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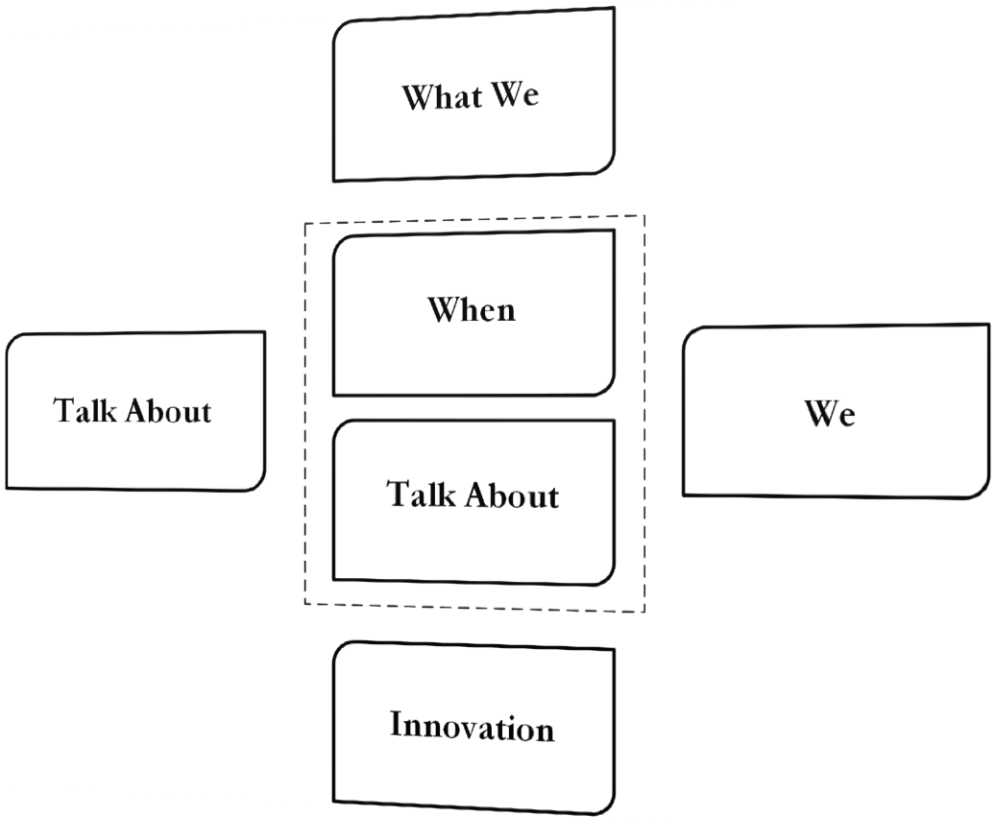

Proposing a tool for assessment of innovation capabilities through a case study at Ericsson

What we talk about when we talk about innovation

Master of Science Thesis
in the Management and Economics of Innovation Programme

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Cover:
[A s*implified and stylized illustration of the proposed assessment tool.]*

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Abstract

Managers can only recognize a problem if they are fit to identify it as such, and successfully act on it only if they understand what causes it and how to adapt to it. One area that is hard to both understand and manage successfully is that of innovation. Due to inherent aspect of novelty, managing innovation entails a large portion of uncertainty. Moreover, in an increasingly complex business environment innovation is an area that has become essential for a firm's success. The ability to successfully identify and mitigate problems related to the firm's innovation efforts is consequently paramount for firms' long-term success. It would consequently be of large importance for organizations to possess tools and frameworks that aid them in identifying issues and guide them through the uncertainty of innovation.

The purpose of this report is to develop a tool that acts as a management system that facilitates managerial understanding of innovation as well as be used as a basis for decisions and facilitate communication regarding the topic. Thereby supporting organizations in strengthening their innovation capabilities. This was done through an abductive research, including a theoretical review of previous literature, as well as 38 interviews at Ericsson. A conceptual model of innovation capabilities was developed by combining these two sources. The model was subsequently developed into an assessment tool which was applied on a single product department of Ericsson. The purpose of this application was to evaluate current innovation capabilities and support upcoming efforts, as well as verify the utility of the proposed assessment tool.

The resulting assessment tool consists of six individual elements, each with influence of the innovation capabilities of a firm. System theory is integrated into the assessment tool, meaning that all elements must be taken into consideration when it is applied. The elements are divided into two separate categories called Doing the right things and Doing things right. Doing the right things consists of two elements, Organizational intelligence and Innovation strategy & vision. These elements are presented as central due to their fundamental necessity in developing additional elements. Surrounding elements are Resources, Processes, Values and Organizational structure describing the ability for Doing things right. The assessment tool also includes a way to create a goal and an action plan to reach this goal based on the initial assessment.

Contents

1 Introduction

How humans perceive and conceptualize their surroundings completely shape their beliefs regarding the world. Determining assumptions about structure and causalities, and in turn what decisions are made (Stubbart, 1989). This is equally true for managers and their perception regarding an organization and problems within it. Managers can only recognize a problem if they are fit to identify it as such and are only able to act if they understand what causes it and how this can be adjusted (Stubbart, 1989). How the world is perceived and conceptualized is particular for each person, leading to different conceptions about what constitutes a problem and how to adjust it. Whereinafter conflicts arise around different understanding of what should be done (Ensley & Pearce, 2001). Moreover, the rationality of the human is limited by additional factors such as available information and time constraints for making the decisions (Atkinson et al., 2014). No human, and likewise no manager, thus share the same beliefs nor is fully rational. To support human decision-making, tools and frameworks can act as goggles, helping the user conceptualize how the reality can be demarcated and what causal relationships that exists (Stubbart, 1989). Thus, framing a problem to facilitate more rational decision-making and creating a shared understanding of a situation.

One area that is hard to both understand and manage successfully is that of innovation. Innovation has a multitude of definitions, mostly revolving around something with qualities of novelty that has found a valuable application (DTI, 1994). Due to the required aspect of novelty, managing innovation entails a large portion of uncertainty. This uncertainty sets the innovation process apart from regular operations, which implies fixed and effective processes, utilizing already existing resources and knowledge (Börjesson & Elmquist, 2012). In a fast paced and continuously changing environment, this uncertainty makes the ability to correctly identify what is and will be valuable and rearrange resources and processes accordingly paramount. Otherwise, efforts will be in vain as actual valuable resources might not be utilized, while incorrectly identified resources are (Danneels, 2011). The inherent uncertainty and inability to utilize existing resources and knowledge makes innovation intimidating to manage. It is consequently not unexpected that the development and implementation of innovation is not well understood among managers (Leifer, O'Connor, & Rice, 2001). It would therefore be of high significance for organizations to possess tools and frameworks that guide them through the uncertainty that the concept of innovation entails.

