets, and future market focus which motivates cannibalization. Unfortunately, history knows many cases when companies hesitated too long with their current (and successful) product, process, and business models. For instance, Kodak was not able to decide and cannibalize their chemical film process for digital photography which had initially a higher printing cost. Another example is Motorola which stubbornly kept continuing to develop analog wireless phones although the entire business turned to global digital standards. (Wind & Cook, 2005)

2.2.3 Collaboration and external links

So far discussion has related merely to explore disruptive innovation enablers and barriers inside the company. However, what might fit decades ago as having purely internal R&D activities is not working anymore to be competitive. Beginning of the 20th-century academic community focused attention that companies should be open to outside innovation. It calls that company perceive substantial advantages by external collaboration. (Rigby & Zook, 2002; Christensen et al., 2005) The awaken observation was that not all smart people work inside the company but they work outside of the company as well (Chesbrough, 2003). However, companies might overlook benefits from external collaboration and stuck on the thought that it might be only for some extra work to collaborate with minimum benefits. Unfortunately, it is a

massive error estimate. According to Koschatzky (2001, p.6) "*firms which do not cooperate and which do not exchange knowledge reduce their knowledge base on a long-term basis and lose the ability to enter into exchange relations with other firms and organizations".* Moreover, cooperation shortens time to market and increases innovativeness. It is justified to say that co-operation with an external partner is a necessity if aiming to keep up in competition. According to Enkel (2009) there is still a lack of consensus on how to fully profit from cooperation. One thing can be said for sure that as companies have a different set of assets and dynamic capabilities there is no unified 'the best' collaboration type but also a matter of choice with whom external collaborations are most fruitful.

Despite the fact, at first glance external collaboration seems to have a purely positive picture but however, it is not fully accurate. In the year 2008 was conducted a survey which included 107 companies from European SMEs and large enterprises, shows that companies see (48%) risk for both losses of knowledge and higher coordination cost, hindering the collaboration activity. Secondly, companies mentioned that there is a threat of loss of control and higher complexity (both 41%) to hinder their collaboration activity. (Enkel, 2009)

So far has been discussed open innovation in general but it can be divided into three main co-operation processes which are presented in Figure 7.

1) Outside-in process contains acquiring and enriching external knowledge to the company's knowledge (supplier, customers, and external knowledge sourcing). It has been seen to increase companies' innovativeness (Laursen & Salter, 2006; Lettl et al., 2006; Piller & Walcher, 2006).

2) Inside-out process refers to earning revenue by bringing ideas to market faster than the company could internally by selling IP to outside of a company. Inside-out is seen more for large companies which can allocate substantial resources to outside. It can lead to corporate venturing activities (Vanhaverbecke et al., 2008), new business models, such as new ventures and spin-offs (Chesbrough, 2007), licensing fees (Gassmann & Enkel, 2004; Lichtenthaler & Ernest, 2007), and the commercialization of own technologies in new markets called cross-industry innovation (Enkel and Gassmann, 2010).

3) Coupled process is a combination of the outside-in process (to gain external knowledge) with the inside-out process (to bring ideas to market). Mainly involved with alliances, cooperation, and joint venture. Success needs both, give and take combination. It relates closed consumers (Hienerth, 2006; Lettl et al., 2006), lead users (Franke et al., 2006), universities or research organizations (Perkmann & Walsh, 2007), and partners from other industries (Enkel & Gassmann, 2009)

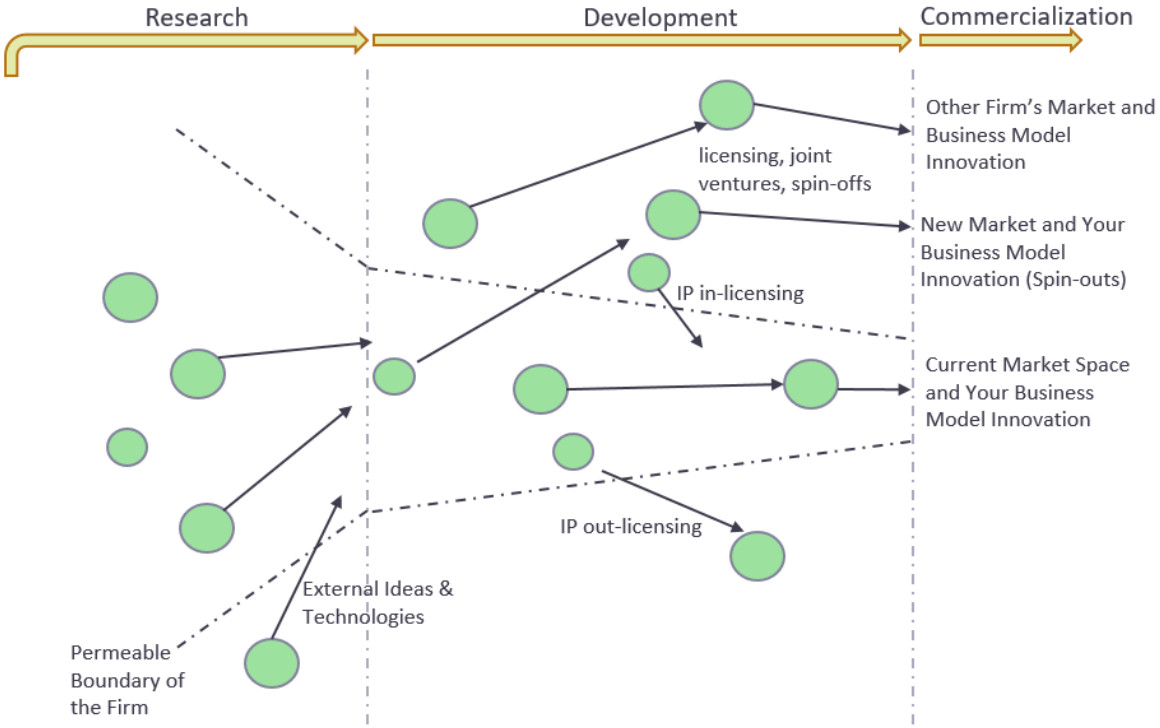

Figure 7. The open innovation model (adapted from Chesbrough, 2003)

It is recognized that new business development (NBD) which utilizes external knowledge, for instance, corporate "venturing", joint ventures, alliances, and acquisitions in terms to exploit disruptive innovation has its high opportunity for success (Assink, 2006). However, many collaboration fails as companies are looking eagerly new-the-world innovation but forgetting to focus on acquiring new capabilities (Powell, 1998).

What earlier discussed disruptive innovation pursue to impact either new market or technology aspect. More precisely, it is especially a big concern where to find access to new technology. A

possible answer lays for instance, in corporate venture capital (CVC) as a recent survey of more than 100 companies showed that 92% of respondents had co-operation with startups as attempting access new technology (500 Startups, 2016). In fact, start-ups might be a great option in case the incumbent company finds unmet needs in existing markets where the company cannot or does not want to go yet as it is seen as too risky. Therefore, the company can provide financial support for a start-up company that can entrant to the market. It offers a view to learning what is working and what is not working in that emerging market. This situation is much better than any other market research as the incumbent observes for a real company that is making business in that unmet extent. Possibilities for action after 'market test' depends on firstly, whether the company wants to be a customer for that start-up company and wants to look more for a strategic direction for its own business. Secondly, if the startup is succeeding well, opportunities can be also to work more closely with them in an alliance. Thirdly, if the startup becomes a threat to your business, an option is to acquire the startup company and merge its capabilities' to your own company. (Chesbrough, 2003)

Nevertheless, how closely companies have chosen external partners will not be beneficial for them if they cannot assimilate knowledge and distribute it within a company. In other words, it is an absorptive capability which is part of external knowledge and refer the capability how company supply, use and develop knowledge from outside (external) the company and use it to company's operations (Prahalad & Hamel, 1990; Teece et al., 1997). Caloghirou et al. (2004) identify absorptive capability to consist of three main factors intensity of interaction, the value of external knowledge sources, and attitude towards external knowledge. According to Allen (1977), Allen et al. (1982), and Katz & Tushman (1981) they recognized external sources can positively influence disruptive innovation creation within the company as well. They called them gatekeepers which maintained active communication with the external environment for example universities, suppliers, and partners. Moreover, Powell et al. (1996) and Henderson & Cockburn (1994) identified in their researches that external linkages had a significant and crucial role in the effective knowledge creation process.

2.2.4 Organizational structures and communication

As discussed earlier that companies tend to focus excessively on their core competencies such as improving existing design and technologies, a so-called dominant design that results to

incremental innovation. There becomes a risk to be overtaken by a disruptor that disrupts the market in the end. (Christensen, 2003) Incremental innovation provides continuous and stable profit which satisfies companies and limit the will to take a risky step for uncertain disruptive innovation. However, if a company is not taking that risky step they have another risk of falling into the familiarity trap (Ahuja & Lampert, 2001; Christensen, 2003) Sometimes the reason is not solely avoidance to take a risk but merely an existing business model is not providing an easy way out. In other words, they are like prisoners of their own business model and thus affecting unable to unlearn for instance well-known companies such Coca Cola, McDonald's, Xeroc, and Siemens (Hamel, 2002; Paap & Katz, 2004). Moreover, Chandy & Tellis (1998) notice that unable to learn and risk-averse attitude create together a status quo which reduces willingness to innovate radically and acceptance for cannibalization of its own investments. Stringer (2000) confirms that statement by saying that established large companies have invested too much in their core competencies and technologies which have a risk to become obsolete if embracing radical innovation. In addition, when companies have become large enough they often lose their capability and desire to penetrate emergent markets as they usually not respond to growth needs (Loutfy & Belkhir, 2001; Christensen, 2001, 2003)

Even if a company overcomes the barrier of unwillingness to take a risk and decides to focus more on disruptive innovation, the company can face another barrier called organization dualism. In organizational dualism, a company cannot manage efficiently for both sustain and disruptive innovation. (Paap & Katz, 2004). As Brown (1998) recognizes it is all about finding a balance between centralization which is used for incremental innovation, and decentralization which is more likely to have a positive impact on disruptive innovation. The hierarchical structure, effective on routine-based process favors incremental innovation but disruptive innovation development needs flexibility. Therefore, can be justified to say that many companies are incapable to manage both, keeping eye on existing business but simultaneously looking for the future. (Cosier & Hughes, 2001; Moorman & Miner, 1997; Tushman, 1997; Sharma, 1999).

One possibility to overcome organizational dualism is to create a new unit (spin-off) beside the existing business which has its focus exclusively for disruptive innovation (long-term innovation) where the existing organization focuses on incremental innovation (short-term efficiency) (Tushman & Smith, 2002). Obviously, it means that spin-offs have different goals,

priorities, structures, and reward systems than in mother organization (Duncan, 1976; Tushman & Smith, 2002) and due to units are differentiated and separated (Benner & Tushman, 2003). As it is clear that these autonomous units have ambidextrous structures they need ambidextrous management as well. It highlights management capabilities and leadership, so-called "strategic entrepreneurship" where entrepreneurial and strategic actions are tightly integrated. A prerequisite for ambidextrous organization leaders is to create a clear vision, understanding when and how to change strategy if needed, and balance with organizational politics and resources. By nurturing effectively innovative strategies and management processes is possible to guide, coordinate and support both units with separated structures. (Kimberly, 1986, Hitt et al., 2001; Hitt et al., 2002; O'Reilly & Tushman, 2016) As a result, ambidextrous company fosters exploring new opportunities to disrupt markets in the long run while exploiting the existing opportunities and enhancing current competitive advantages (Hitt et al., 2002).

A physical environment can refer to work-space which must enable employees to communicate easily over the organization's different functions. The physical environment is also data (information) systems. However, data-systems are in every organization nowadays, and will not bring any competitive advantage by being themselves. Those systems must be utilized their best efficiency and support value creation for customers. Physical environment counts also virtual communication and networking and in fact, an increasing amount of innovation are created in networks over organization boundaries consisting of multiple partners. It makes viable collaboration via a network. (Ståhle et al., 2004, p. 78-79) However, Umemoto (2002, p. 466) argues that virtual communication is not as effective as face-to-face interaction and so far is not replacing it. He continues that the overwhelming benefit of face-to-face communication is to transfer complicated knowledge and especially tacit knowledge successfully. In addition, processes and tools are used to create and gather innovative ideas. Those processes and tools can be developed and improved to enhance more systematic and valuable innovation ideas in an organization. (Skarzynski & Gibson, 2008, p. 238-247)

2.2.5 Individual creativity and know-how

All individuals have a capacity for innovativeness and the ability for idea creation – for some individuals capability might be hidden. The aim is therefore to teach and practice innovation skills to employees and release untapped intangible assets to be utilized in the organization.

Teaching innovation skills to employees will also increase understanding of the value of innovation among the organization and thus, develop innovation capability. (Ståhle et al., 2004, p. 67)

Individuals' curiosity is the main factor for breakthrough innovation (Roffe, 1999) However, large companies tend to overlook this and are not motivating individuals who have creative and "break-the-rules" ideas as small companies do (Stinger, 2000). The reason can be that in large companies lay structured and optimized processes that hinder individuals' creativity and feed dogmatism for developing things (Quinn, 1985; Unsworth, 2001). It can be argued that champions among leaders must lead the innovation discussion and foster innovation activity by encouraging to build a creative and supportive innovation climate in the organization.

As individuals' creativity and innovative attitude are contributing positively to the organization it does not mean that innovation should be created alone. In fact, cross-functional teams bring together different sources of expertise. It is essential for superior performance and sparks for innovation activity. In other words, people with different expertise not only know different things but know those things differently creating greater opportunity and idea generation. (Eisenhardt, 2000)

Inability to unlearn concerns for many organizations as discussed earlier but does not affect only for the organization but in addition, it concerns individuals as well. One part of individuals' creativity is the ability to eliminate old logic (the current way of doing something) and substitute it with something new and different which is called the ability to unlearn from mental models. (Sinkula, 2002; Baker & Sinkula, 2002) Individuals' mental models are, for instance, beliefs about the world and why things are done the way they are done which is no longer valid anymore in a fast-paced environment. This leads to errors in the tacit knowledge system of the organization where individuals know-how but not actual why things are done the way they are done. That is the central point when know-how can restrict to development of disruptive innovation (Baker & Sinkula, 2002). It is supported also by Francis et al. (2003) as when looking for disruptive innovation, tacit works as a barrier when helpful and conventional routines are not working anymore. It is justified to say that unless mental models are not built correctly in the way to create innovativeness in both organization and individuals, them can be

substantial barriers. In addition, unfortunate is that they are rooted deeply in an organization and are one of the hardest things to change. (Brown, 1998)

It has been now discussed that an individual's creativity and ability to innovate are important across the company. However, some individuals which have personality traits with certain activities to bring and push nontraditional ideas are called champions. More precisely, it refers to a person with drive, aggressiveness, political astuteness, technical competence, and knowledge of the market. Moreover, organizations with reward systems and training programs enable the influence of champions (e.g., Deshpande & Webster, 1989). Similarly refers Moscovici et al., (1969) and (Mugny, 1982) as they describe champions to be bold individuals which dare to question self-evident issues and not giving up their vision even the majority will not see the value of ideas. They continue arguing, the way as champions act is important due to the nature of disruptive innovation, breakthrough business ideas needs a coherent, confident and persistent attitude for champions to be relentless.

As the traditional market research which is customer orientated might work well for incremental innovation, however, it can be very misleading for disruptive innovation (Lynn, 1996; Trott, 2001). Robust and fundamental understanding of what customers' latent needs are without customers' involvement works for some companies. As Akiro Morita, former Sony CEO has said "*Our plan is to lead the public with new products rather than ask them what kind of products they want. The public does not know what is possible, but we do.*" It refers that if there are not markets yet how consumers might be able to name it. As it might sound a bit provocative the message calls for dedication for a strong vision for the future. Similarly, Mullins et al. (2000) support this by saying that due to a long disruptive innovation development time, consumers' needs can be changed in the meantime. Moreover, Gatignon & Xuereb (1997) validate this by empirical research which results that strong customer orientation is not affecting positive influence for disruptive innovation. By staying too close with customers lays a threat to a loss for market position, even for dominant players (Christensen, 2003). In other words, it highlights skills for balancing and keeping suitable distance for customers, as to be aware of customers latent needs but reduce to underpin exclusively for customers.