At the same time the economy and technology is moving at a faster pace than ever before; some even state that the market has entered a new era of discontinuity and disruption (Drucker, 1984). Correspondingly, the speed of product development has drastically increased, as product lifecycles have been reduced by half or more (Assink, 2006). This has raised awareness of the necessity of innovation on the market and many considers it to be a top priority (Lawson & Samson, 2001). The increased attention to innovation as a competitive advantage, has resulted in an improved overall performance regarding innovation. Consequently, firms need to perform at higher level to simply stay equally competitive as before. The requirements on firms are thus larger than ever before, especially if the firm is active in a technology-based market. The pace of technological development have continuously increased and seems to proceed accordingly (Lawson & Samson, 2001).

To be able to compete in a market with increasingly high demands it is a necessity to enhance the innovation capabilities of the firm. The concept of innovation capabilities is relatively recent and has emerged simultaneously out of theories as varied as resource based theory, discontinuous innovation, idea management and leadership. There is a large divergence in what definitions

different academic authors use, often due to different theoretical foundations. The disparity is even larger in how they conceptualize innovation capabilities and what building blocks it consists of. Recently, management consultant firms have entered the field of innovation capabilities from a non-academic perspective. There is also a large disparity in the discourse used by management consultants as they too approach the subject from different perspectives (Phillips, 2013). As a result, the discourse of innovation capabilities have become even more diverse. The wide variety of co-existing definitions, conceptualizations and demarcations can lead to additional frustration in managing innovation. Due to managers not using appropriate mental models in envisioning resources, problems and causalities, resulting in weak innovation capabilities.

As stated, the reason behind the divergence in academic literature regarding the innovation capabilities concept seems to be that authors' use different theoretical foundations. Some emerge from management theory striving to create a management system. Others arrive at the subject from a resource based view, attempting to identify resources and capabilities connected to better innovation performance. Another reason for the divergence is in what method authors utilize when trying to demarcate building blocks of innovation capabilities. Deriving building blocks through literature studies within management theory (Lawson & Samson, 2001) tend to result in a different perspective of the subject than an empirical study of the problem (Guan & Ma, 2003; O'Connor, 2008b).

It is perceived by the authors that one thing that all previous conceptualizations have in common is an inability to communicate what innovation capabilities is and create a mental framework that also can be used by managers to measure and manage the performance of it. Existing models are either too vague, not offering any clear connection to the reality of managers (Christensen, 2013; Moss Kanter, 2006). Or they tend to describe individual problematic elements without offering a framework in which they can be visualized or related to concrete problems (Assink, 2006; Guan & Ma, 2003; Lawson & Samson, 2001; O'Connor, 2008b). Consequently, they do not offer managers a framework or tool needed to understand and frame the reality in such a way that relationships and causal effects can be handled.

This thesis aims at filling the identified gap in previous literature and studies through the creation of a conceptual model and assessment tool of innovation capabilities. The purpose of this assessment tool is to act as a basis for decisions and facilitate communication regarding the subject through a shared understanding. The assessment tool was the result of a comprehensive theoretical analysis together with case study of the thesis partner Ericsson. The proposed assessment tool is then applied on the focal department within Ericsson to evaluate current innovation capabilities and support upcoming efforts, as well as verify its utility. The report is the result of a master thesis at Chalmers University of technology written by Björn Sjölander and Anton Holm. The master thesis was undertaken at Ericsson in the spring of 2015.

1.1 Purpose & Research questions

Based on the motivation of the thesis the following purpose was derived.

The purpose of this thesis is to generate a model that conceptualizes innovation capabilities through reviewing and comparing previous literature on the subject. The conceptual model illustrates the importance of innovation capabilities and its separate components. Moreover, it acts as a foundation for the further development of an assessment tool for innovation capabilities in a large firm. Thus, offering a tool for managerial understanding of the current condition of vital practices and potential

improvements. That can be used as a basis for decisions and facilitate communication regarding the subject through a shared understanding. The assessment tool will in turn be utilized to map out and assess the current innovation capabilities of Ericsson, as well as provide an opportunity to establish a subsequent action plan.

To clarify what specific issues will be studied, the purpose is arranged into three distinct research questions:

1. *How can innovation capabilities of a large firm be conceptualized to facilitate managerial understanding of the concept and its separate elements?*
2. *How can a tool for understanding and assessment of innovation capabilities be designed to act as a basis for decisions, as well as facilitate communication and benchmarking regarding the subject through shared understanding?*
3. *In what way can the assessment tool be applied at Ericsson to both verify the usability of the assessment tool, as well as map out and evaluate current innovation capabilities of the focal product department within Ericsson in a manner that is understandable and appropriate for managers in a business context?*

1.2 Academic contribution and motivation

There are many attempts to conceptualize innovation capabilities, however they are generally aimed at academia and further research. Almost all previous conceptual models of innovation capabilities are presented in an academic context, often describing vague structures and building blocks with the purpose of being theoretically sound. As opposed to these identified models, the purpose of this thesis is to produce an assessment tool that acts as a management tool that aids understanding of innovation capabilities and how these can be governed. Meaning that a visual and structured presentation, as well as more concrete aspects are being preferred over ambiguous elements and theoretical complexity. The thesis thus aims at contributing to the academic field through acting as a bridge between an academic and business context.

Another contribution to the discussion of innovation capabilities is the inclusion of organizational intelligence, described as managerial cognition and perception. These subjects are present in dynamic capabilities theory, depicted as the sensing of opportunities and threats as well as the ability to recognize valuable resources (Börjesson & Elmquist, 2012; Danneels, 2011; Teece, Pisano, & Shuen, 1997). However, when discussing the adjacent topic of innovation capabilities these subjects are absent. Especially, when it comes to assessment tools where it has yet to be identified. Moreover, all studied previous assessment tools are focused on assessment of individual building blocks. Thereby not discussing how to conduct an overarching analysis where building blocks are evaluated as a system. It is the perception of the authors that these are gaps in the current literature which needs to be filled. A system-level reflection as well as an inquiry regarding the mental models used by management are both vital aspects to evaluate to enable a thorough understanding of the innovation capabilities of an organization.

Many studied articles solely rely on theoretical studies to identify what innovation capabilities could be conceptualized as consisting of. This thesis proposes a conceptual model of innovation capabilities, through imbuing a theoretical foundation with findings gathered from a case study of

Ericsson. Ensuring that the conceptual model was aligned with findings of the study. Thus, only components identified during both the literature study and the case study was chosen as a part of the conceptual model. This offers value as the case study is utilized to verify the proposed conceptual model.