2.2.6 Summary of subcategories

Following in Table 5 is a summary of subcategories of dynamic innovation capability which are discussed in chapter 2.2 Subcategories of dynamic innovation capability.

Table 5. Subcategories of disruptive innovation

Subcategory of disruptive innovation	Main factors
organizational culture and climate	Organizational culture is how employees feel values of organization, beliefs, myths and norms. A positive climate in an organization is a critical contributing factor to enhance new knowledge generation. Disruptive innovation requires unlearning skills from an organization which encourage to break conventional way of thinking. Working should be self-orientated where goals are shared, understood, accepted and align with individuals' own values. This way entire organization is committed to supporting a favorable innovation climate for disruptive innovation.
leadership and decision-making processes	Leaders have a huge role in how individuals feel themselves comfortable and supported by the organization. It is not only to support verbally but concretely as well such innovation investments and slack for employees. The leaders role is to point out that innovation belongs to everyone in the organization not solely R&D. A decentralized organization increases the probability of disruptive innovation. Disruptive projects are risky and hold a lot of uncertain, required commitment, encourage and trust to support long-term projects and its resource allocation from leaders.
collaboration and external links	Open innovation shortens time to market and increases innovativeness. Three main co-operation processes are outside-in process, inside-out process, and coupled process. CV is an interesting option to learn what is working and what is not working in that emerging markets. In open innovation is needed absorptive capability which refers on how firm supply, use and develop knowledge from outside the firm and use it to firm's own operation.
organizational structures and communication	Companies have a tendency to focus excessively their core competencies, the so-called dominant design which results to innovate incrementally and increases a risk to be overtaken by disruptor which disrupts the market in the end. Many companies face organizational dualism where company cannot manage efficiently for both sustaining and disruptive innovation. One possibility to overcome organizational dualism is to create a new unit, i.e. spin-off. Virtual communication is not as effective as face-to-face interaction.
individual creativity and know-how	All individuals have the capacity for innovativeness and the ability for idea creation – for some individuals capability might be hidden. Therefore, teaching and practicing are needed to release untapped intangible assets to be utilized in the organization. Individuals curiosity is the main factor for breakthrough innovation. Cross-functional teams increase innovativeness in the organization. The company needs champions, to bring and push nontraditional ideas.

2.3 Innovation process

2.3.1 Evolution of innovation process models

Can be said that innovation should represent the core of a company's strategy in a short-term view but a long-term view as well –making innovation the most important activities of companies (Balachandra & Friar, 1997; Hess, 2009; Prins & Verhoef, 2007). Despite its high importance, innovation literature reports very high failure rates of innovations, close to 50% (Castellion & Markham, 2013). Referring to that, innovation fails its investments if it is not generating future revenues and can even risk the competitive advantage of the companies in the

long run (Hess, 2009; Bayus et al., 2003). As Cozijnsen et al. (2000) highlight it is not meant to develop any kind of innovation rather they need to be essential to be successful to enhance continuity in the market and strength competitive position. While innovation must have its certain target to be successful, it simultaneously carries many risks that can reduce the viability of a company (Sandberg & Aarikka-Stenroos, 2014) it is thus justified to say that innovation is an expensive and complicated process (Domínguez-Escrig, 2019).

If we come back at time for the year 1998 when Cooper initially developed the innovation process with go/kill gates (in Figure 8), the main idea was adopted by Booz, Allen & Hamilton (1982) where the main stages were roughly unchanged (as idea generation, screening, and evaluation, business analysis, development, testing, and commercialization) instead Cooper included gates between the different stages (see in Figure 8; e.g. Cooper, 1988; 2001). The purpose of these gates is to decide whether to continue the development process or kill the idea. The framework aims to minimize risk in new product development by following a systematic process for managing new product activities. In other words, to respond high failure rates for innovation at the time. However, seems that the innovation process still fails often although there is a turn for the better. Following is discussed shortly innovation process for its three parts separately as literature acknowledge its *front end*, *NPD* and *commercialization*. However, still keeping the focus on the front end of innovation which is the main objective in the thesis.

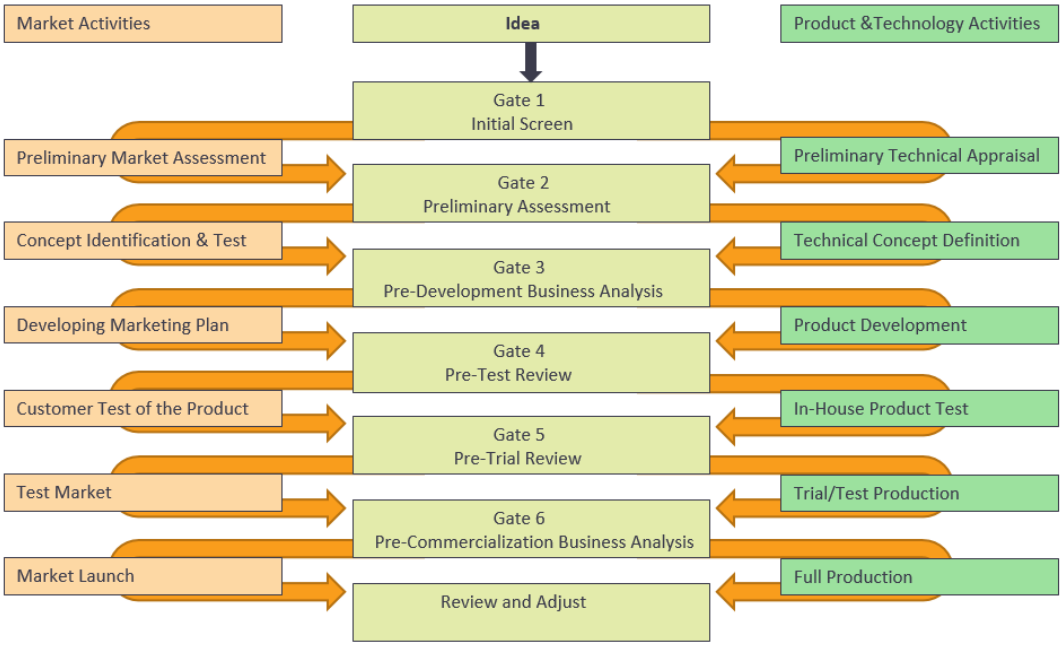

Figure 8. New product development with go/kill gates (adapted from Cooper, 1988)

2.3.2 Front end of innovation

The front end includes the activities which precedes the formal New Product Development (NPD) and "Stage Gate™" process. The front end can be depicted as a period from where opportunity (or ideas) are first considered and ends when a business concept is ready for progressing further in NPD. (Koen et al., 2001; Kim & Wilemon, 2002) According to Reid and Brentani (2004) they divided front end for early and late activities; as the early activities are problem/opportunity structuring and/or identification/recognition (Leifer et al., 2000; Urban & Hauser, 1993); information collection/exploration (March, 1991); and "up-front homework" (Cooper, 1996). They continued that whereas the later activities are seen as involving aspects of idea generation and concept development (Cooper, 1990; Urban & Hauser, 1993), continued information collection, and prescreening (Crawford, 1980; Crawford & Benedetto, 2003) with possibly some initial fund allocation for exploring a new idea (Cooper, 1990; Cooper & Kleinschmidt, 1986).

According to Koen et al. (2001) designed New Concept Development (NCD) model can be seen gathered previously mentioned early and late front end activities quite well. In other words, it is reasonable to discuss Koen, et al. (2001) model following as it is a general level collecting all the main activities in front end which current literature acknowledge. More precisely, Koen et al. (2001) included five activities in the NCD model which represents the front end phase; *Opportunity identification*, *Opportunity Analysis*, *Idea genesis*, *Idea selection*, and *Concept development* which can be seen in Figure 9. The circular form of the NCD model presents that key activities can flow, circulate and iterate between and among and therefore not expected to progress in a specific order. Driving forces for these key elements are in central of the circle as an 'engine' which consists leadership and culture of the organization –subcategories of dynamic innovation capability. In outer edge are organizations' other subcategories of dynamic innovation capability (Koen et al., 2001).

Sometimes can be heard 'fuzzy' utilized with the front end, where fuzziness is the implication of something which may not have a clear structure, process and which has a high set of management challenges. Somewhat it is odd but surely interesting as well that managers and researchers claim that the initial phase where innovation is born still lack of full complete understanding on why, how and when things happen as they happen in successful innovation and thus front end improvements are far away from design engineering process improvements.

According, to Zhang & Doll, (2001) "*most projects do not fail in the end, they fail at the beginning*", it conducts the thought that the front end of innovation is the most important part of the entire successful innovation process.

When Khurana & Rosenthal (1997) found out from their research that companies are struggling with product developments such as cancelling product development during NPD due to it does not fit the strategy, people are too busy to develop top projects, and too late launches on the markets what was initially planned are precisely originated poorly managed front end phase. In the same year, Murphy & Kumar (1997) elaborated that companies need to understand why clearly defined product before development is so crucial. Outcomes responses for companies problems such well managed front end assist to understand development time, cost, required technological competencies, market potential, risk, and to understand how well product fit for strategy. In addition, Khurana & Rosenthal (1997) recognize as well that a clear product strategy makes decision making consistent and assist in addressing responsibilities in the front end phase. Secondly, they mention also that product vision should be understood well and mutual in an organization, to balance risk and return in short/long term products and mature/emerging markets. In chapter 2.4 is discussed the front end of innovation more precisely by taking disruptive innovation on focus.

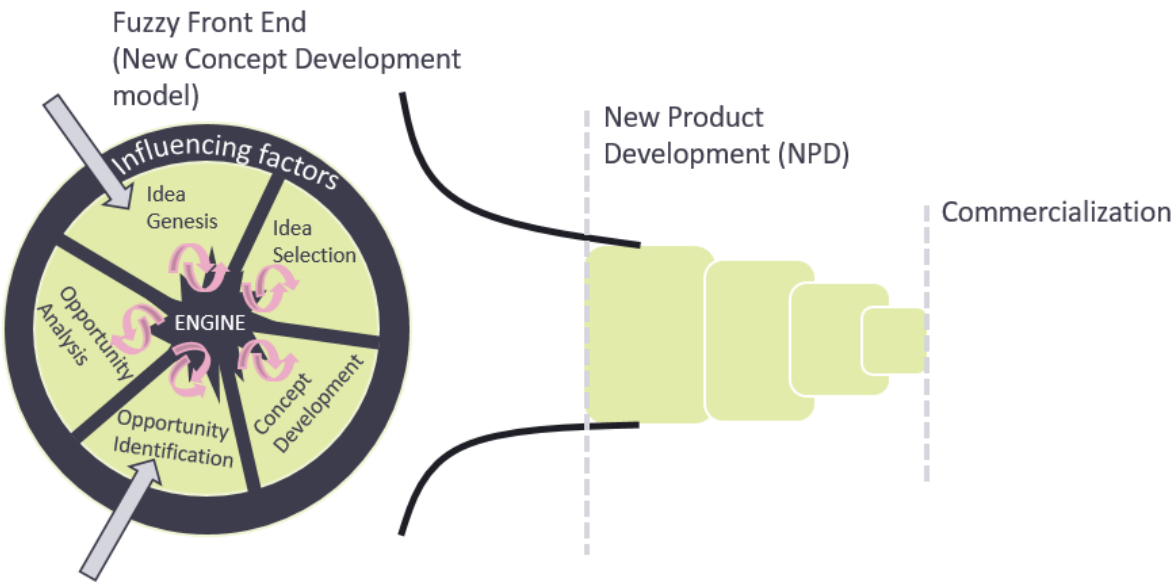

Figure 9. Front end model (adapted from Koen et al., 2001)

2.3.3 New Product Development

NPD process is seen beginning when the business concept has been accepted in the front end phase. Requirements for a clear business concept are the project's scope, target market and price, product concept and value proposition to the consumer, and in general what features, attributes, and requirements are set for the product. (Cooper, 2017). In the NPD process, the purpose is to develop a physical product from a business concept. More carefully front end phase is done, better possibilities there is success in the NPD phase. As the world change rapidly so do also people minds and therefore is necessary to rethink product's design continuously to meet consumers demand when developing the product. During the process is recommended to gather feedback from consumers regarding to prototype and make an iteration for design if necessary. Again, if the concept is defined well in the front end phase it will decrease the work in the development phase and will offer better opportunities to launch the product to the market in time. Another thing which can hamper development work is impossible technical specification in business concept. It will increase cost, time, and work as needed to change concept specification for a more suitable form. (Cooper, 1993, p. 205-206; Kim & Wilemon, 2002)

2.3.4 Commercialization

According to Cooper (1993) no matter how well the NPD phase has done but if the commercial phase fails, innovation has no worth. Therefore, launch, marketing, and all commercial activities must be considered carefully for successful innovation. It highlights that product commercialization cannot be overlooked as it needs a lot of expertise to get profitability and continuum sales after launch. (Di Benedetto, 1999; Montoya-Weiss & Calantone, 1994; Song & Parry, 1996) Moreover, Hultink & Altuahene-Gima (2000) find out that many launches fail initially due to lack of resources. As they mention both resources, as people and funds are needed for the base of a successful launch.

2.4 Front end of disruptive innovation

Already Schumpeter (1934) recognized that to be able to create new products, processes and markets there is high involvement of entrepreneurship. Recently, end of the 20th and beginning of the 21st century, these two fields highlight the importance of each other's in the literature

review; first innovation was determined core of entrepreneurship (Hitt & Ireland, 2000), and later reciprocally entrepreneurship was proved to be the core theme of innovation domain (Shane & Ulrich, 2004). And as Drucker (2007, p. 25) defines "the entrepreneur always searches for change, responds to it and exploits it as an opportunity" which clearly results in the thought of innovation process. Most importantly, the entrepreneur aspect is highlighted in this thesis due to it aims to create new resources or combining existing resources in new ways (Hitt et al., 2001; Ireland et al., 2001) which fundamentally are required factors in the front end of disruptive innovation.

2.4.1 Vision –a management tool

"*Your vision will become clear only when you can look into your own heart. . .who looks outside dreams; who looks inside awakes.*" - Carl Jung

In this chapter, at first is discussed the broad definition of vision and what principles it should hold to be effective. Thereafter, is shortly discussed uncertainties of disruptive innovation and how the vision will make a remarkable change to reduce uncertainties in the front end of disruptive innovation. The end of this chapter is closely recognized four main visions which are both prevailing and steering to the successful front end of the disruptive innovation process.

Vision is defined as "*an image of a desired future*" (Stokes, 1991, p. 118). In other words, vision tends to state a clear future where we would like to be. The literature recognizes many company-related visions such as organizational vision (Collins & Porras 1991, 1995; Hamel & Prahalad 1994), project vision (Lynn & Akgu¨n 2001), market visioning (Colarelli O'Connor & Veryzer 2001), market vision (Reid & de Brentani 2010), technology vision (Reid & Roberts 2011), and peripheral vision (Day & Schoemaker 2005). Whatever aspect of vision we have, there lay certain three principles which are involved:

1. *A goal or target (future):* The purpose of the vision is to set in our minds and mental models an interesting goal or target for where we are aimed towards. Vision represents hopes and dreams in the future which commit people to it by working together. The future goal is divided for '*form'* by mean what vision comprised of and '*scope'* representing the size and effectiveness of the goal.

2. *Passion (desired):* By creating the vision it must fascinate and be a passion for the visionary itself whereupon potentially affect other individuals in an organization that will share the vision. Great vision is built with magnetism and energy which help people to overcome reluctance they tend to have when moving towards the goal.
3. *Clarity (of the goal image)*: Without vision being tangible, clear, and achievable employees will hardly pursue the same goal. Clarity is a must in a vision to achieve a mutual understanding on where to go, which helps individuals work together and interpret others' actions on the way to the goal.

As a vision is now shortly discussed in a generic way it is good to remind uncertainties in disruptive innovation to better understand by mean of vision in the front end of the disruptive innovation process. Due to the nature of disruptive innovation, they tend to be new to the company and marketplace (Ansoff, 1957) and involve "*dramatic departures from existent products or their logical extension*" (Veryzer 1998, p. 306). Obviously, disruptive innovation is more complex and uncertain in comparison to sustaining innovation which calls a company to build new technical and commercial skills and business models (Colarelli O'Connor, 1998; Garcia & Calantone, 2002; Song and Montoya-Weiss, 1998), and to employ new problem-solving approaches (Burns & Stalker, 1961; Tushman & Anderson, 1986).

Regarding uncertainness in the disruptive innovation process, part of it is a high level of involvement of individuals working on the unstructured problems and with limited information raise the risk to fall out radar of senior management and focal organization (Reid & de Brentani, 2004). Therefore, it is crucial to understand what decision process and actions of key individuals encounter in the initial phase of the innovation process to reduce the uncertainty in the front end but recognizing better a new market and technological disruptive innovation opportunities as well (Burgelman & Sayles, 1986; O'Connor & Rice, 2013; Crossan et al., 1999; Reid & Brentani, 2004). The determinant role of vision, especially in the front end of disruptive innovation processes underpin strongly for key individuals, firstly how they understand and interpret disruptive innovation and secondly, how disruptive innovations are linked to the organization (Reid & de Brentani 2004; Tidd et al., 2005). According to Colarelli O'Connor and Veryzer (2001) executives which are visioning in the front end can be divided into two types; innovators and ruminators. They continue that innovators are typically those who play a technology-visioning role where ruminators play a market-visioning role. Similarly (Allen,

1977; Roberts, 1977), "*they occupy positions where they either work directly with the new technology or are involved with markets where there is a possibility of an application for the technology.*"

Now based on the understanding that innovation is rather a process than a product, and an individual is the main part of the innovation process can be judged to say that vision is a certain 'tool' to manage uncertainty in the front end. However, it is not true to think that vision is stable entire front end phase, in contrast, a vision born at an initial phase where both technology and the market potential is unknown and develop clearer over time when innovation move toward the market. Figure 10 elaborates this where is 2 x 2 matrix which has a different form of visions in each quadrant. The same figure consist x-axis which is market-related as in a low market context where is untapped potential for technology which becomes clearer when moving further toward a high market context while the innovation process progress. Y-axis represents 'who' is initiating the vision from individual to organization level. This will give some idea of the location and reasoning behind the starting point of vision and its final target point of disruptive innovation. Following is discussed closely each quadrant that might initiate vision and wherein technology and market trajectory the vision appears. (Reid, 2015)

1. *Value-Driven Vision (high individual focus/low market context)*
   Based on the opportunity recognition (i.e. the convergence of two relatively distinct arenas) or pure inspiration where individual spark the vision of the future which has barely a low-level technology development and not any clear market context. For instance, Richard P. Feynman noted in his speech (1959) "*There's plenty of Room at the Bottom*" which was an initial phase for nanotechnology invention which however came alive many years after as the development of the scanning tunneling microscope in the year 1981.

2. *Technology-Enabled Vision (high organization focus/low market context)*
   At a very early stage of technology development, vision can be born within both company's scientist group and/or with external collaboration. It is highly important to understand that while there tends to be one technology aspect there still lays many different vision opportunities which can lead for across many different application. Can

be said it favors benefits for external collaboration –speeding up the development process and offering a vision focus on own business.

3. *Bottom-up Market Vision (low organization focus/high market context)*
   In this quadrant vision is individual orientated (entrepreneurial) which can be derived for example from Technology-Enabled Vision. The vision is formalized to represent the individual motivations and the nature of the person. More importantly, the vision holds a clearer understanding of the markets and customers what helps for product development. Due to the entrepreneurial-orientated vision, technology competence requirements cannot be complex.

4. *Top-Down Market Vision (high organization focus/high market context)*
   This vision can be derived also for example from Technology-Enabled Vision and be formalized to represent executives' vision where the company needs to be looking for in the future. In this quadrant, technology competence demand can be higher than Bottom-up Market Vision as innovation is developed in an established companies. (Reid, 2015)

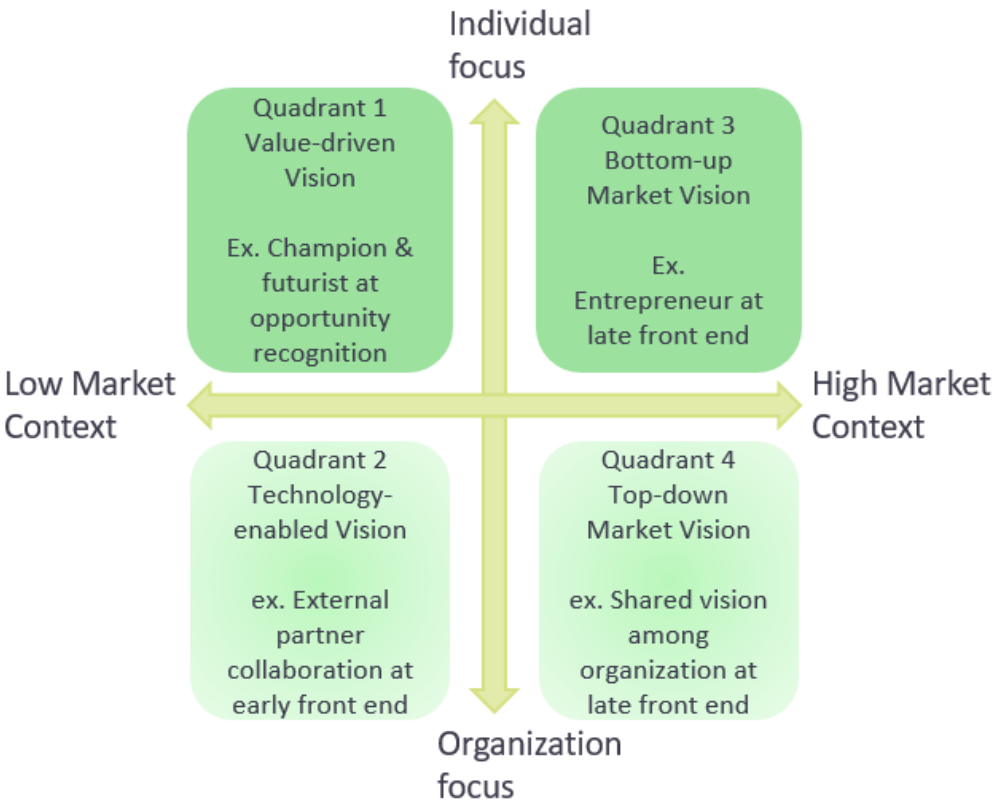

Figure 10. Vision typology in the front end of innovation (adapted from Reid, 2015)

There is not a clear structure of how vision should move among these four quadrants but merely it enables the vision to flow reciprocally depending on time and technology perspective as Reid, (2015) summarize the idea well of how visions move and develop over time in front end phase: "*If we look at these quadrants and how they are potentially related through a longer-term lens, it seems that over time and with a certain set of technologies and/or core ideas at hand and depending on the nature of the various visions, innovation may travel through these four quadrants, in a variety of ways and through different key individuals and organizations*". As it is now obvious that vision affects in the front end, but more importantly focus should be to understand the nature of key individuals involved in the front end. As effective vision help individuals to set goals, share information and make decisions through the process which in turn result desired outcome in a certain moment.

2.4.2 Entrepreneurial approach to front end of innovation

Based on the five elements of the front end which Koen et al (2001) recognized, forms the main body of this chapter. However, as disruptive innovation needs much more iteration and reciprocal movement among activities than incremental innovation this chapter has also characteristics of Assink's (2006) interpretations of the dynamic disruptive innovation process (in Figure 11). As Assink (2006) elaborates disruptive innovation process *"... is a rhythm of searching and selecting, exploring and experimenting, of learning and unlearning, and cycles of divergent and convergent thinking. It is a complex and interactive process of probing and learning feedback.*" He continues, that disruptive innovation is more a spiral or circular development process rather than a linear process. Moreover, creative thinking and intrapreneurship abilities are highly involved when aiming for disruptive innovation results.

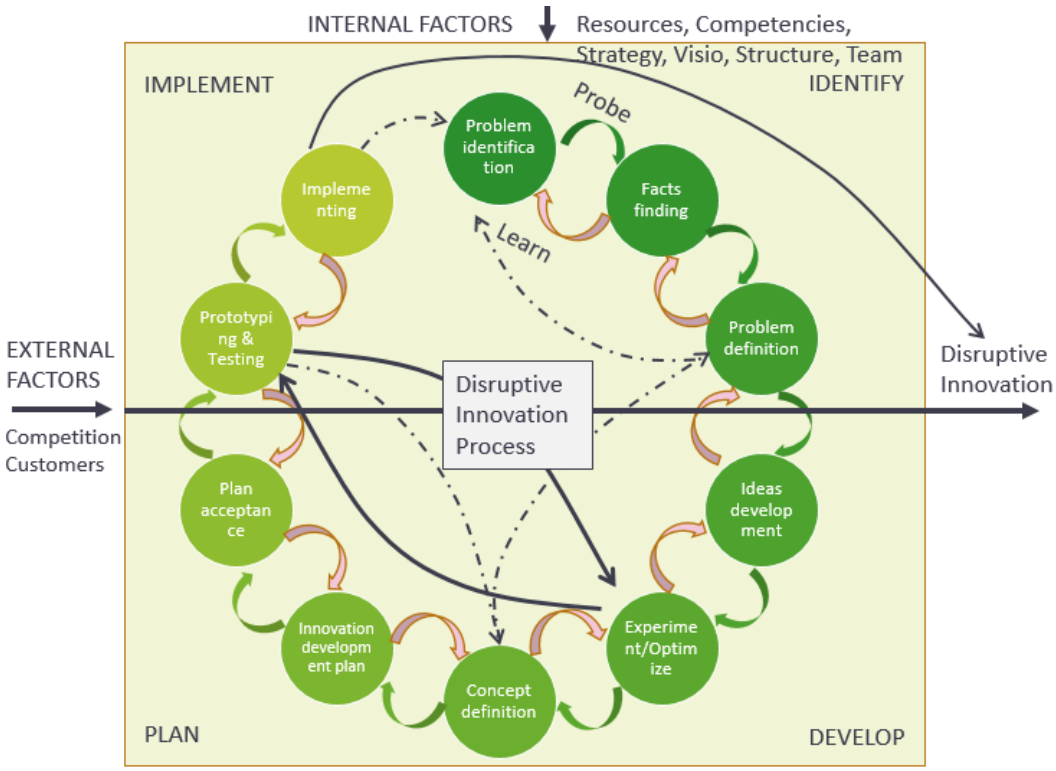

Figure 11. Dynamic disruptive innovation process (adapted from Assink, 2006)

<u>Opportunity identification</u>

As opportunity identification is the first element in the front end it is necessary to define the meaning of opportunity which holds its disruptive nature. Therefore, the opportunity is defined to include three main characteristics; potential economic value (profitable), newness (product, process, technology that did not exist previously), and perceived desirability (general acceptance among customers and society) (Baron, 2006, p. 104).

The aim is to have a perception of the latent market potential in opportunity identification. One effective approach to opportunity identification is to use entrepreneurs' way to "connect dots" between unrelated events or trends in the external worlds such as technology demographics, markets, government policies, etc. For this reason, it is helpful to utilize an opportunity recognition framework which includes three main factors:

- *commitment in active exploration for opportunities*
- *alertness*
- *prior experience and knowledge of industry, market, or customers* (Baron, 2006).

Opportunity recognition underlies the importance of searching actively opportunities that have an untapped potential (Gilad et al., 1989). As considering present market dynamism, employees' sensitivity to change work and fast-phased technology changes are not solely enough to trust and underpin internal development. Therefore is beneficial to take other external actors into the innovation process. (Chesbrough, 2006; Klevorick et al., 1995; von Hippel, 1988, 2005). In fact, Cassiman & Veugelers (2006) studies emphasize the advantages of combining internal R&D and external resources for best innovation performance.

External knowledge searching strategy refers to the way an organization finds valuable ideas from external sources of innovation. It depends on such as what type of innovative activities the company is looking for, availability of technological opportunities, and available resources. (Castellacci, 2007; Laursen & Salter, 2006; Malerba & Orsenigo, 1993). This two-dimensional search can be divided first, *breadth* –where the aim is to have a wide range of sources and/or secondly, *depth* - where few external sources but a very intensive search (Laursen & Salter, 2006). Whether to utilize breath and/or deep search strategy, Hills & Shrader (1998) argue the importance of using personal contacts and more specialized publications than just public information like magazines, newspapers, and trade publications. Literature also identifies that opportunities can be recognized without active and systematic search (called passive search) if an individual has unique alertness to recognize them (Gilad et al., 1989; Kirzner, 1985; Ardichvili et al., 2003). Where alertness has referred to the capacity of high intelligence and creativity (Ardichvili et al., 2003). Individuals' capability to alertness help identify a new solution for latent customer needs or untapped market potential (Busenitz, 1996). As a third factor in opportunity recognition, prior knowledge-rich and varied life experiences play a major role to recognize radical potential opportunities (Shane, 2000).

As discussed and identified opportunity recognition factors (active/passive search, alertness, prior knowledge) above them are an interaction between each other. Integration among factors leads to pattern recognition, which helps to understand the basic nature of opportunity recognition and how to help an organization to achieve the required skills needed to end up to disruptive innovation ideas. To succeed in this complex and multi-faceted process, the key is to find links between unrelated trends, changes, and events and knot these dots together. (Matlin. 2002)

For all individuals in an organization are then encouraged to build their own pattern recognition where unrelated issues (events, changes, trends in the external world) are interpreted through cognitive frameworks which include different mental models i.e. prototypes and exemplars. In the results where alertness and search are affected with cognitive frameworks output is a perceived pattern that suggests a) new product ideas which need to be developed or b) new products which not usable and therefore discarded.