1.3 Why innovation capabilities is important for Ericsson

Ericsson is active in the telecom market, a market under constant rapid development, where standards and the technology base are continuously developed and substituted. The market has been particularly unstable the last years, due to privatization and rapid development of mobile technologies. Ericsson is and has been a leading actor in this industry since foundation of the company in the late 19th century. However, changing market conditions and increased competition have made it increasingly challenging for Ericsson to retain the leading position. Increasing difficulties are partly due to increased competition from actors like Huawei and the merger between Nokia and Alcatel (Nokia, 2015). Partly also due to that circuit producers and other suppliers of the telecom industry have become progressively more powerful and seek to extend their value capturing further down the value chain. All of this combined augments the necessity for strong innovation capabilities.

This novel market structure are diminishing the benefits of previous technological expertise as well as previous competitive advantages of incumbents such as Ericsson. Shorter product lifecycles due to the rapid change in technological development in the telecom industry renders technical expertise obsolete at a previously unseen pace. Moreover, a new type of customer with no previous linkages to incumbents and novel demand increases in importance (Ericsson, 2015; Meurling & Jeans, 2000). Consequently, the benefits of being able to continuously improve current technology while maintaining the capability to compete in the future has generally increased (Lawson & Samson, 2001). This puts pressure on Ericsson's capabilities to create, nurture and implement both incremental and radical innovations. Given the size, diversity and complexity of products and services offered by Ericsson this is a significant operation, both short-term and in a longer time-frame.

On a company-wide level Ericsson has recognized the necessity to respond to this change of market structure (Ericsson, 2015). Innovation is increasingly mentioned by top-management in both formal and informal arenas. An inquiry of expected market changes and technological development as well as reports on customer trends are continuously released. However, it may not be sufficient to solely rely on planning based on expected development. There might be rapid changes not identified in this plan and implementation of the plan can be inadequate. A result of this line of action, and subsequent problems, can be a focus on short-term competitiveness. Focus on short-term competitiveness is common among large incumbents as they need to focus on markets of a large size to be financially viable (Christensen, 2013). It is therefore vital for companies of Ericsson's stature to find a balance between routinizing actions to increase the effectiveness and to create and nurture innovations. Generally, routinized processes such as incremental and pre-planned development plans are seen as the main responsibility according to interviewees. Especially as incumbents tend to listen to the current customers when developing new products. Therefore, innovation outside incremental improvements might not get as much interest from management as it should.

Moreover, due to hardship in measuring the benefits of innovation efforts, it is hard to illustrate why they are valuable for a company. At the focal product department of Ericsson, effects of innovation efforts are currently measured mainly through indicators such as community of practice and number

of ideas, which are weak indicators of the entire spectrum of value that innovation capabilities produce. It is therefore important to develop a tool which can be used to define and map out problematic areas regarding innovation capabilities. Offering an understanding of what causal effects exist in the area and how to manage it. Generated knowledge can in subsequent stages be connected to initiatives aimed at reducing these problem to see in what shape the organization is today and what could be improved and how to achieve it. This would significantly facilitate the decision making connected to innovation, and the improvement of innovation capabilities. Hopefully, reducing the problems with uncertainty and short-term focus while enhancing the desire to handle this type of issues. Thus, an assessment tool that acts as a basis for decisions, through enabling understanding and assessment of innovation capabilities, would be of great value for Ericsson.

1.4 Delimitations

Ericsson is a company with 118 000 employees and worldwide presence (Ericsson, 2015), making it hard to encompass in a single case study. The size of the company makes it perceived as unfeasible to reach out to the top-level management for interviews. Furthermore, there is no large central innovation division with a clear responsibility which would facilitate a company-wide study. A company-wide study of innovation capabilities would therefore require a vast amount of interviewees at different sites. Consequently, it was decided that the assessment would be based around a single product department. This would allow a more thorough study of different aspects of the organization, such as the development organization, the business division and connected research departments. However, theories of innovation capabilities is often aimed at understanding and assessing the whole organization, resulting in a need for a translation to be applicable on specific departments. An area of focus has therefore been the interface between the studied departments and surrounding as well as the mother organization.

Inherent qualities of the concepts of innovation and innovation capabilities entail hardship in trying to assess them through quantitative analysis. Financial effects of innovation capabilities are often disconnected from the capability both causally and temporally, making it almost impossible to assign them any clear value. Neither are other indicators often associated with innovation, such as number of patents and community of practice, not accurate representations of actual performance. As a result, these types of quantitative indicators of innovation capabilities has been disfavored, while indirect and subjective performance indicators have been favored.

Before starting the thesis it was established that the goal was generate both academic value and be of high relevance for Ericsson. During initial discussions with Ericsson is was therefore decided that the result of our study should be the delivery of a model for innovation capabilities, as well as an assessment of current performance in the focal prouct department. This meant that the model should be understandable for management at Ericsson, and properly capture specific problems and situations that exists within the organization. Still, the master thesis must stay relevant from an academic perspective. This trade-off was managed through the goal to have firm theoretical roots and an appropriate use of methodology throughout the process. Results of the master thesis would therefore remain academically proper, while still offering value for Ericsson.

One of the factors that define a radical innovation is that they transform entire markets. Due to the uncertainty and difficulty to grasp in practice, radical innovation is often the focus of articles aimed at innovation capabilities. However, inherent delimitations are set due to the nature of the products and services Ericsson is providing. Its equipment has to be connected to the existing range of

network standards, and thus there are limitations to how disruptive an innovation are allowed to be as it still has to be compatible with older technology. Furthermore, an important component of the generation of the assessment tool was insights from interviews with Ericsson employees regarding experienced problems with innovation. These interviews were deliberately open and unstructured to gain an interviewee's unbiased views on the subject. Therefore the authors did not provide interviewees with definitions and demarcations on different types of innovation. It is perceived that this resulted in interviews where problems were not solely focused on radical or incremental innovation. Due to these factors the assessment tool is not solely focused on assessing the capabilities for radical innovation.

The aim of the case study at the focal department of Ericsson was to evaluate the current state of the innovation capabilities. Moreover, the assessment tool proposed in this thesis also provide support in creating a way forward and create an action plan based on the current situation. However, the authors will not investigate how possible actions to change or improve the state would be manifested. Instead, this is seen as the next step that the focal department of Ericsson must take.

2 Theoretical Framework

The following chapter presents the theoretical framework that is utilized when constructing the proposed conceptual model and assessment tool of the thesis. The theoretical framework will initially discuss the concept of innovation through comparing and assessing different definitions. Followed by a similar discussion regarding the concept of innovation capabilities. Both discussions will be concluded by the proposition of an own definition utilized in the thesis. Finally, theoretical background of cognition and strategy will be presented. Chapter 5 and 6 will present the proposed conceptual model and assessment tool of this thesis, which will introduce further literature as the models are defined.