Prototype models

According to Smith (1995) individuals formalize idealized presentations of the most typical factors of a category (objects or issues that seem to belong together). This mental prototype is like a "house" which includes an experienced combination of attributes associated with the certain core of business knowledge like doors, walls, tables, rooms, etc. When new information (events, market changes, technology, etc.) appears it will be recognized and compared if it includes (i.e. huge mansion or simple cottage) or excludes (i.e. skyscraper or igloo) to this house which represents a mental prototype. (Baron, 2006, p. 109)

Exemplar models

The exemplar model is specific knowledge-driven rather than an idealized prototype model. This is based on those new objectives or things that individuals encounter are compared with specific examples (as exemplars) of current concepts already formalized in mind (Hahn & Chater, 1997). As an exemplar not consist solely of an idealized generalization but rather would include numerous and specific examples. This affects that person does not have to build prototypes rather just compare new information to exemplars where they are already knowledgeable in memory (Fiet et al., 2004). It refers to that person just know when they encounter a good opportunity which highlights persons' ability to certain alertness as previously mentioned. (Baron, 2006, p. 109-110)

Both, prototype and exemplar models represent cognitive frameworks which are like receptors for changes in markets, technology, events, etc. However, these cognitive frameworks are not in contrast (Nosofsky & Palmeri, 1998) rather they are interrelated between where a prototype model consists of a person who has no fundamental understanding of a certain extent whereas an exemplar is used by a person with more expertise and specific knowledge for a certain extent. Thus, it can be said that they are supporting each other and are in key roles as attempting to identify new business opportunities. (Baron, 2006, p. 104)

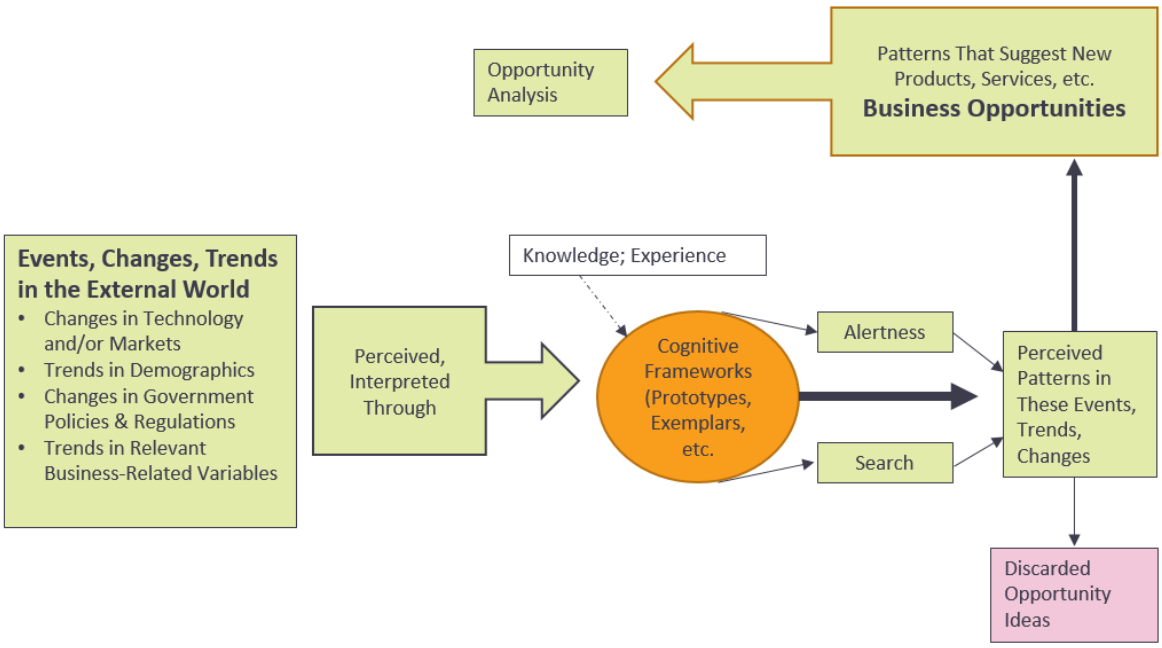

Figure 12. The potential role of pattern recognition in opportunity recognition (adapted from Baron, 2006)

Opportunity Analysis

The role of opportunity analysis is to translate input from opportunity identification into specific business and technology opportunities to be able to reduce market and technology uncertainty. Nevertheless, anticipating market potential and demand is insecure, Wiefels (2002) and Sandberg (2002) highlights its importance to avoid the "chasm-phase" which is a product-development black hole (product in NPD process although it does not fit the strategy). All kinds of assessments with existing information are significant including utilizing external knowledge from groups and market studies not forgetting scientific experiments as well. Whether to have in-depth analysis or not, depends on how attractive of opportunity is seen, how risky versus profitable the opportunity is, and how well the business opportunity will fit with the business strategy and culture. (Koen et al., 2001, p. 50)

Idea Genesis

Traditionally companies think and act that Research and Development (R&D) is the only one in an organization that is responsible for innovation. The organization is awaiting that R&D is developing new business, features, and functionality but unfortunately under the pressure of

management to achieve quarter results, the business is rather focusing on incremental improvements than radical innovation. (Kalil & Choi, 2014). Needless to say that these small improvements are apt to build on existing capabilities which only run the company to competence traps as mentioned earlier. A good start to find explorative ideas into new areas where results are uncertain but yet can be long-term and attractive is to use open-innovation (outside-in and/or inside-out) and corporate venture capital which is discussed in 2.2.3 Collaboration and external links. However, O'Reilly & Binns (2019) see that in addition, would be good to use Scale of Ambition and Hunting Zones practices to generate disruptive innovation ideas.

Scale of Ambition

The aim is to set a very high goal for an idea that is equal to opportunity or threat of disruption which can occur in business. It makes people think on a large-scale and takes ideation away from incremental or tactical innovation. It is good to remind that generating a business idea is not just a product or process but merely an entire business model –for instance, a technology company can look outside from current business i.e. currently selling components but see opportunity and revenue coming from services. Moreover, three criteria's can be set which needs to be met i.e. differentiated customer experience, the potential for large business, aligned with corporate strategy (like Amazon and IBM has done) (Caldwell & O'Reilly, 2012; O'Reilly & Binns, 2019)

Hunting Zones

Hunting Zones not necessarily exclude Scale of Ambition goals rather complement to set boundaries around ideation by defining roughly attractive markets, business models, types of identified problems, or to whom (customer segments) to focus. This way energy of idea creation is on the way to complete the ambition goal that has been set. Thus, disruptive innovation ideas are more likely to raise rather than only exploitative ideas to help existing businesses. For example, new business can be based on deep expertise in a certain realm and manufacture competence to create a barrier for imitation. Or a company can focus on a new business idea if demand and benefits are recognized across the company and in addition, it offers a new source of customer value. In short, this kind of concrete guidance helps to keep searching for new business idea on track and ensures for assessment of the attractiveness of the opportunity (market size, market penetration analysis, possible threats, etc.) (O'Reilly & Binns, 2019)

Although there is the aim in disruptive innovation ideas to be novel, appropriate, useful, correct, and valuable it is good to remember that sometimes even unsatisfactory ideas can be re-evaluated and if possible to amend to increase their benefits (Hennessey et al., 2011; Moon & Han, 2016). In other words, surprisingly disruptive innovation not come up solely but is more combination of the several smaller ideas based on recognition environment differently, challenging usual manner of doing things, expanding boundaries, spotting the "white space", alertness to understand latent customer needs, thinking what other's do not, and challenging our underlying mental models (Coulson-Thomas, 2001; Winds & Crook, 2005). Also worth to mention that already in the idea generation phase is crucial to achieving cross-functional teams to better cope with different expertise fields and point of views (Koen, et al. 2001).

Despite the fact that how well-run ideation approach is conducted there are many, if not the most, generated ideas are not brilliant. It must be understood and accepted it is nature of ideation: to generate a diversity of options. Thus, the next question arises that how leaders can identify good from the bad ideas which have the potential for investing? The answer is idea selection and concept development, or incubation as O'Reilly & Binns, (2019) refer to it and highlight the importance of market test validation which is discussed following.

Idea Selection and Concept Development

As discussed so far methodologies to recognize opportunities (mental prototype and exemplar) and idea generation (scale of ambition and zone hunting), they are just a small part of existing activities which lead to generating ideation. Despite the fact them purpose is to open eyes on how to take the first steps in the front end of disruptive innovation. O'Reilly & Binns, (2019) refers that companies usually do not lack new ideas but rather are facing the problem to separate good from bad ideas. Therefore, is entitled to say that generating ideas for a company is not an issue but how to select and manage the best ones to invest in is what matters. Following is presented two methods that are effective for managers or front end team leaders to validate disruptive ideas in the marketplace –Lean Startup and Business Model Canvas. Besides, these two methods are valuable to pick the best idea, they are attempting to gather feedback from customers which will improve continuously business concept as well.

Lean Startup

The core of the lean startup model is the Build-Measure-Learn loop which pursues to minimize total development time by utilizing a feedback loop (in Figure 13). The idea is to break the normal rational way of thinking, which means to think backward from business results that are targeted instead of progressing forward from some solution or technology which is in mind. When the idea (or hypothesis) is clear, the first step in the loop is to enter the *build* phase with a minimum viable product (MVP). The goal of MVP is to start the process of learning not to make a perfect product. Obviously, MVP lacks numerous features, some might be even essential, and therefore is time to move quickly forwards in the loop to *measure* phase. In the *measure* phase, the aim is to evaluate MVP impact and level of interest from the potential customers. Crucial in the measuring phase is to decide whether product development is worth putting in real progress. Simplified, is there a demand or not for a business idea. Therefore, metrics must be created in a way that illustrates truth *data* to analyze customers' behavior correctly. The purpose is not to embrace the managers as known a vanity metrics. (Ries, 2011)

The *learning* phase is the most crucial part of the loop, where is either decided to continue the development process if the business idea looks promising but if not, there is needed to make radical changes in strategy (known as the pivot) to achieve the vision. The Build-Measure-Learn helps to alert as early as possible whether pivot is needed in order to save time and money. The question may arise that what has been learned and is it time to pivot or not? Shortly, innovation accounting is an answer which includes three steps to evaluate the learning process:

1. draw a clear picture of the current status of the new business idea
2. formalize what is the target point as ideally, where are team reaching for
3. after many small changes and optimizations will be seen if the ideal target is coming closer which helps to decide whether to pivot or persevere current strategy. (Ries, 2011; O’Reilly & Binns, 2019)

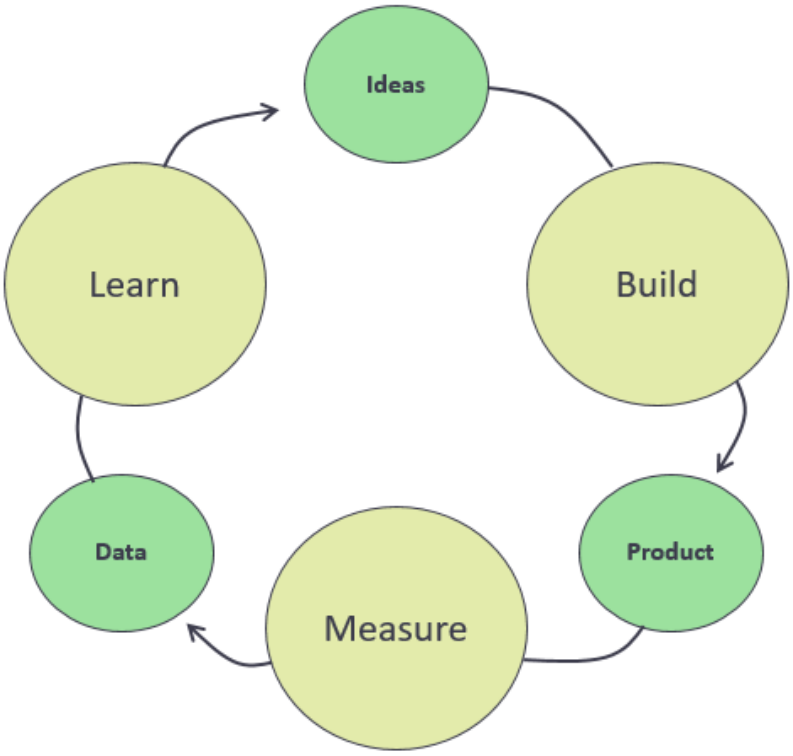

Figure 13. Build-Measure-Learn feedback loop (adapted from Ries, 2011)

Business Model Canvas

Alexander Osterwalder developed a business model canvas that can be seen as a visualization tool and supports business concept development together with a lean startup model. What makes business model canvas very useful in practice is that the user needs to identify a viable set of elements that makes the business idea working. The business model canvas consists nine building blocks (in Figure 14) which can be divided roughly into three main structures as Cost Structure which includes all operation cost as key partners, key activities and key resources whereas Revenue Streams consist money which company generates from customer segments via customer relationship and channels. In the middle lays Value Proposition which describes all the offerings which create value for a Customer Segment. (Osterwalder et al., 2010; Osterwalder & Euchner, 2019)

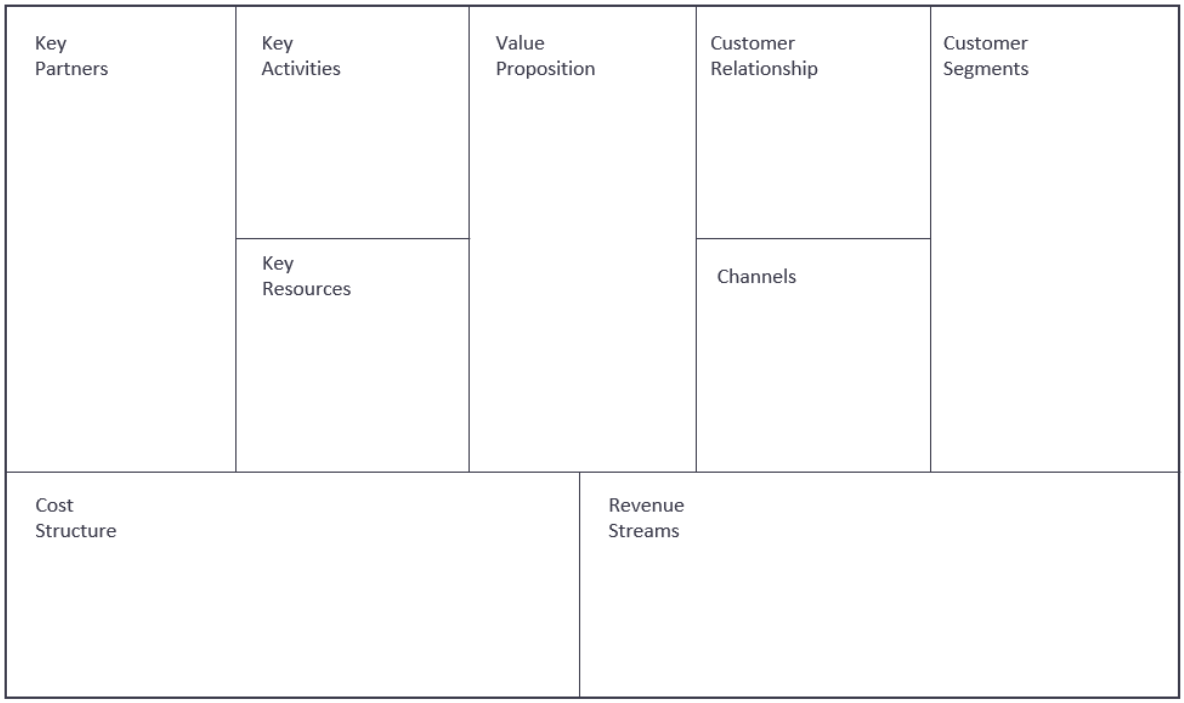

Figure 14. The Business Model Canvas (adapted from Osterwalder et al., 2010)

As discussed on a scale of ambition that in an idea generation focus should not be just a product or a service innovation but rather entire business model innovation. The same rule follows here in the business model canvas which is very practical as attempting to build holistic business model innovation instead of focusing only on product, process, service innovation alone. In fact, business model innovation itself is more difficult to imitate than just a product, service, etc. innovation. Factor for success is to find a scalable business idea with a competitive advantage such as switching cost in the business model. However, it is not meaningful to design a business idea excessively but rather to make a prototype quickly and test it for instance with a lean startup model to see how it works. It emphasizes that the business model canvas helps to evaluate the learning process continuously which means that there is no purpose to make a final business model at once. Moreover, there are four innovation metrics in Figure 15, which mitigates the innovation risk but also measuring progress in the innovation process. (Osterwalder, 2010; Osterwalder & Euchner, 2019)