2.1 Innovation

It is obvious that there are a multitude of co-existing definitions of innovation, as different authors do not use the concept in an interchangeable manner. This is even more apparent as a phrase like "Innovation, as I use the term…" is used in the definition by one author (Wolpert, 2002). The concept however always revolves around a novelty which has found an area of application. Sometimes defined as simply as "the successful exploitation of new ideas" (DTI, 1994; Francis & Bessant, 2005). Other definitions are more focused on the opportunity-aspect of innovation, such as "the recognition of opportunities for profitable changed the pursuit of those opportunities all the way through to their adoption in practice" (Baumol, 2002). There are also definitions that try to narrow it down to what value it creates, such as "The process of successfully creating something new that has significant value to the relevant unit of adoption." (Assink, 2006).

All of these definitions create a vital distinction from the concept of invention, which denotes something novel that must not have found any application (Garcia & Calantone, 2002). Moreover, innovation can also be described as a process. This includes the perception of a novel market or opportunity as well as the development, production and marketing necessary for the commercial success of an innovation (Freeman, 1989; Garcia & Calantone, 2002). Thus, the innovation concept can be either a noun or a verb. Meaning that it does not necessarily revolve around artifacts. Finally, Drucker (1984) simply explains innovation as the means by which an entrepreneur generates new wealth-producing resources or enhances existing resources with additional potential. Empathizing that the context in which something is created is vital for it to be an innovation.

Within the concept there are further distinctions to be made to differentiate between innovations of different types. One central distinction is based upon the level of innovativeness or degree of novelty. Often labeled on a scale from incremental to radical innovation (Garcia & Calantone, 2002; O'Connor, 2008b). Incremental innovation refers to novelties that are within the boundaries of current market or technology and processes of a firm (Assink, 2006). Thus withholding the status quo within a firm or industry (Garcia & Calantone, 2002). On the other end of the spectrum there is radical innovations which, by definition, transform existing markets to create new ones (O'Connor, 2008b). What drives the creation of a new market is either explained by inherent qualities of unprecedented performance features of the product itself (Assink, 2006; Leifer et al., 2001). Or the transformation can be explained by a redefining or reframing of a concept, which significantly transform the demand or needs of a market. Thereby disrupting existing key players or practices (Brown & Eisenhardt, 1997).

A fundamental aspect of innovations of a more radical character is that they include increased uncertainty, due to novelty of technology or market formation. However, it also entails large opportunities if it can be utilized as a competitive advantage (Assink, 2006). This uncertainty sets the innovation process apart from regular research, which implies a controlled process for inducing knowledge and finding the answer to an already formulated question. As well as product development, which utilizes already existing resources and knowledge (Börjesson & Elmquist, 2012). Moreover, uncertainty regarding the value of the result of an innovation activity is a necessity. Neither is it possible to know evaluation and performance criteria before the innovation is already successful (Le Masson, Weil, & Hatchuel, 2010).

It has been shown that innovation is a necessity for long-term success and that firms that succeed at innovation of radical nature can reach supranormal returns (McDermott & O'Connor, 2002; O'Connor, 2008b). Moreover, it has been found that decline is inevitable for a firms that does not succeed in innovation (Hamel, 2002). Additionally, innovation has become a necessity in the global economy, as seen in a 1999 study by The Economist, as nearly 50 % of US economic growth at the end of 1990 came from markets that did not exist only a decade earlier (Wolpert, 2002). Some even argue that virtually all economic growth since the 18th century is due to innovation (Baumol, 2002). The combination of being both a necessity and risk therefore makes it vital for firms to succeed at radical innovation.

How innovations, primarily radical innovations, are developed is often a complex and unstructured process. Incremental innovations can be fostered through regular research and development processes, utilizing structured methods as stage-gate (Assink, 2006). Due to that the definition of incremental innovation entails novelties that are within the boundaries of the current market or technology of a firm. Thus, it is suitable to employ defined processes and planned activities during incremental innovation (Backman, Börjesson, & Setterberg, 2007). This is not possible, per definition, during innovation of more radical nature as it involves high uncertainty and the disruption of the current market or technology (Brown & Eisenhardt, 1997). Still, as stated, it is vital that firms develop the capacity to develop radical innovation to stay competitive (Hamel, 2002).

Thus, firms cannot support this vital capability by old structures and defined processes and consequently require other means of support (Backman et al., 2007). Instead the mechanisms that facilitates incremental innovation and existing operations might act inhibiting to the uncertain and disorderly process of radical innovation (Sharma, 1999). Christensen found that this was one of the main reasons why large incumbents often failed to stay competitive when their operating market was affected by radical innovation, while new entrants often became dominant in the new market (Christensen, 2013).

Based on the conducted literature study, the following definition of innovation has been chosen.

The creation and successful exploitation of something novel.

2.2 Innovation capabilities

The following section discusses the theoretical foundation of the concept of Innovation Capabilities as well as a comparison between the different definitions and usages of it. Resulting in a proposed definition of innovation capabilities. Furthermore, it describes and compares how different authors delineate the building blocks of the concept to identify similarities and differences in previous attempts.

2.2.1 Theoretical foundation of the concept

As stated previously, simply relying on incremental innovations in the current competitive landscape leads to a situation where the firm lose its competitiveness (Bower & Christensen, 1995; Danneels, 2011). Incremental innovations are a necessity in a short-term perspective to trump competitors in an established market, but eventually a radical innovation might emerge, making incremental innovation to the firm's product inconsequential. However, where short-term incremental innovation can be governed by old structures and defined processes, organizing a firm for more radical or disruptive innovations is notoriously difficult. The firm's ability to succeed in continuously introducing incremental innovations for existing products while simultaneously working on more radical offerings is therefore frequently stated as being a main competitive advantage (Bower & Christensen, 1995; Lawson & Samson, 2001; Leifer et al., 2001).

The innovation capabilities concept is preceded by the notion of evaluating the competitiveness and performance of a firm through a resource-based view. Instead of judging a firm by its products, services or market position, it views each firm as a collection of tangible and intangible resources and capabilities (Lawson & Samson, 2001). Competitiveness is grounded in how valuable, rare, inimitable and non-substitutable the firm's resources is within the industry in which the firm is active (Teece et al., 1997). It is suggested that a firm's resources are "sticky" and cannot easily be replaced, due to path dependence, complexity and inability to trade a specific resource. Competitiveness is rated by the firm's ability to develop new value and offers from these resources and capabilities, rather than the offers themselves (Lawson & Samson, 2001).

Capabilities are combinations of resources and transcends departmental boundaries and functions within the firm, signifying what a firm is able or not able to accomplish (Börjesson & Elmquist, 2011). A capability might therefore be constructed by tangible resources present in distinct functions, or by less tangible resources such as firm values and organizational learning (Christensen, 2013; Lawson & Samson, 2001). A firm's core capabilities are those that distinguish the firm in the market. However, the valuableness of the firm's resources and capabilities are not inherent, but dictated by its context and competitive environment. The demand of the firm's resources are furthermore decided by external causes such as economic cycles or political changes. Thus, as external conditions change, the core capabilities may turn into core rigidities as they lose their competitive value (Danneels, 2011; Prahalad & Hamel, 1990; Teece et al., 1997).

New market conditions requires the firm to alter its competitive resources and capabilities accordingly. Pisano and Teece (1997) states that the firm's ability to adapt to and overcome these market changes by integrating, building and reconfiguring capabilities are labeled dynamic capabilities. Thereby reflecting the capacity to overcome path dependencies, transform obsolete resources and maintain competitiveness. As products and services are constructed from an increasingly wide range of technologies, it is of essence that the firm has the ability to rearrange capabilities and maintain competiveness (Lawson & Samson, 2001). Dynamic capabilities is one group of capabilities connected to the certain type of knowledge or ability it contains. Other similar groupings are integrative capabilities, denoting knowledge related to the ability to absorb knowledge from external sources, and learning capabilities, denoting the ability internalize experience gained from previous attempts (Lawson & Samson, 2001).

2.2.2 Principles of innovation capabilities

Similarly, innovation capabilities is the group of capabilities related to the ability of the firm to accomplish the task of repeatedly producing innovations (Lawson & Samson, 2001). The concept of innovation capabilities is relatively new, and how these capabilities should be defined differs between authors. One of the earlier definitions was “the comprehensive set of characteristics of an organization that facilitate and support its innovation strategies” (Burgelman, Kosnik, & Van den Poel, 1988), focusing on the strategic intent of the firm as the point of departure. Björkdahl and Börjesson (2011) states that innovative capabilities are “the set of practices aimed at enabling the assembly and integration of resources to achieve innovative outcomes”. It has also been described as the ability to deploy available resources (Prahalad & Hamel, 1990) and the ability to utilize organizational resources for the purpose of achieving a particular result (Helfat & Peteraf, 2003). These definitions makes the theoretical foundation of the resource-based view explicit.

Other definitions, such as Saunila and Ukko (2012) simply states that innovation capabilities are elements that influences the firm’s capability to nurture and manage innovation. Assink (2006) describes innovation capabilities as “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” (p 219). Thereby highlighting the importance of the context and surrounding market in which the innovation is developed. When comparing different definitions, it becomes evident that authors have contrasting viewpoints regarding what degree of novelty that innovation capabilities should support.

Lawson and Samson (2001) describes innovation capabilities as a higher-order capability, depicting the ability to mould and combine multiple lower-order capabilities. Organizations in possession of this are more able to integrate key resources and capabilities to stimulate and foster innovation. Börjesson and Elmquist (2012) argue that there are similarities between dynamic capabilities and innovation capabilities, for example their focus on re-configuration of assets. Nonetheless, they are separate as innovation capabilities are a higher order capability, of which dynamic capabilities are of the lower orders that compose it.

O'Connor (2008a) describes innovation capabilities as a combination of three blocks; Discovery, Incubation and Acceleration, including an interface between individual blocks and towards the rest of the organization. It is stated that these building blocks together form a complex system of interdependent elements that need to be present within an organization for the ability to commercialize radical innovations on a repeatable basis. Highlighting that a system supporting major innovation is a complex set of supporting and continuously interacting elements of a management system. Which is far more complex than each specific element, and especially more complex than individual operating routines or ways of supporting idea champions (O'Connor, 2008b). Christensen (2013) also describes the ability to overcome obstacles of disruptive innovation as consisting of building blocks, namely those of resources, processes and values.

Innovation capabilities best can be seen as the innovation muscles necessary to withhold the character of preparedness of innovation capabilities to nurse competitiveness through innovation, as described by Börjesson and Elmquist (2012). Thus, creating a vital distinction from the concept of innovation performance. Innovation performance is the subsequent results of the actual usage of these “muscles”. The measurement of innovation performance is however notoriously hard, as innovation efforts are disconnected from financial outcome both causally and temporally (Saunila & Ukko, 2012). It is also vital to understand that these innovation “muscles” are not a one-time effort, but a set of continuous practices enabling and facilitating innovation. Another usual misconception is that innovation capabilities are solely the firm’s creative capabilities. However as Sharma (1999) states “Indeed, left to their own devices, a group of experienced individuals can have an impressive

array of innovative ideas ricocheting of the walls in minutes". Thus, a creative culture is merely one building block of many that together creates innovation capabilities.

There are also similarities and trends in the models created by earlier authors. Recent research are leading towards viewing innovation capabilities as a system, where each building block are interdependent and necessary for the system to be functional (Assink, 2006; Börjesson & Elmquist, 2012; O'Connor, 2008b). A system is a complex of elements in mutual interaction where each individual element does not only depend on it internal conditions, but to some extent also on the condition of other elements within the system (O'Connor, 2008b). Thereby acting opposite to how a firm is presented in ordinary management literature. According to this ordinary business literature, corporations are composed of a large amount of functions and units, connected in a network of processes. In search for efficiency, processes within the firm are routinized to reduce risk and ambiguity (O'Connor, 2008b). These routines can then be evaluated in isolation from each other.

However, radical innovations are as described earlier the outcome from a highly uncertain environment that needs situational-specific knowledge, and thus a process-view is suboptimal when describing radical innovation capabilities. O'Connor (2008b) proposes instead that necessities for adequate innovation capabilities should be viewed as a system comprised of elements relevant for the realization of radical innovations. As stated earlier by Lawson and Samson (2001), innovative capabilities are a higher-order group of capabilities, merged together from several lesser elements within the firm. These elements may be in the form of functions, processes, values or some other distinction, and are not mutually exclusive in any way. Thus, the innovation capabilities in a firm can be described in the shape of a complex system that is feasible to describe theoretically but difficult to improve in practice.

The authors' proposed definition of Innovation capabilities is:

"A set of practices enabling the ability to continuously generate and develop novel ideas and opportunities to achieve competitive advantage through valuable and marketable innovation."

2.2.3 Building blocks of innovation capabilities according to previous literature

As described, there are both differences and similarities between previous definitions of innovation capabilities. However, most authors agree on the large importance innovation capabilities has and the most basic qualities of it, such as that it in some manner supports innovation within the firm. Although, exact definitions and the conceptualization of what innovation capabilities consists of, and what makes some companies more successful than others, are more diverse. Nonetheless, conceptualizations often concern how the organization arranges capabilities and resources or perform in specific practices to enable innovation. Which is similar to how the related area of organizational capabilities is described as consisting of bundles of resources transcending departmental and functional boundaries (Lawson & Samson, 2001).