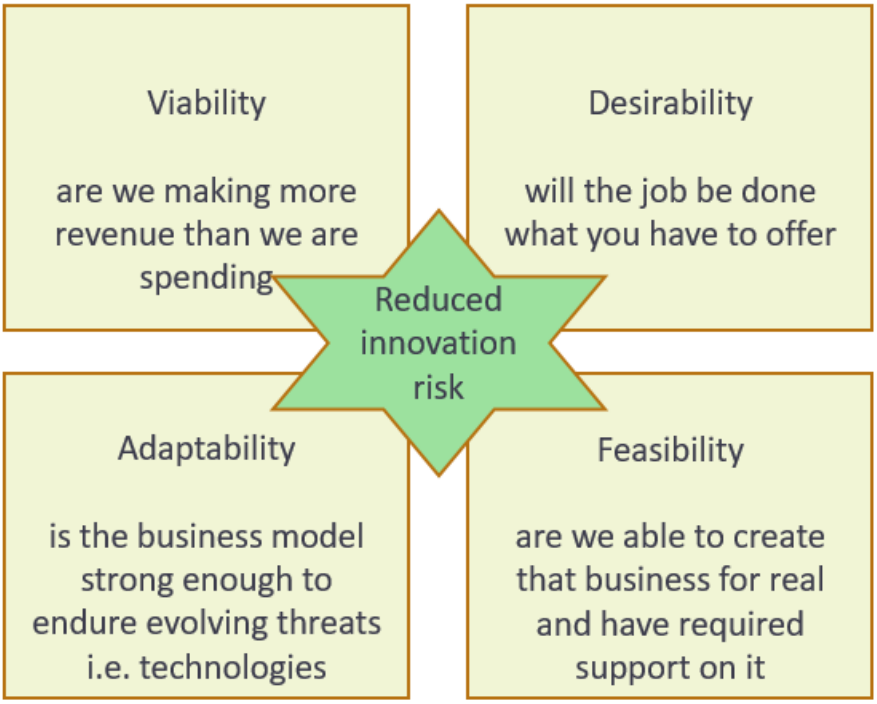

Figure 15. Four metrics to reduce innovation risk (from Osterwalder & Euchner, 2019)

Without these metrics is almost impossible to evaluate if a team is making progress or not. Simultaneously, it provides a chance to compare ideas, some might have potential but huge risk and another smaller potential but reduced risk. In other words, metrics help to make a list of the most beneficial ideas and for decision-making standpoint which idea to invest in and which not. (Osterwalder et al., 2010; Osterwalder & Euchner, 2019)

The above presented approaches provide measurable impact for established companies to the select best disruptive business ideas and develop the business concepts for them. Despite these approaches are effective in its purpose they are overlooked with the respect of scaling if business starts to grow. In other words, they have a lack of guidance on how an organization should be designed to ensure that the growth trajectory is governable. In fact, one of the most known entrepreneur in Silicon Valley, Steve Blank said that "*After three or four years of watching innovation in large companies trying to use the lean startup methodology, I'm embarrassed to say that most of it has ended up in innovation theater*" meaning that while the lean startup approach is effective, the greater problem is that established companies do not have capabilities to scale for the new business. (O'Reilly & Binns, 2019)

Therefore, O'Reilly & Binns (2019) have gathered three practices for established companies to address barriers that reduce generating scalable business. They are Hypothesis Testing, Feedward Measurement, and Executive Oversight which are discussed respectively in the following.

Hypothesis Testing

In the central of idea selection is an iterative loop to reflect and improve the business idea towards an assumption about the market opportunity and feedback from customers that confirms or disables that assumption. It will not result automatically in success but rather it is a learning process. While the learning process includes many failed experiments often established companies' executives are not willing to put energy and do the job with a series of small tests of limited hypotheses. It consists of two reasons, testing a hypothesis with data is not familiar nor comfortable for executives which results to skip this important discipline. Unless this discipline is managed appropriately there lays the risk of unproven assumption when moving to scaling. (O'Reilly & Binns, 2019, p. 57)

Feedforward Measurement

Many established companies are struggling with measurement systems in order to evaluate their experiment in the innovation process. Companies tend to use a feedback loop and review data on past performance, compare it with expectations and make corrective actions. The questions which arise are; *What was our goal? How did we do? What explains the variance, how can we close the gap?* Instead of focusing on measuring outputs, required is to understand early success factors like assessing which inputs drive the outputs (e.g. speed of delivery or rate of adoption). That is called a feedforward system which tracks performance toward a strategic goal and the core is to understand how an experiment is performing relative to its hypotheses. Adapting this, measurement illustrates achievements which need to have in a way to the goal i.e. number of customer adoptions of a reference design. (O'Reilly & Binns, 2019, p. 57)

Executive Oversight

Senior managers' presence and formal involvement are needed in an idea selection process. It means actual time and attention to review the experiment when it is revealed. In other words, it emphasizes understanding and commitment towards experimentation. As when the company

moves from idea selection to scale up the business there is crucial to have consensus and clarity about the ambition for the new business idea. Unless it is not clear, the risk is that investments are addressed for the profitable established business which is yet a short-term reward in contrast to investing uncertain but long-term profitable disruptive innovation. Needless to say that in that case there is no opportunity to scale up the new business which is thus doomed before even the innovation is launched.

At the end of this chapter, there is also a good to point out that no matter how well the marketing research and testing phase have been conducted there always lays a risk that innovation will not succeed. Ståhle (2004) recognizes this and argues that all the good ideas cannot be tested and validated with customers due to customers can be rooted to think with the old way as called the old paradigm. Ståhle (2004) continues that when creating a new disruptive innovation there is needed to approach the innovation in a more holistic view as to how innovation is on way to change the old paradigm. A holistic way to approach disruptive innovation means sufficient cross-disciplinary understanding in terms of seeing more comprehensively the solution than consumers. In addition, the possibility is that the old paradigm is not only rooted for the customers, as executives might have been also under the old paradigm and therefore will not support the new disruptive innovation. (Ståhle, 2004)

3 CASE RESEARCH

3.1 Research process

3.1.1 Literature review

The thesis started with a preliminary search when the author was initially looking for research ideas. Both rational thinking and creative thinking were used to refine the research topic. The purpose was to find a topic that would be suitable for a company but also which would interest the author as well. At the point when the author found an interesting research topic, it was introduced for two mentors in a company to find out if the topic matched with the company's interest. At the same time, other topics were also discussed which mentors thought of being topical and beneficial for a company. Within the next few weeks author finalized the topic together with mentors which was then suitable for both company and the author. Thereafter, the author started a critical review to figure out which published literature were in alignment with selected research questions. Critical review ensured that selected literature addressed tightly research questions and parts of literature that did not concern research questions were left out. Mainly professional literature, books, journals, and presses were utilized in this research. Keywords that were used to find articles from the electronic database were *disruptive innovation, radical innovation, fuzzy front end, innovation process, dynamic innovation capability, opportunity recognition, barriers for disruptive capability, fuzzy front end managemen*t, etc.

3.1.2 Interviews

This thesis aims firstly to develop the dynamic innovation capability of the company in order to innovate radically and secondly, to manage efficiently the front end of innovation. Therefore, to be able to understand about company's status quo, information was gathered by interviews. The selected interview technique was "the general interview guide approach" (Patton, 1990, p. 280) latter called theme interview which is one of the qualitative methods. Figure 16 presents how the theme interview has a middle position between structured interview and unstructured interview. The purpose of the theme interview is to preselect themes from the literature which will be covered in interviews. However, questions can still vary between different interviews. Therefore interviewer can emphasize certain themes more than other themes in the interview depending on the interviewee's background. (Eskola & Suoranta, 2003, p. 65; Hirsjärvi & Hurme, 2000, p. 47)

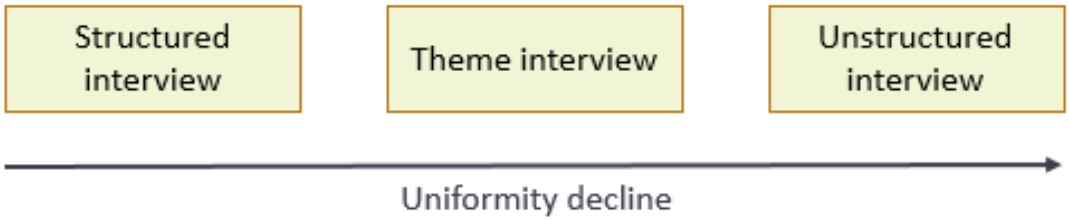

Figure 16. Different research interview forms (adapted from Hirsjärvi & Hurme, 2000, p. 44)

As the thesis concerns subcategories of dynamic capability but also process and management aspects from the front end of innovation, it can be said that it was difficult to find a single person to be able to answer for all selected themes in the company. Therefore, the theme interview was suitable for this thesis as the interviewer was able to change themes and questions depending on an interviewees' background and position. From the literature review was recognized subcategories of dynamic innovation capability which are *organizational culture and climate, individual creativity and know-how, collaboration and external links, leadership and decision-making process,* and *organizational structures and communication* but those were not applicable directly as such. Therefore, the interviewer needed to adjust slightly interview themes to correspond better for practicing purposes. As a result, the following themes are *Vision and strategy, Organization culture and leadership, Collaboration and external links, Organization structure, Individuals creativity,* and *Front end*. More precisely, V*ision and strategy* was separated from the front end phase as an individual theme. The reason for this was to address how recognized opportunities will have a place on the company's vision in the end of three years roadmap which was developed for company X.

In Table 6, can be seen that for interviews were selected twelve persons from the company. They represented executive committee members (ExCom), management team members (MTM), and employees level. The focus was to select approximately an equal number of interviewees for each position level but also present extensively different organization functions point of view's. Also, in Table 6 is presented persons' work experience in the company. When experience years indicate short it means less than four years of work experience, for the medium it indicates four to eight years of work experience and for long indicates more than eight years of work experience. Overall interviews were executed in two weeks and one interview took

approximately one hour. Interviews were also recorded which helped to ask certain questions again for another interviewee but also assisted accurate transcription later on.

Table 6. Interviewees' in company X

Position	Organization function	Experience years
employee	product development	medium
employee	research	short
employee	research	long
employee	marketing	medium
employee	marketing	medium
management team member	product development	medium
management team member	research	long
management team member	marketing	short
management team member	sales	medium
executive committee member	COO	short
executive committee member	COO	medium
executive committee member	CEO	short

3.2 Status quo of company X

3.2.1 Recent history

Company X has almost 80 years of history as being a pioneer food products manufacturer and has built many well-known brands in Finland and international markets. Over its long-lasting history company has gone through many changes which of course, have been sometimes for the necessity to adapt to prevailing circumstances but sometimes it has been also for strategic choices. For instance, less than ten years ago was planned to relieve organization structural cost and therefore technological competencies were outsourced which on the other hand, led the company to be more supplier oriented in some way. However, the last few years have changed the direction investing more in their capabilities, technologies, and competencies in order of being more agile and responding more accurately to customer needs. As these were more or less visible changes in public there has been also a lot of management changes in an internal company. To mention such a purpose for a company which guides daily base working, value-based management, and management choice to set strategic targets for three years periods – all of this only within three years. For this reason, organizational culture and structures are in transformation and it will take time until the company has its desired balance and is possible to utilize fully its capability and potential. Undoubtedly, these changes reflected in many

interviews, therefore it is necessary to consider carefully what and how development ideas can be presented in Roadmap 2021-2023. Following will be analyzed and compared answers from interviews which were conducted for executive committee members, management team members, and employees.

3.2.2 Vision and strategy

ExCom created the company's purpose in the year 2018 which represents the mission, why the company exists, and vison what kind of things are purposed to work in the future. Therefore can be said as purpose embeds mission and vision, all company's activities should reflect this highest statement. Based on the company's purpose ExCom creates and plans strategic targets for the next three years at a time as strategic periods. Noteworthy is that every strategic period should embed for the company's purpose, but the pending strategic period could not hamper for the following strategic periods. Based on the interviews with ExCom, their mutual understanding is that employees have assimilated the company's purpose and understood current strategic targets well.

When it comes to strategic targets, employees and MTM feel that them are not clear and have a wide range of interpretations among personnel even after adjustments were done by ExCom. Moreover, ExCom have not made clearly visible what are the strategic projects for the company and how well the company is performing based on the strategic targets. Unclear strategic targets lead to confusion in project prioritizing and resource allocating. MTM recognize that ExCom' meaning might have been just steering the direction for the personnel in letting them find the path and execute strategy in given frames. MTM consider it as a good thought but personnel are not ready yet for the self-orientation which was not possible yet for some years ago when the company was structured strictly to follow rules as (previous) ExCom aligned. Based on this company culture, it is yet too early a maturity phase for this kind of managerial practice. Moreover, as long as there are too many different interpretations for strategic targets in the company, personnel cannot work mutually which in turn hinders achieving strategic targets. It is apt to negatively affect to build up innovation culture which should represent the feeling of togetherness, mutual goals, and openness.

MTM and employees feel mutually that the company's purpose has given direction for the company which was earlier missing. However, they feel that purpose is strong as how it

represents the mission, but what it does not express clearly is to give passionate and concrete achievable future goals like the vision which drives employees towards concrete targets. As few interviewees' represent "*Executive committee should make a decision where we want to be best after five to ten years or something*". Importance of vision is also recognized in the literature as discussed earlier in this thesis. The interviewer understood from interviews that a clearer picture for future achievable goals would help to work in two ways. Firstly, it could clarify the strategic targets which are now seen as ambiguous especially among MTM. Secondly, the importance of vision is recognized with personnel's opinion who have to plan future research projects in their work where a clearer picture for the future would steer working more purposefully.

The interviewer conducted two main themes from interviews which are discussed in the 4 Roadmap 2021-2023. Firstly, more punctually communicated strategic targets for personnel and secondly differentiate company's purpose in the long run for individually mission and vision to resonate better for working mutually and self-orientated for the future.

3.2.3 Organizational culture and leadership

The literature recognizes two separate subcategories of dynamic innovation capability as *Organizational culture and climate*, and *Leadership and decision-making process* but as they have a very close relationship and underpin strongly each other in practice those are discussed together in this chapter as Organizational culture and leadership.

In an interview employee of ExCom told that some years ago innovation culture was drifted to the point where innovativeness was almost killed in the company. At that time it was not allowed to make mistakes, or at least it was seen as a shame rather than an opportunity to learn from them. Personnel worked only for what was expected to fulfill their task rather than being innovative and bringing ideas openly. However, during recent years, there has been time for creating new positive innovation culture for the company which came alongside a new CEO. ExCom feel that the company's values courage, fairness, and drive are characteristics that guide personnel's way of working inside the company but how they express themselves outside as well. In literature, personnel mutual values are also recognized as part of mental models which cultivate innovation culture for the better. ExCom see that innovation culture is being more open, supportive, and encouraging. They also describe that their role in build-up innovation

culture is to facilitate innovation discussion, trust, and give time to personnel to innovate which all are widely recognized in literature in terms of strengthening innovation culture.

MTM and employees, recognize and embrace widely that innovation culture has been improved in recent years. They feel that openness and fairness express well current situation. They share also the same opinion that ExCom listen to everyone equally and hierarchy levels are not hindering to bring ideas for ExCom for evaluation. However, what was raised up from MTM and employees interviews was mutual that there is not anyone who is leading innovation discussion and guiding what kind of innovation are expected from personnel by ExCom level. Moreover, the issue that is linked tightly to the latter one is that although there is an easy way to bring ideas in the air, no one was there to catch them. In other words, concrete actions are missing which might soon affect innovation activity if there is no response from ExCom. It can be destructive as especially employees are very curious about trial and error culture and receptive to even radical innovations at the moment. It calls that there is currently high hype among innovations and expectations for something to happen. What needs to be cultivated more and offer to personnel are available resources. As from interviews was seen that daily base work routines take all the time and hinder creative thinking which means there is no time left to innovate. Time (known also slack) is seen extremely important asset when expecting innovation. Above mentioned things are real concerns from personnel as a literature support the importance of the executive role as leading the discussion of innovation and concrete actions towards innovations like giving enough resources, time for innovation, and money to test hypotheses.

Obviously amending innovation culture is a very slow process that needs considered actions from ExCom but also the time as nothing is happening overnight. However, as much as is done already to build a more positive innovation culture there appeared interesting common viewpoints partly from MTM and partly from employees interviews which is good to elaborate separately.

Currently, there is a wide viewpoint and focus that innovation are merely products in the organization but not so well understood what other innovation can be like process, marketing or even business model. In addition, while the company has invested more in R&D, mostly for hiring new employees it is apt to increase pressure for R&D performance among the

organization. This might be the reason why in MTM and employee interviews raised a concern that the current way of working in the organization is that functions are kind of separated and inward when it comes to innovation. It reflects that there is not required support between different functions which is a fundamentally basic pillar in the dynamic innovation capability of an organization that experiences and competencies can be shared and utilized to enrich innovation. This conduct to the point that research function is working alone for future innovation without any support from other functions which could for instance share their insight of new trends and customer behavior or make other types of innovation as mentioned earlier. There is clearly a lack of vertical and horizontal communication about innovation. As vertical communication aspect ExCom should lead the discussion that different kind of innovations are needed but also as horizontal communication to support different functions and gain valuable insight.