Most conceptualizations follows the same path and tries to conceptualize innovation capabilities as consisting of building blocks, each with influence of innovation capabilities. A collection of different authors' attempts in defining and demarcating these building blocks are presented in *Table 1*. The qualities of the building blocks and their relation to innovation capabilities and each other are vastly different in different attempts here. Some models describe higher-level perspectives from which the structure supporting innovation capabilities can be described (Christensen, 2013; Moss Kanter, 2006), others describe problematic areas fundamental for success while still offering a broader

perspective (Börjesson & Elmquist, 2012; Lawson & Samson, 2001; O'Connor, 2008b; Rådesjö & Sandström, 2013; Saunila & Ukko, 2012), while a few highlights more specific problems related to innovation (Assink, 2006; Guan & Ma, 2003).

The purpose a model serves is a main influence of how it is conceptualized, resulting in large discrepancies regarding what building blocks are present and how general these are. Assink (2006) identifies inhibitors to innovation capabilities while highlighting concepts like organizational attitudes and mental models to offer a list of areas that must be managed. Meanwhile, O'Connor (2008b) identifies seven elements that together forms a framework for a management system, offering managerial understanding of how these are interrelated and how they affect innovation capabilities. Guan and Ma (2003) in turn, attempts to statistically prove the influence of individual factors resulting in another type of system. Thus, the different purposes behind the creation of the models seems to be the main reason for this type of divergence. Both Assink (2006) and Guan and Ma (2003) tries to highlight specific problems vital for succeeding in innovation, while O'Connor (2008b) aims at creating a comprehensive management model. Differences like these, due to the purpose of the model, is identified throughout the literature review.

Table 1 - Elements of innovation capabilities according to previous articles

Lawson & Samson (2001)	Vision & Strategy	Harnessing the competence base	Exploration & Idea management	Org structure & systems	Management of tech	Culture & Climate	Organisational intelligence
O'Connor (2008B)	Requisite skills	Exploratory processes	Identifiable org structure	Interface mechanisms	Governance & decision making mechanisms	Appropriate performance metrics	Appropriate culture and leadership context
Börjesson & Elmquist (2012)	Knowledge base	Strategy	Exploration	Org. Structure	Technological development	Managerial systems	Values/norms
Assink (2006)	Organizational rigidity	Inability to unlearn & out of sync cognition	Attitute towards risk	Innovation process management	Infrastructural problems		
Saunilla & Ukko (2012)	Leadership & Decision-making processes	Org. structure & communication	Collaboration & external links	Organizational culture and climate	Individual creativity and know-how		
Rådesjö & Sandström (2013)	Org. structure	Culture & Learning	Innovation strategy & vision	Leadership & Innovation management	External linkages	Implementation	Creativity
Moss Kanter (2006)	Structure	Strategy	Process	Skills			
Guan & Ma (2003)	Learning Capability	R&D Capacity	Resource exploitation capability	Manufacturing capability	Marketing Capability	Organizational capability	
Christensen (2013)	Resources	Processes	Values				

What elements are present and how they are divided are also largely divergent in the different attempts seen in table X. Even models with similar purpose display these differences, such as Lawson and Samson (2001); O'Connor (2008b), Saunila and Ukko (2012) and Börjesson and Elmquist (2012). Many of the building blocks are present in several models, but how they are grouped together seem rather arbitrary. However, it should be highlighted that some building blocks are present in almost all models, such as innovation strategy, exploratory processes and organizational culture. Nonetheless, these building blocks, although similar, are still divergent in the definition offered by different authors. For example exploratory processes as described by O'Connor (2008b) focus on qualities of processes that are necessary to integrate uncertainty into innovation. While exploration as described by Lawson and Samson (2001) focus on the ability at generate ideas. Still, there seems to be underlying assumptions and root-causes that these labels try to pin down. Due to that many models are generated independently, it is believed that building blocks that are often included are reasonable assumptions of what innovation capabilities entails.

Another divergence among previous literature on the subject is how the models, and their building blocks, were generated. Some authors, such as Lawson and Samson (2001), state that all building blocks of the model are derived from literature of management of innovation. Not offering any further justification of why these specific building blocks were chosen. O'Connor (2008b) derived her conceptual model, and building blocks, from an empirical study of twelve large companies. This study is presented together with the results, offering much stronger arguments on made demarcations. Other, as Börjesson and Elmquist (2012), Rådesjö and Sandström (2013) and Saunila and Ukko (2012) utilize a comparative literature study on previous articles to prioritize among identified building blocks. Although no full-fledged reasoning behind each individual element, nor the grouping of them, have been identified in any of the studied articles; reinforcing the notion that demarcations are done comparatively arbitrary, based on the mental framework of respective author.

2.3 Managerial perception and cognition

Cognition theory describes that human activities are derived from how the world is perceived and interpreted by a person. These perceptions are derived from the human need to filter and make sense of the surrounding world, through creating mental representations to demarcate and structure the real world into manageable fragments (Stubbart, 1989). A vital aspect of cognition theory is the influence that intentions have in how we make sense of the world. Humans, and managers, make choices not mainly by habits, routines or repertoires, but due to internal intentions or reasons. Thus, there is a free will to how we chose to interpret and structure the world surrounding us and how we act upon this. Nonetheless, this does not mean that the intentional action is always correct. Neither is this process always conscious (Mintzberg, 1978).

Moreover, humans act on mental rules describing when specific responses are valid. This computational function guides human activities through operation mechanisms for encoding, locating, changing and using mental representations (Stubbart, 1989). It is also vital to recognize that not only the individual cognition is of importance for organizational performance. It is vital that mental models are shared by management to ensure a high performance (Ensley & Pearce, 2001). Moreover, the ability to transfer knowledge between people and departments in an organizations, largely influence its performance. Thus, making the integration of knowledge in tools and frameworks when communicating and interacting within the company a competitive advantage (Argote & Ingram, 2000).

Vital for firms to successfully utilize and leverage their resources on the market is the managers' ability to understand the market, as well as what resources are available, valuable and desired. Managers have mental models by which they interpret the market and how to react to challenges and changes. This include aspects such as the demand of customers, what product categories that exist on the market, and what value is offered by the firm. These mental models are called a resource schema and is a process of subjective self-conscious inquiry. This implies that the schema can be altered to better align with the real situation of the firm. An inaccurate conceptualization of resources can be detrimental to the demise of a firm, as it will be impossible to leverage resources that are actually important due to an inability to recognize which they are. In a similar manner, incorrect mental models regarding what customer demand and existing product categories can lead to erroneous decision-making (Danneels, 2011).