In the roadmap 2021-2023, a more precise plan will be discussed on how to increase cross-functional communication about innovation, what could be done to enable concrete action towards innovation, and how to make sure to have slack for innovation.

3.2.4 Collaboration and external links

External links and collaboration, known also as open innovation are seen as very crucial for the company based on all interviews. All participants acknowledge that especially if looking for disruptive innovation, open innovation has its major role. Interestingly, how interviewees' define open innovation varies vastly which partly might explain that open innovation is not well-rooted in the company formal discussion. For instance, among ExCom recognize that personnel are doing a lot of open innovation with suppliers, research institutes, and customers. In addition, they mentioned reciprocal reliability is a key success factor in collaboration. Comparing these standpoints with MTM and employees, is clear that their viewpoints differ quite a lot from ExCom' viewpoints. Firstly, personnel feel that they are just working for the minimum with external partners when it comes to open innovation as there is no permitted to share goals and future plans which could help concretely to innovate for both parties. Basically, external links are just for to acquire information outside-in process. Personnel feel that the company's distrust for collaboration is a real matter which hinders successful open innovation. Moreover, from interviews draw a picture that the company focuses and trusts its own capability

too much. Based on the literature review about open innovation it seems that the company is just utilizing its minimum of total open innovation potential.

Based on what discussed above, personnel see a tremendous chance of development for open innovation. They highlight, for instance, that the company should open up and communicate freely for markets as such what are the company's future goals and what are ongoing projects. It would increase the company's image as being open for external opportunities and call for collaboration for instance cross-technology areas, but also invite external parties such as customers for idea generation contest. Personnel were interested in corporate ventures like start-up's which nevertheless would need very strict scope in a strategy to be successful. ExCom admit that corporate venture is not the company's current way of working and due to it is not going to happen in near future. In addition, they confess that corporate venture needs the internal capability to find right start-ups' in order of reassuring that money is targeted towards the right direction.

In the roadmap 2021-2023, is discussed how open innovation could be communicated in the organization and what would be the next step to utilize open innovation more efficiently.

3.2.5 Organizational structure

Organizational structure is a subcategory of dynamic innovation capability which shared more or less mutual understanding for current situation by all interviewees'. Everyone agrees that the company is not as agile as it should be and especially compared to its size. More precisely almost everyone noted that as small size as the company is the size should be for its competitive advantage compared to larger companies. On the other hand, interviewees' also noted that the company might still not be very rigid either.

What makes the company rather rigid than agile however divided standpoint between ExCom, MTM and employees. For instance, ExCom see that company's history is one of the reason for rigidity based on the old launch criteria's which have been once decided and have not been questioned recently to renew. Whereas, MTM see that rigidity comes from hierarchical organization chart which is divided for B2B and B2C units wherein some functions unequally serve one unit more than another. It is apt to hinder synergies that could be utilized if organized

differently. ExCom and MTM saw that company is too supplier dependent which reflects directly delays in the company's innovation process and commercialization. This is one of the reasons why the company has invested radically more in its own technology and competencies to get rid of that rigidity that comes from excessive supplier dependence. Employees see that roles and responsibilities are still unclear which is one of the reasons for not being so agile. Another reason which employees raised was that the company does not have enough risk tolerance which means that the company plays excessively safe side almost in all situations. All participants agree on the fact that the company can act very agile when it desires. The interviewer thinks that this happens in the situation when the company is in 'panic' mode for one reason or another. It implies that personnel can work very closely with each other and agile when there is a demand to do so. The interesting question is how these smoother processes in a 'panic' situation could be adapted into normal day-to-day working.

What comes for managing both incremental innovation and disruptive innovation literature suggests spin-offs' or skunkworks to solve the dualism dilemma. Everyone sees that spin-offs' and skunkworks are interesting alternatives and would be efficient. In the same breath, they added that the difficulty is that the company is not large enough and does not have excessive resources which would be possible to release for autonomy unit or project. Few also noted that to establish an autonomous unit, one would need to hire more employees which would be the almost same cost as acquiring a start-up.

In the roadmap 2021-2023 is discussed how the company could act more agile and how the company would test benefits for the autonomy project team which emphasizes looking into long-term rather than short-term goals.

3.2.6 Individuals creativity

The literature recognizes that all individuals have creativity capacity for innovativeness and ability for idea creation, but for someone it might be hidden. This was also well noticed in all MTM and employee interviews where many said that personnel are well heterogeneous and do have a lot of innovation capability. Concern raised about utilizing untapped potential efficiently. Reasons why many noticed concerns about untapped and hidden innovation capability was that many of personnel are just 'working' to get their monthly payment but do not have any

additional interest to innovate and share ideas. Another reason was noted that personnel have enough on their hands already which is not motivating to get more work as to innovate.

In interviews were also discussed if there are champions in the organization who have personality traits to bring and push nontraditional ideas up for the crowd. Interestingly, few and the same champions were recognized almost in all interviews but perhaps not surprised that they addressed mainly for R&D function. Therefore, champions would be fascinating to see extensively to cover more functions in terms of diversifying innovation discussion. Undoubtedly, champions are the ones who lead innovation discussion but it is not solely enough as many interviewees emphasize the importance of social relationship in the innovation process. In literature, it is seen strongly the same way. In fact, many employees and MTM figure out in the discussion that the company is not utilizing a sufficiently cross-functional team in terms of enriching innovation discussion and increasing innovativeness. They see that either company has not considered that aspect when formalizing project teams or it is too new way of working in the company. Whatever the reason is, it is something which should be thought about more thoroughly.

Overall, what is seen to increase innovation activity is that there should be more discussion about innovation, what kind of innovation exists and to name someone who is leading the innovation discussion. This is closely related to innovation culture which is discussed earlier. Moreover, personnel are looking for more teaching and practices when it comes to innovation, especially for disruptive and radical innovation. They also note that an innovation event once a year is not the way to harness innovation activity rather more often and regularly.

In the roadmap 2021-2023 is discussed on how to motivate personnel to innovate and facilitate cross-functional teams to increase innovation capability in the organization.

3.2.7 Front end of innovation

In literature regarding word fuzziness in the front end is the implication of something which may not have a clear structure, process and which has a high set of management challenges. In fact, it is quite accurately stated and comments from interviews pointed out that the front end is unclear almost for all interviewees’. As mentioned earlier in Strategy and Vision section that

ExCom make strategy periods for three years at a time. Approximately, after the first year of the pending strategic period ExCom awaken to inquire for research function to search the opportunities that the current strategy targets would meet. In other words, chosen strategic targets guided to opportunity identification and was in that way done as needed. Thus, the research function investigated about ten opportunities within a few weeks that could fit for current strategic targets and have a huge potential in the near future. Then ExCom decided to execute a few opportunities as projects. Therefore it is reasonable to say that, the company currently does not have a continuous "front end" phase as it is depicted in the literature.

Due to the continuous front end phase is missing in the company, it is clear that personnel, in general, cannot know what the front end of innovation is and what expectations are towards it. Also, the front end is partly confusing for ExCom why the front end management is so important and necessary to implement in the company's innovation process. Missing the front end phase in the innovation process might be also a half-truth why personnel requires leading for the innovation discussion, process and that someone will take care of innovation ideas what discussed in Organization and leadership section. Moreover, if not counting noncurrent opportunity recognition which was led by ExCom, the company is sort of lacking new extraordinary innovation ideas (or opportunities) which was understood from many interviews. Many calls in the interviews that the company's focus for two brands in strategic targets restrict personnel mind to innovate. Although the company's purpose should be the highest statement for steering radical innovation. The interviewer noticed also from interviews that there is a lack of understanding on where to find opportunities but also a tool to gather them in the company. Based on the literature review of the front end it calls that opportunity identification is the root for disruptive innovation. According to Zhang & Doll, (2001) "*most projects do not fail in the end, they fail at the beginning*", it strengthens the thought that the front end phase is the most important part of the entire successful innovation process.

As drawing the current situation like this awakes the question of how this could be changed for a more favorable direction. Due to the early maturity phase of innovation culture in company X and the lack of front end phase, there is a calm development plan made for roadmap 2021-2023. Everything begins with ExCom recognizing the importance of the front end and committing to take it as a part of the innovation process. After then it is possible to carefully extend the concept of the front end of innovation for personnel and practice what it requires to

get started. Thereafter, ExCom should determine what adjustments are required to the front end phase to correspond to goals that have been set initially.

4 ROADMAP 2021-2023

As discussed earlier theme interviews consisted subcategories of dynamic innovation capability but also process and management aspects from the front end of innovation. From each subcategory was selected few development targets which were seen to hinder dynamic innovation capability and the front end management in the company. Following is discussed year by the year each subcategory and which actions should be done to achieve improvements on the status quo. In addition, there is a holistic theme each year which reflects what kind of things are on purpose. The first year the purpose is to enhance communication, the second year bold actions are needed towards increase dynamic innovation capability, and the third year the purpose is to take the first step for the self-orientated organization. Figure 17 presents all subcategories and them development actions by each year.

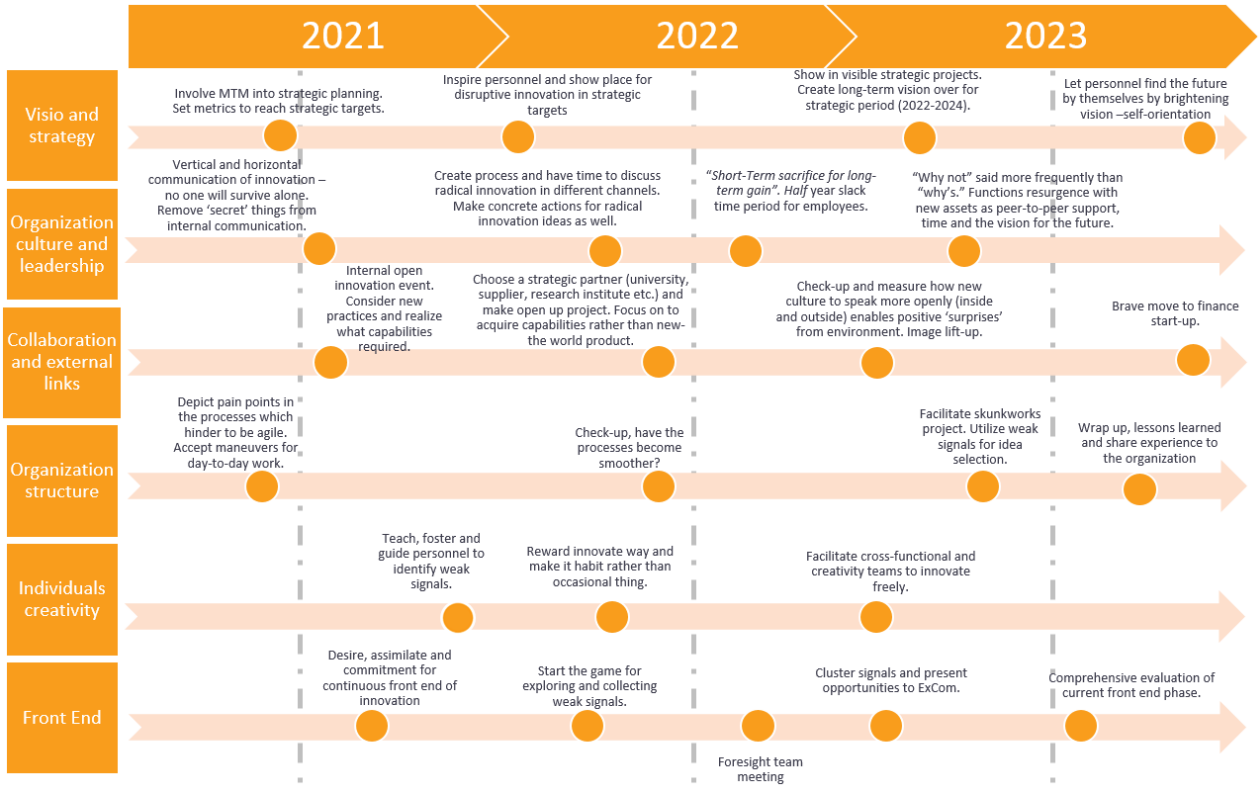

Figure 17. The roadmap 2021-2023

4.1 2021 Communicate and plan

Vision and strategy

As was discussed earlier in the vision and strategy section, pending strategic targets have too many interpretations among personnel which will affect a high probability that personnel not working towards a mutual goal. Obviously, the mutual goals should be ultimately the highest priority in the company strategy. Interviewer understood from interviews that MTM were a bit offended that they were not initially involved in the strategy targets discussion when they were planned which partly could result the strategy targets being difficult to understand. Also, one part was that ExCom were sure that strategy targets are very clear and persisted not to make any clarification to it as it remains unclear for MTM. However, ExCom could pay attention that it is important to get MTM involved early on in the process when the next strategic targets are planned. What should be done in the year 2021 is to increase communication between ExCom and MTM which amendments have been recognized for the last strategic period, what was good in strategy, and make a plan on how the next strategic period is clear for all from the beginning. If there is still a place for discussion in the next strategic period what could be done is to set metrics to measure performance in different fields in the strategy. It would make visible for all functions where they are heading to and what are their expectations. Moreover, it will make a clearer picture of the expectations ExCom have for the short-term and long-term period.

Organizational culture and leadership

The interviewer understood from interviews that the research function is sort of alone in terms of innovation. It reflects in two ways. Firstly, the organization expects more or less innovation being a product and secondly, functions do not see that their role is to help and provide valuable insight for research. More precisely, the interviewer understood that research and marketing are quite apart from each other which is surely hindering research capability to innovate for the future. Although research function is many times spark for innovation, they should not be left alone to innovate in the company. It calls for ExCom to take a role to lead innovation discuss and challenge actively other functions to innovate as well. Education and practices should be arranged regularly to diversify functions understanding about innovation and above all motivate them. Look away for a moment from research and at the same time make other functions aware that innovation are everywhere and needs communication and support. Vertical communication

from top to bottom will diversify opportunities where horizontal communication cultivates innovation culture and a mutual way of working.

What also includes in roadmap 2021 as attempting to influence positive innovation culture is to remove ‘I am not allowed to speak’ from the internal discussion. Not allowing to speak things from colleague to colleague hinders feeling of togetherness and can affect confusion in the organization. For instance, from interviews many pointed out that the strategic targets affect a lot of interpretations. Therefore, for someone the strategic targets represent existing products which the company manufactures, and for someone it is what ongoing investment will be able to produce within a few years. As long as ongoing investment belongs to the ‘not allowed to speak’ category, people who are in the project are not able to share their thoughts with others who are not involved in the project. This kind of culture is apt to affect interpretation among personnel.

Collaboration and external links

In literature, it is recognized that a company can perceive substantial advantages by external collaboration. Open innovation is seen for instance to shorten time to market and increase innovativeness. Based on the interviews especially MTM and employees thought that open innovation is vital for the company but also that ExCom have not thought about open innovation as it is missing totally in the strategic targets. Personnel rise many aspects on how the company could utilize open innovation such as collaborating with the academic world, arranging innovation contests, and funding start-ups’. A common aspect for all which is now hindering collaboration is that the company does not rely enough on others and is not willing to share development projects and goals for markets which would increase collaboration possibilities for the company. The recommendation for the year 2021 is therefore to arrange an internal event in the company where personnel would be able to share development ideas and thoughts about open innovation for ExCom. It is wise to utilize personnel knowledge on how they interpret open innovation and what would be a good way to approach it. The open discussion will for sure help to understand both sides as personnel what capabilities is needed to execute some collaboration but also for the executive committee to consider some reasonable thoughts.

Organizational structure

Based on the interviews, all participants see that the company is not agile but not very rigid either. For this reason, there is not any radical implementation for the roadmap. However, from interviews came up a theme that the company also can act very agile when it desires. Usually, this happens in the situation when the company is in a 'panic' mode for one reason or another. Therefore, what could be done in the year 2021 is that the company should depict the process on how the company works more agile when is the demand to do so but still within 'acceptable' frames. There can come out some observation for instance that some processes especially in decision making can be made shorter or the company can trust more some preliminary test results of shelf life and therefore launch product faster to the market.

Individuals creativity and know-how

Individuals' creativity is seen generally at a good level in the interviews. However, as disruptive innovation are less common than sustaining innovation there was reasonable to know on how they form and how to invent one. In literature, it calls opportunity recognition which is explained more precisely in 2.4.2 Entrepreneurial approach to front end of innovation. In summary opportunity recognition framework includes three main factors which are *interaction between each other commitment in active exploration for opportunities*; *alertness to identify a new solution for latent customer needs or untapped market potential*; *prior experience and knowledge of industry, market, or customers* (Busenitz, 1996; Baron, 2006). As there is interest in disruptive innovation in the company, it is proposed that utilizing internal champions they could teach and guide personnel on how they interpret changing trends, events, and markets in the beginning. Thereafter, external innovation consults specialized for the opportunity recognition would be appreciated training personnel for example part of innovation day. The author believes that it would give a flying start for the mutual journey to recognize disruptive opportunities for the company.

Front end

Nevertheless, the lack of the front end phase in the company does not mean it has always been missed. Surprisingly, based on the one management member interview, the front end process

and its management was actually in pilot use in the years of 2014-2016. The reason why activity weakened and terminated in the end, can be said to originate at a time when the organization chart was renewed. At that time employees who were involved in the front end activity shifted work position or work which affected that there was not anyone to continue operation. Moreover, can be said that other priorities came up at that time which had more attention than to run continuous front end phase. To be able to raise the front end activity up again calls ExCom desire, understanding, and commitment towards it. As a member of MTM stated in the interview "the *front end phase is ultimately a tool for leaders to discuss recognized opportunities which can steer the discussion when planning further strategic periods for a company*." The interviewer agrees on this and continues that when the company's purpose steer personnel to recognizing opportunities it will guide leaders to know how personnel see the company's future markets, trends, and customers. This is also the point where a vision can born. Moreover, when gathering opportunities it affects internal discussion and opportunity evaluation in the company which in turn unites personnel together. It creates trust and belief where everyone can be part of building a mutual future for the company. Therefore, the obvious move to activate the front end discussion is that firstly ExCom must identify demand to recognize opportunities excessively and for continuous process. It calls also that someone in ExCom is clearly in charge of front end activity. Secondly, there is required to communicate for personnel what are purposes and targets for front end activity. After that can be discussed what kind of structured process the front end will be for the company.

4.2 2022 Time to show courage

Vision and strategy

The year 2021 is time to increase communication between ExCom and MTM where all key takeaways are now amended for the new strategic period of 2022-2024. Besides communication of new strategic targets for personnel, it is essential to state what kind of innovation the company is looking for to reinforce its competitive advantage. It is good to remind wide varieties of possible innovation for instance product, process, and marketing innovation but also important to turn gaze from short-term innovation to outwards for radical and disruptive innovation. It requires ambition and a bold point of view from ExCom to show personnel that radical innovation have a place on strategic targets and are here to stay. It calls to set the bar

high for goals and targets which to achieve. It is something that employees also supported in interviews which calls that employees are not afraid of setting ambitious goals and achieving them.

Organizational culture and leadership

Many of the personnel commented there are a lot of ideas in the air, but they lack concrete actions towards implementing them. As the year 2021 is time to increase communication, the year 2022 is time for concrete actions. How to start the year 2022 as cultivate organizational culture is to make processes and different forums where radical innovation are discussed. It highlights utilizing different channels where different kinds of inventors have space to express themselves. Someone is not afraid to throw ideas loudly on innovation day where another one is shyer and wants to utilize some digital tool for innovating. The important issue is that there is not just personnel to discuss with each other but also executive committee members to make time for discussion and showing presentation how different radical ideas have been taken into account on the roadmap and will be implemented. Moreover, due to the nature of radical innovation, trial error culture is observed of being efficient. It emphasizes available funds to be shared for testing hypotheses.

Besides many personnel commented that there is not any concrete action towards ideas was also stated that personnel have enough on their hands already and there is no time to innovate. The second half of the year 2022 is proposed to facilitate a slack period for personnel. Regarding on what is enough amount of slack, should be discussed with personnel and decide by the executive committee but a good start would be to reserve two-three hours per week just for innovating. Of course, it can affect controversy that if someone is not using time for innovating or if someone is so busy that they do not have opportunity to utilize innovation time and otherwise other works need to be done over time. Things will not change overnight but rather need time. The purpose is to start making a culture for the company where innovation time is respected from top to bottom and where personnel can learn to schedule their work in the long run. Proposed is to facilitate this kind of slack for personnel for half a year and after that gather experiences and discuss how it works and what kind of amendments are needed.

Collaboration and external links

The year 2021 is the time to discuss and share ideas on how the company would benefit from open innovation and take it into account for strategy. Hopefully, some open innovation thoughts are considered in the year 2021 as the way that they are possible to put in implementation. Propose for the year 2022 is carefully selecting a strategic partner for the company and kick-off some project. A selected strategic partner can be a university, supplier, or research institute, etc. Very important matter is to focus on how things progress when there is deep trust and desire to make collaboration where both parties will benefit. The most important thing is, however, to acquire and learn capabilities from a strategic partner rather than focus solely on new-the-world innovation. The literature recognizes that this is a stumbling block for many successful collaborations.

Organizational structure

In the year 2021 was proposed to depict the process on how the company has worked when it has had high demand to do so. Observations that increase more agility are preferred to implement into processes in the year 2021 and check-up in the year 2022 if there has been any positive or negative impact on the process. If there has been a positive effect, then can be revised to depict the process and find if something can be fixed like in the year 2021. Vice versa, if a negative effect has been found then return to original process. This is apt to foster a trial and error culture in the company.

Individuals creativity and know-how

As was mentioned earlier that some people for one reason or another are not motivated to innovate. Of course, it is not possible to make everyone motivated but some occasional reward system would be beneficial. Reward system cannot be too serious and complex as innovating should not be either. Consider intangible rewards such as public acknowledgment, fall of fame, dinners out, etc. rather than tangible rewards (financial). Remember the reward for both, ideas and implementation.

Front end

The year 2022 starts with the assumption that in the year 2021 is discussed benefits of the front end phase entirely but the focus should be on opportunity identification. As the purpose is that opportunity identification is acknowledged as a tool of strategic planning and has ExCom commitment. Moreover, a member of ExCom must be the leader of the front end discussion and name a 'foresight' team who will report occasionally. Thus, in the year 2022, the company will have a good start to gather opportunities for selected idea tool. The author suggests that the existing innovation idea tool can be divided into a part where only opportunities ("weak signals") are gathered. Therefore, it is clear for all personnel from the beginning that opportunity recognition is a 'playground' for all ideas where judgment is not allowed. Again, as was mentioned earlier, opportunities are abstract, latent consumer needs and/or growing trends i.e. where there are not concrete products yet. The named foresight team will inspire personnel to be creative and observe changes in trends and markets which could offer a future business for the company. The foresight team will also gather weak signals and have occasional meetings where it is discussed if something remarkable weak signals have been found and need to be presented for ExCom.

4.3 2023 Self-orientated organization

Vision and strategy

Based on the understanding from interviews is that personnel do not know clearly what activities meet the strategic targets. Therefore, the second year in the pending strategic period is time to show in a visible way what are the strategic projects for the company and how well the company performs based on the strategic targets. To ease this work, ExCom can utilize performance metrics to show which actions are performing aligned strategic targets and which needs amendments. It creates belief among the personnel that projects have meaning in strategy and if needed guide activities back on track. As this is concrete action to make the short-term goal more visible there is a need to make a passionate, clear, and achievable future state in the coming years for the company. In other words, strategic targets are waypoints for vision as the desired direction for the company of where it is heading. It will guide personnel to figure out the company's activities in the big picture, as "when we are doing this, we are going there". As

to make a concrete vision there is no need to invent a totally new thing as vision is derived from a mission statement which the author believes is well presented in the existing purpose of the company. It calls to leave the mission as it is in the company's purpose but separate the vision for an individual statement to show the company's desired and chosen future where the company wants to be after some years. At this point, it is possible to utilize some promising 'weak signals' which have been noticed from opportunity recognition. By doing so, the vision inspires and unities personnel for a mutual future path. Trust people and let them work together as self-orientated for a brighter and clearer future and remember to discuss with them on how vision has affected their work already by the end of the year 2023.

Organizational culture and leadership

In 2023 organizational culture is expected to evolve in the direction where "why not" will replace "why's" when talking about innovations. It concerns not only for ExCom but personnel on how they esteem and get inspired for colleague's ideas. In addition, innovation discussion addressed to cover all functions in 2021 will result in personnel innovating actively across functions. It will be shown for instance well-balanced innovation portfolio with varieties of innovations and other functions support for research activities. In the year 2023, the company feels a peer-to-peer spirit among the organization and there is a clear future goal that guides passionate innovation activities.

Collaboration and external links

In the year 2021, the company is gradually removing 'secret things" in the internal discussion which over time will impact how personnel communicates more openly also with external partners. At the beginning of the year 2023, it is time to check up and recognize how more open innovation culture bear fruit for different functions via improved collaboration relations. In the meantime, the company is also more open on how it communicates for markets which increase interest and contacts from outside towards the company. The end of the year 2023 is time to observe and decide if some start-up meet the company's criteria to start a corporate venture.

Organizational structure

What comes for managing both sustaining innovation and disruptive innovation literature suggest spin-offs' to solve the dualism dilemma. Due to the company not being large there would be difficult to release for an autonomy unit as such. However, it would be advised to consider in the first half of the year 2023 to facilitate a pilot skunkworks project around for selected radical innovation idea. Even better if some of the gathered weak signals will be selected and implemented in this project. What makes this for the pilot project is a purpose to pick up the necessary amount of people 'cross-functional team' which are working full day for certain project half to one year. The ambition goal for a project is to have some concept tested for consumers and ready for the NPD phase by utilizing, for instance, a lean startup model which depicted in 2.4.2 Entrepreneurial approach to front end of innovation. After the pilot period completed experiences will be gathered and shared across the organization. More importantly, to maximize learning is crucial to set metrics and measure what have been learned in the pilot project. Instead of using a feedback loop and review data on past performance, should be understood early success factors like assessing which inputs drive the outputs as discussed also in 2.4.2 Entrepreneurial approach to front end of innovation.

Individuals creativity and know-how

Although an organization needs creative and innovative individuals to innovate it is rarely enough to fulfill the whole innovation process. In fact, the literature emphasizes the importance of social relationship in the innovation process. However, many employees and MTM figure out in the interviews that the company is not utilizing sufficiently cross-functional teams in terms of increasing innovativeness and solve challenges that would need innovative solutions. They see that either company has not considered that aspect when formalizing project teams or it is too new way of working in the company. Therefore, the proposal for the year 2023 is more actively build cross-functional teams to solve challenges. For successful cross-functional teams, it is beneficial to bring together such technical skills, creative thinking, different functions to create a holistic picture of how to bring an idea to implementation. It might be common that when a challenge appears, the first thing is often to start solving it inside the function instead of making a cross-functional project team to solve it. For example, innovation days are a great place for innovating new ideas freely but there can be also discussed which challenges there

lays and which needs to be solved in the company. As people are usually already in innovative mode these kind of innovation days there is the possibility to try which cross-functional teams might work and which do not. Moreover, this would be good practice for the pilot project to run later in 2023 what depicted in the organizational structure.

Front end

Less than a year after starting to gather opportunities, there will be time to cluster them with the selected foresight team and then present clustered opportunities for ExCom. As this is the pilot phase to start the continuous activity of opportunity recognition and therefore relatively new thing it is proposed to utilize external consult to cluster opportunities but also assist analyses of opportunities with ExCom. Shortly, the role of opportunity analysis is to translate input from opportunity identification into specific business and technology opportunities to be able to reduce market and technology uncertainty. All kinds of assessments with existing information are significant including utilizing external knowledge from groups and market studies but scientific experiments as well.

The benefits of analyzing opportunities are firstly, as discussed earlier, to be able to steer the discussion when planning further strategic periods for a company. Secondly, from analyzed opportunities might arise concrete potential opportunities which can be seen to put into the progress in front end phase called ideation. To be able to focus on disruptive and radical innovation is proposed to use scale ambition and hunting zones as complementary. As scale ambition emphasizes that generating a business idea is not just a product or process but merely an entire business model. Whereas, hunting zone is kind of concrete guidance and assists to keep searching of new business idea on track and ensures for assessment of the attractiveness of the opportunity (market size, market penetration analysis, possible threats, etc.). Scale ambition and Hunting zones are discussed more precisely earlier in the literature.

Can be said that generating ideas for a company is not an issue but how to select and manage the best ones to invest in is what matters. In the literature review is discussed two methods that are effective for the managers or the front end team leaders to validate disruptive ideas in the marketplace –Lean Startup and Business Model Canvas. These methods not only assets to decide on which idea to invest in but also to help formalize business concept due to close

relationship with the customer and their feedback in order to continuously improving prototypes.

During the year 2023 is a moment also when the front end activity needs to be evaluated comprehensively. Discuss and interview personnel from different functions on how actively led front end phase has affected to innovativeness, clarified innovation, and increased motivation. By ExCom taking a gradually more visible role for the front end of innovation, it will make sure that there comes regularly innovation ideas, they are evaluated and discussed properly and perhaps the most importantly clarifies responsibilities which are missing in the status quo.

5 CONCLUSION

5.1 Answering the research questions

This thesis is aiming to develop dynamic innovation capability and the front end of innovation for company X. The aim is to draw a holistic point of view about the current state of dynamic innovation capability and front end in company X. Based on the analyzed results from interviews a three-year development plan was created for company X. Research results are presented by answering the following three research questions:

1. What is dynamic innovation capability?
2. How to improve dynamic innovation capability in company X?
3. How to improve the front end of disruptive innovation in company X?

Research question one is answered based on the literature review. The second and third research questions are answered based on the literature review and the empirical results. All the answers to the research questions are presented in Table 7.

Research question 1. What is dynamic innovation capability?

For the literature review, the first thing was to define innovation capability which however turned out to be difficult. Some researchers were trying to draw a comprehensive picture of innovation capability by utilizing institutional theory, cognitive theories, transaction cost economics, sociotechnical approaches, resource-based view, and market orientation but ended up without a holistic view. The results revealed only fractions of a comprehensive view, and it was concluded that due to the heterogeneity of assets between different companies, a generic framework of innovation capability cannot be obtained. However, in general, innovation capability has been defined as a capability to learn, transform, receive and apply new knowledge in order to achieve competitiveness. Unfortunately, this definition merely pursues small improvements on products/services since the competitive advantage is being defined solely from an internal perspective. Therefore, the concept of dynamic innovation capability was defined to explain how companies survive when existing competencies become obsolete and new skills have to be developed. Moreover, it was observed that dynamic capability consists of

subcategories which affect the ability of a company to create new products and processes and to respond into changing circumstances in the market.

Similar to the definition of innovation capability, also dynamic innovation capability is challenging to define in a comprehensive way. As the core in dynamic innovation capability is an inimitable combination of resources which cut across all the functions in an organization, and the management capability of those resources, it can be said that higher levels of company dynamic innovation capabilities consist of internal and external factors. More precisely, internal factors are investigated and learned from unexplored knowledge located inside the company, for example, employees' previously gathered experience and information (tacit knowledge). External factors on the other hand, consist of new knowledge that the company can explore outside the company boundaries, for example, suppliers, customers, competitors, universities, venture capital, and alliances.