2.4 Strategy

Business strategy is a field within management literature which covers how a firm plans to act and compete over a long-term perspective. It incorporates both internal abilities and qualities of the firm, such as resources and capabilities, and analyses them in light of external factors, such as threats and opportunities. Lawson and Samson (2001) describes strategy as something that "determines the configuration of resources, products, processes and systems that firms adopt to deal with the uncertainty existing in their environment". The objective of a firm's strategy is to direct the firm into reaching a certain performance or goal. A firm's innovation strategy therefore describes to what extent the firm incorporates present and future innovations to reach this goal (Gilbert, 1994). Lawson and Samson (2001) state that a successful innovation strategy requires a clear articulation of a common vision that the whole firm is moving towards. A strategic direction is necessary to explicitly institutionalize innovation for avoiding loss of attention and ambition. Furthermore, if the firm's direction is understood throughout the organization, employees have a better notion of what problems or obstacles they may face ahead, giving them better opportunities to come up with creative solutions. Offering a common strategic direction regarding innovation also makes it an explicit parameter to consider during decision-making (Gilbert, 1994).

Porter (1980) distinguishes between innovation leaders and innovation followers based on their willingness to be in the forefront of technical development. The former is generally first with releasing technological novelties on the market and develops technically superior products, while the latter releases products with similar performance at a later stage. Innovation leadership entails a risk as the firm must allocate a larger proportion of available resources on industry analysis, responsiveness to customer demands and other innovation activities. However, the firm might also reap substantial profits due to Schumpeterian rents (Porter, 1980). Innovation followers however have the benefits of avoiding the first-mover risks that are inherent to really novel products. Björkdahl and Börjesson (2011) argue that the innovation goal of the firm must be aligned with the firm's overall strategy. Thus, if the strategy of a firm is to be innovation leaders, its innovation strategy must be aligned to ensure continuous attention and ambition as well as adequate resource allocation.

3 Methodology

This chapter will discuss the process and methodological choices made during the thesis. Initially, the main outline of the thesis process will be described shortly, including both the theoretical review and the abductive case study at Ericsson. Secondly, choices and arguments for research design will be discussed, to present how the purpose of the thesis shaped choices regarding how the process was designed. Methodological choices and considerations concerning the design of the conceptual model and assessment tool will then be presented. Finally, the research method will be presented, including with how factors as sampling and interview setup affected gathered data, followed by a discussion about research quality in qualitative studies.

3.1 Research Approach

The thesis began with choosing a specific topic to study, namely that of innovation capabilities. The topic was narrowed down as the research design was elaborated. It was established that the thesis should be two-folded with a theoretical exploration as well as a case study. This initial phase consisted mostly of an explorative theoretical study through reading and reflecting on previous articles on the topic. Throughout this process, potential thesis partners were contacted to see if they were open for collaboration. Writing the thesis together with a company partner was desired, to facilitate the generation of both business and academic value. It was identified that the focal department of Ericsson sought understanding and development of their innovation capabilities. This strive was clearly aligned with the purpose of the thesis, leading to the forming of a partnership.

It was decided that the main purpose of the thesis should be the development of an assessment tool for innovation capabilities which facilitates managerial understanding and decision-making regarding innovation. The purpose was derived from the main identified challenges within the topic. Initially, there has been long and ongoing debates in the academic field regarding the conceptualization of innovation capabilities. However, there is no consensus in how to model the concept, or even define it. Secondly, a large amount of firms do not even recognize the need for innovation capabilities, but sees it as a luxury. Furthermore, even though a firm do recognize innovation as being vital for long-term profit for a firm, many do still not develop or work with innovation capabilities explicitly. To enable the thesis to produce both academic and business value, the purpose of the thesis was the resolving of identified challenges.

Even though assessment tools for innovation capabilities are plentiful, pre-defined tools were not deemed appropriate for the thesis. This was due to that previous assessment tools did not overcome the identified challenges within the topic. Chiefly due to that previous assessment tools were not perceived as being pedagogical and comprehensive enough to enable managerial understanding and facilitating decision-making. Thus, they would not act as a tool for motivating management to enhance the innovation capabilities of a company. The proposed assessment tool of the thesis would fulfill this criteria through outlining both the need of managerial commitment and understanding, as well as provide a connection to subsequent activities aimed at enhancing innovation capabilities. Nonetheless, previous assessment tools were continuously used as inspiration and theoretical foundation during the development of the proposed assessment tools.

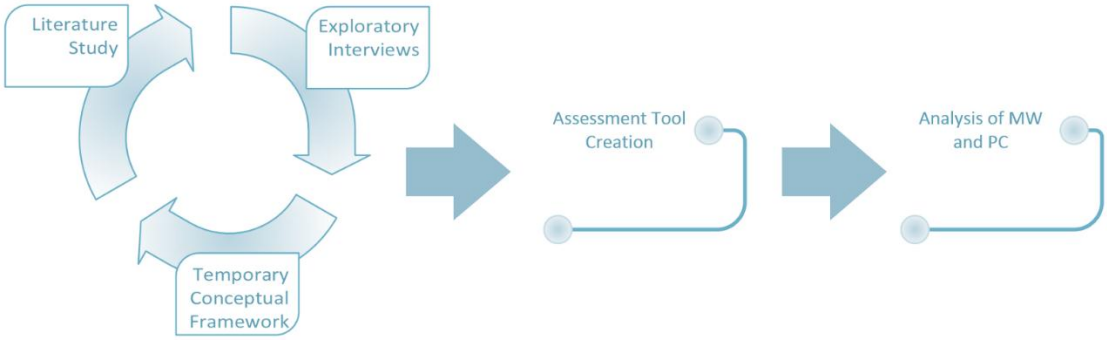

Figure 1 - The iterative process of developing a conceptual model and assessment tool.

In parallel with the theoretical exploration, a case study at Ericsson was conducted to align the initial conceptual model with observations from an authentic setting. An iterative process was thereby utilized, so that knowledge gained during the case study was continuously integrated into the conceptual model. Thereby, an abductive approach was utilized during the study (Dubois & Gadde, 2002). At the same time, theoretical understanding was utilized to gain deeper insight into the setting of the case study. This iterative process was concluded with the proposing of an assessment tool for innovation capabilities. To be able to verify and strengthen the utility of the proposed assessment tool, as well as offer an assessment of the current innovation capabilities at the studied department, it was applied at Ericsson. The study at Ericsson included a large amount of interviews with employees in various position to get a comprehensive understanding of the organization. Furthermore, a smaller study at a second product department of Ericsson was conducted to establish whether the assessment tool could identify departmental differences and to what extent innovation capabilities in departments within a larger organization could diverge.