Hence, it is reasonable to say that both internal and external organizational learning is required for new innovation capability generation and it is a widely acknowledged perception. However, the subcategories related to innovativeness are presented differently in literature. One reason may be that different innovation types require a different set of attributes meaning that there is not a unitary set of attributes to affect all kinds of innovation. Therefore, innovation capability can be seen as a multi-faceted phenomenon which includes different structures, internal and external factors, etc. In this survey, the author decided to choose the following five subcategories of dynamic innovation capability. Moreover, it is important to examine the factors within these subcategories that enable or disable the company's radical innovation capability.

- Organizational culture and climate
- Leadership and decision-making processes
- Collaboration and external links
- Organizational structures and communication
- Individual creativity and know-how

Mental models in organizational culture have a major influence on how employees interpret, observe and perform in an organization. Mental models are very deep in an organization

structure which contains values of organization, beliefs, myths, and norms. In an organization, mental models contribute to generating and assimilating knowledge within the organization, inspiring a strong desire to learn more, and encouraging for an innovative mindset. Leaders have a huge effect on how this kind of positive innovation culture is created. Individuals need to feel themselves comfortable and supported by the organization. Beside leaders showing that they value creativity and all kinds of business ideas, they need to support for the innovation creation process. Also, decentralized management in an organization has been observed to increase radical innovativeness when decision-making is spread across functions, teams, and individuals. Although there is a lot of innovation potential inside a company, the company should observe the surrounding environment and harness external capabilities as well. The literature emphasizes strongly that companies that do not exchange external knowledge are most probably losing their competitiveness in the long run. Cooperation shortens the time to market and increases innovativeness. Organizational structure is also considered important but challenging to manage both for incremental and radical innovation. Where effectiveness on routine-based processes favors incremental innovation, disruptive innovation development requires flexibility. Although, all subcategories of dynamic innovation capability are important, maybe the most crucial among them is individual creativity and curiosity which are central to innovation. All individuals have some innate capacity for innovation and ability for idea creation – for some individuals this capability might be hidden. The aim is therefore to teach innovation skills to employees and release an intangible asset to be utilized in the organization.

Conclusion 1. Dynamic innovation capability explains how companies survive when existing competencies become obsolete and new skills are needed to develop further. It is an inimitable combination of resources which cut across all the functions in an organization.

Conclusion 2. Dynamic innovation capability is an ambiguous concept which consist of subcategories that can be either internal or external to the company. Subcategories of dynamic innovation capability that affect the innovativeness of the organization are *organizational culture and climate, leadership and decision-making processes, collaboration and external links, organizational structures and communication,* and *individual creativity and know-how.*

Research question 2. How to improve dynamic innovation capability in company X?

In the literature review five subcategories of dynamic innovation capability were recognized, that affect the innovativeness of the organization. These subcategories provided the body for the theme interview which was selected as the method to find out what is the current state of dynamic innovation capability in the organization. However small changes are required for subcategories to be better applicable in practice i.e. too close correspondence between subcategories could cause confusion in interviews. For example, *organizational culture and climate*, and *leadership and decision-making process* were embedded in one theme as *organizational culture and leadership*. Thereafter, the following themes were selected for interviews: *organizational culture and leadership*, *collaboration and external links*, *organizational structure*, and *individual creativity*.

Based on the interviews development targets were recognized for each subcategory. Thereafter, development targets were divided for the first year, second year, and third year development plans. Due to the company having recently had major changes in its organizational structure and executive committee level, the author needed to consider the development plan carefully not to make too radical proposals while still developing innovation capability powerfully forward for the organization.

The first year development plan was created to enhance communication and to make changes that create a fundamentally solid base for the more radical changes during the second and third year. Therefore, the first year included improvement suggestions such as opening inward activity between functions to increase cross-functional activity, strengthening the company's culture to rely on each other, increasing agility in processes, and increasing personnel awareness of disruptive innovation.

The second year development plan was to make bold actions towards increasing dynamic innovation capability in the organization. It highlights leading by example and commitment by the executive committee to take personnel with them for a mutual journey where disruptive innovation is possible. Therefore, the second year included bold actions such as facilitating slack for personnel, selecting strategic external partnerships that possess deep trust, and rewarding personnel for an innovative way of thinking to increase motivation.

The third year development plan was based on the assumption that the development proposals for the previous years are executed successfully and on time. Therefore, the organization can take the first step towards a more self-oriented way of working and monitoring how executed improvements follow the forecasted direction. It means that cross-functional support is present for all innovation activities, the organization acts naturally in a more open way outside of the company boundaries and dares to release skunkworks projects from the organization.

Improving dynamic innovation capability in an organization is a long process that requires commitment from the entire organization, a holistic point of view, and perseverance. Although a development plan for dynamic innovation capability was made for the next three years it does not mean that disruptive innovation will occur automatically after that. It highlights that the organization needs to and should monitor how dynamic innovation capability develops over time and make adjustments continuously. Also in the literature, it is emphasized that dynamic innovation capability calls for competence to translate and renew current knowledge into new capabilities constantly. That is the biggest challenge but at the same time the key to success.

Conclusion 1. Based on the interviews, development targets for each subcategory of dynamic innovation capability are recognized. Thereafter, development targets are derived into a three-year development plan which follows recognized characteristics of dynamic innovation capability in literature.

Conclusion 2. Assimilate the company's status quo and ExCom state of mind according to dynamic innovation capability improvement which enables composing a comprehensive and consistent development plan.

Research question 3. How to improve the front end of disruptive innovation in company X?

In the literature, it is recognized that the front end of innovation consists of opportunity identification, opportunity analysis, idea genesis, idea selection, and concept development. Thereafter, an approved business case will be put forward in the NPD phase. As this thesis has its focus on a disruptive innovation point of view, an approach that suits the selected point of view needed to be chosen. Therefore, entrepreneurship was selected as an approach for this

thesis as entrepreneurs always search for changes, respond to them and exploit them as opportunities. Thereafter, all five elements in the front end of innovation were elaborated by keeping the entrepreneurship point of view visible. In addition, it was noticed that disruptive innovation needs much more iteration and reciprocal movement among activities than incremental innovation in the front end phase. Besides all the elements being examined carefully in a literature review, it was also considered how to manage the front end efficiently. From the literature, it was recognized that management needs to be committed and has to understand the front end phase comprehensively, evaluate progression continuously, allocate resources, have a strong vision and make sure that responsibilities are clear for all team members. After the literature review was completed, two themes of the front end of innovation were selected for theme interviews. These themes were *front end,* and *vision and strategy* where the latter was separated from front end phase as an individual theme. The reason for this was to point out the importance of vision in terms of opportunity identification which was highlighted in the literature.

Based on the interviews development targets for both *front end* and *vision and strategy* were recognized. Thereafter, development targets were divided for the first year, second year, and third year development plans. It was important to maintain consistency between *front end* and *vision and strategy* themes and the subcategories of dynamic innovation capability as they were included into the same three year development plan. As mentioned before, the company has recently had major changes in its organizational structure and executive committee level. Due to this reason the author needed to consider the development plan carefully not to make too radical proposals while still developing the organization's innovation capability powerfully forward.

The first year development plan was to clarify the strategy targets for personnel which had previously been perceived as confusing. This was considered crucial as strategic targets are waypoints of vision and will imply the desired direction of development for the company. Secondly, as a concurrent front end phase did not exist in the company, the author stated that an obvious move to activate front end discussion is that firstly ExCom must identify the demand of recognizing opportunities excessively and for continuous processes. It calls also that someone in ExCom is clearly in charge of the front end activity.

The second year development plan was to show personnel that radical innovation have place on strategic targets and are here to stay. It calls to set the bar high for goals and targets which to achieve. Moreover, was proposed that the company starts to gather opportunities which are not currently done. In order to gather opportunities was proposed to utilize the existing idea tool.

The third year development plan was to gather and cluster opportunities with the selected foresight team and then present findings for ExCom. As this is a relatively new thing for the company it is proposed to utilize external consult to cluster opportunities but also assist analyses of opportunities with ExCom. Gathering opportunities will have three main functions. Firstly, them can be utilized to form the company's vision which will guide personnel for desired future. Secondly, them steer the discussion when planning further strategic periods for the company. Thirdly, there might be recognized next disruptive innovation for the company which will be put further into the front end phase which is discussed clearly in the theoretical part of this thesis.

As the company does not have the concurrent front end of innovation and ExCom is not yet committed to it there must be optimistic how much front end activity there is possible to develop in the three year development plan. However, to be able to improve the company's front end of innovation, the fact is that main step is to assimilate the benefits of the front end. By ExCom gradually taken the more visible role for the front end of innovation, can be ensured that there comes regularly innovation ideas, them are evaluated and discussed properly and perhaps most importantly it clarifies responsibilities which are missing in the status quo. Thereafter, the process can be elaborated and managerial practices improved to achieve efficiency in the front end.

Conclusion 1. Based on the interviews, development targets of front end phase are recognized. Thereafter, development targets are derived into a three-year development plan which follows recognized characteristics of the front end of disruptive innovation in literature.

Conclusion 2. Assimilate the company's status quo and ExCom state of mind according to the front end of innovation improvement which enables composing a comprehensive and consistent development plan.

Table 7. Answers for the research questions

Research questions	Answers for research questions
1. What is dynamic innovation capability?	Conclusion 1. Dynamic innovation capability explains how companies survive when existing competencies become obsolete and new skills are needed to develop further. It is an inimitable combination of resources which cut across all the functions in an organization. Conclusion 2. Dynamic innovation capability is an ambiguous concept which consist of subcategories that can be either internal or external to the company. Subcategories of dynamic innovation capability that affect the innovativeness of the organization are organizational culture and climate, leadership and decision-making processes, collaboration and external links, organizational structures and communication, and individual creativity and know-how.
2. How to improve dynamic innovation capability in company X?	Conclusion 1. Based on the interviews, development targets for each subcategory of dynamic innovation capability are recognized. Thereafter, development targets are derived into a three-year development plan which follows recognized characteristics of dynamic innovation capability in literature. Conclusion 2. Assimilate the company's status quo and ExCom state of mind according to dynamic innovation capability improvement which enables composing a comprehensive and consistent development plan.
3. How to improve front end of disruptive innovation in company X?	Conclusion 1. Based on the interviews, development targets of front end phase are recognized. Thereafter, development targets are derived into a three-year development plan which follows recognized characteristics of the front end of disruptive innovation in literature. Conclusion 2. Assimilate the company's status quo and ExCom state of mind according to the front end of innovation improvement which enables composing a comprehensive and consistent development plan.

5.2 Reliability and validity

In this thesis, the empirical part was executed as a theme interview. Based on the interviews were derived conclusions which factors restrict dynamic innovation capability, and which factors restrict efficient front end of innovation in company X. Thereafter, three years development plan was created in order to improve dynamic innovation capability and front end of innovation in the company. In order to evaluate how well was succeed in the thesis, can be evaluated reliability and validity. In practice, reliability refers to the extent that if the same

answers can be gathered however and whenever it is carried out. Since qualitative research represents interpretations from the results of interviews can be said that if interviews will be repeated, hardly the same results can be gathered. However, cannot be said that reliability would be poor but merely that results fluctuates because interview situations changes. (Hirsjärvi & Hurme, 2015) Validity of the survey means that if the executed research method is correctly chosen and it measured the wanted factors. (Hirsjärvi et al., 2009, p. 213) Moreover, validity can be divided into internal and external validity. Where internal validity refers to how well the researcher's understandings correspond to interviewees' understandings according to researched factors, and external validity means how well research results are suitable to move another similar case. (Eskola & Suoranta, 1996, p. 166-167)

Internal validity of thesis can be considered relatively good as authors point of views in conclusion part obey strongly both interviewees' thoughts, and issues which are presented in the literature. However, the external validity of the thesis cannot be considered so good. Meaning that results are not able to move easily for other similar cases. The reason for that is due to the heterogeneity of companies there prevails different resources, structures, processes, cultures, etc., and therefore same results are not applicable as such to utilize for other companies. Nevertheless, themes that were used in interviews can be considered efficient and valuable for some other companies if attempting to analyze and improve dynamic innovation capability and front end process.

5.3 Future development

The thesis purpose was to provide three years development plan for the company which will affect improvement on the status quo. Therefore, the next interesting future development would be to put the development plan into implementation. It would be interesting to see how each subcategory will evolve over time. To be able to monitor improvement there should be some metrics to measure how things develop and how well each development targets have been achieved in comparison to its goals.

Secondly, as the thesis concerned solely B2C organization in the company, there was left out B2B organization. Due to it, there should be executed interviews for the B2B side of the company and observe which development targets will arise and how they differ from conducted

B2C side of the organization. As the company is rather small, B2C and B2B are a bit intersected but still some distinctions could be noticed.

Thirdly, it would be interesting to study if some other subcategories would have been selected for the thesis and how much it would have been affected the results. In terms of how different subcategories would be possible to integrate for in three years development plan and how significantly they would affect the company's capability to innovate radically. Also, it would be interesting to find out which is the best set of subcategories for company X to increase dynamic innovation capability. In addition, how much that perfect set of subcategories in the company would distinct from different company's perfect set of subcategories in the same industry and more excessively another company in another industry.

6 SUMMARY

Many executives have recognized innovation as a major concern in a company, arising from the demand to differentiate and compete against experienced rivals in a fast-paced world. Moreover, companies have recognized that incremental innovation is not enough anymore, but instead they need to find something that really enhances their competitive advantage in the long term: disruptive innovation. However, due to the nature of disruptive innovation it is not easy to manage which calls for the ability to develop and reconfigure competencies in a continuously changing environment. This research focused firstly on improving disruptive innovation capability which increases the readiness to execute disruptive innovation in the company. Secondly, the aim was to clarify the front end of disruptive innovation and how it should be managed to result in clear business concepts for NPD development processes. While attempting to meet these goals a three-year development plan for the company was created.

The literature widely acknowledges that subcategories of disruptive innovation are factors that enable or disable innovativeness in a company. However, what the subcategories are that relate to organizational innovativeness, is presented differently in literature. One reason may be that different innovation types require a different set of attributes meaning that a unitary set of attributes that affects all kinds of innovation does not exist. Therefore, innovation capability can be seen as a multi-faceted phenomenon which includes both internal and external factors but also different structures. In this thesis, the subcategories that increase disruptive innovation capability in the company were chosen to be analyzed.

Thereafter, a literature review focused on examining the front end of disruptive innovation which is known to be the most important phase in an innovation process. An entrepreneurial approach was selected due to it aiming to create new resources or combining existing resources in new ways which are required factors in disruptive innovation. Moreover, critical factors of how to manage the front end phase successfully were observed such as clear vision, executives commitment, hypothesis testing, risk management, and using metrics to understand early success factors.

In the empirical part of this thesis, the material was gathered through theme interviews which is a qualitative research method. Theme interview was considered suitable for this thesis due to

the complexity of the research subject, which required drawing a comprehensive picture of the phenomenon and then making a conclusion on it. Based on the interviews the author found out what is the current state of dynamic innovation capability and front end phase in the organization, but also what are the main development targets. Thereafter, the development targets were moved into the roadmap which depicts how each subcategory should be developed within three years in order to improve dynamic innovation capability and front end phase in the company. In addition, it was considered carefully that each subcategory is evolved parallel year by year in a way that ensures a comprehensive and coherent development plan for the company. Taking into account the company's maturity phase, the first year development concentrated to increase communication, whereas the second year focused on leading by example which results in self-orientation in the organization by the third year. Regarding to the research questions, the author considered that good and comprehensive answers were provided.

Possible future development is to implement the development plan in the company in practice and to measure how much improvement will be achieved in comparison with the current state. In addition, it would be interesting to study which development targets arise for the B2B organization in company X, and what is the best set of subcategories for increasing dynamic innovation capability for the company. Moreover, it would be interesting to know how much the perfect set of subcategories in company X differs from the perfect set of subcategories for other companies in the same industry.

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