The purpose is developed into more specific research questions, aimed at facilitating the ability to identify what type of data was necessary to answer them and thus the thesis to fulfill its purpose. Consequently the next step was to determine what type of data was needed to answer the chosen research questions, as well as how to achieve this (Bryman & Bell, 2011). Due to the inherent difficulties of measuring innovation capabilities in a quantitative matter (Saunila & Ukko, 2012), it was decided that a qualitative study was better suited. A case study is concerned with the complexity and particular nature of a specific organization or location and is therefore a fitting research design for fulfilling the purpose of the study (Bryman & Bell, 2011). Therefore, it was also recognized that a case study was most suitable for the area of innovation capabilities, together with a theoretical review. Thus making the research design two-folded. This was aligned with the research questions as the generation of a conceptual model would be aided by constant iterations between data collection and theoretical exploration.

It was perceived that a case study would enable necessary data collection from an organization to define and arrange the area into specific demarcated problem areas. These demarcated areas could then be explored through further theoretical exploration. Furthermore, this would enable the answering of “why” and “how”-questions as well as offer a way to study a situation not possible to control (Yin, 2003). Hence, data gathered from a real-world example could be analyzed and defined to form new theory, while this theory was utilized to gain ability to gather additional relevant data. Identified issues and problems were thus incorporated with theoretical knowledge to enhance the ability to create an exhaustive and improved conceptual model. This iterative process is illustrated in Figure 1 above.

The choice of conducting a case study resulted in a study of an inductive nature. An inductive study is research that is built by initially gathering data, which in turn is used to create theory or hypotheses (Bryman & Bell, 2011). No clear hypothesis had to be tested, but rather theory was to be derived from the data collected during the case study. It could also be argued that the incomplete set of data gathered through observation and interviews meant that the study had an abductive nature. Patterns and problems within the organization were gathered and presented together, so that a most likely explanation in literature was found (Dubois & Gadde, 2002). Moreover, the use of previous literature as a basis for the conceptual model, meant that elements of a deductive study was also present. This was due to that an initial understanding was required to accomplish the initial assessment of the company.

The creation of a conceptual model fulfilled the purpose of delivering academic value. However, the purpose was two-folded and also included generation of business value. To deliver this value, as well as enhancing the academic value through testing the model on an organization, it was decided that the generated conceptual model was to be utilized within the studied organization to measure its innovation capabilities. To ensure that the tool is able to identify small variances in the current state of innovation capabilities it was deemed necessary to compare the results from more than one department. Nonetheless, the business value was to be delivered to one single department, while other studied departments was seen as points of reference.

The unit of analysis was chosen to be on a departmental level of Ericsson. The main reason for this decision was that the data possible to collect would be of higher quality if only one department was studied. The higher quality was due to interviews with the top management of the company was believed to be too unattainable, while it would be possible to interview top-management of the department. Furthermore, since there is no central innovation department, data gathering on a company-wide level would be scattered. Resulting in an inability to gain a comprehensive and thorough understanding of the setting. Moreover, a study on a departmental level would enable an inquiry of an adjacent department. This would offer a point of reference to evaluate which traits affecting the innovation capabilities are specific for the department and which are given from a larger context. Consequently it was decided that a smaller study should be conducted at an adjacent department within the same firm.

3.1.1 Creation of the conceptual model

As mentioned, the initial study of the topic of innovation capabilities yielded the knowledge that previous assessment tools were not pedagogical or possible to be utilized in a business context. Previous models and assessment tools found in literature often had the desire to be thorough and theoretically sound, however mostly aimed at other academics. The purpose of this thesis was however to produce a model that overcomes these identified challenges, so that it might be used as a tool to facilitate managerial understanding and decision-making. Thus, a broad theoretical study was conducted to identify models and concepts that are utilized to a large extent by management, such as PEST-analysis, value chain models and balanced scorecards. These models were analyzed to identify what aspects made them pedagogical and relatable outside an academic context. Aspects believed to be helpful and pedagogical were used as input in the subsequent development of the proposed assessment tool.

Early on, it was recognized that the process of searching and selecting among articles during the literature study can be problematic in itself. Nonetheless, initial choices in this phase largely influences subsequent decisions regarding the content and design of the assessment tool. The

concept of innovation capabilities is a rather new and narrow area of study. Authors in the field of innovation capabilities tend to reject other nearby academic areas, covering the topic of innovation, as they perceive these as too structured and process-focused. Nonetheless, there might be relevant and valuable knowledge lost in this current strive towards differentiating innovation capabilities from existing fields of knowledge. This was largely recognized and the reason why a broader scope of literature was studied in the initial phase of the literature study. Thus, a large and broad theoretical study was undertaken on the topic to produce a general knowledge and understanding of the subject of innovation. The initial literature study was therefore not only focused on innovation capabilities, but also literature on the topic of innovation, systems theory, measurement in conceptual models and innovation economy.

Eventually the theoretical study was narrowed down and focused on articles about conceptual models of innovation capabilities. A quantity of articles on the subject was identified and studied to generate an initial understanding of what innovation capabilities consists of. It was quickly understood that the creation of models on the topic is not an objective science, but the "innovation cake" can be cut in a multitude of ways depending on what the conceptual model is trying to explain or define. The reasoning behind the chosen content and design of the proposed conceptual model is derived from identified challenges in previous literature. For example, the number of elements included was due to recognized problems with previous models including either too many or too few elements. Too few elements would make the elements too abstract and not connected to real-life aspects. On the other side, too many elements would lead to the model becoming cluttered and hard to grasp.

The theoretical study resulted in an initial conceptual model based on the current understanding of the innovation capability concept. The purpose of the model was however not to be used as innovation capability audit at the company, but act as a model to identify real-life problems during the first round of interviews. It was also constantly iterated and reconfigured as the interviews began to make the understanding better. Some issues raised by respondents were not even discussed in literature, while issues often discussed in literature were deemed inconsequential in reality. The model that appeared during this process consisted of several elements with an influence on innovation capabilities, chosen by cross-referencing previous literature with data from interviews. These elements were divided into smaller, often more concrete, sub-elements which then were joined to create theoretical constructs which were clearly demarcated from each other. The use of both more concrete sub-elements as well as larger elements, were also a part of preparing for the creation of an assessment tool that was easy to understand and use.

3.1.2 Building the assessment tool

When the conceptual model had been established, the process of generating an assessment tool was continued with a narrowed down literature study, together with more focused interviews of employees at the studied organization. The continued literature study aimed at identifying more concrete issues regarding innovation capabilities. At the same time, using the established conceptual model, a questionnaire focused on specific issues and sub-elements were developed. The questionnaire also included concrete indicators for each sub-element, to enable probing within each individual sub-element. These were also gathered through cross-referencing theoretical findings with data from interviews.

One problem identified with using data gathered from interviews as input to the assessment tool, was difficulties of knowing to what extent the factors identified by respondents could be said to be

real problems or factors of innovation capabilities. It is not given that elements highlighted by a single employee is a valid factor with causal effect on innovation capabilities. However, if certain elements or problems were highlighted as central by several employees, or if they could be related to factors also identified by other authors, they were deemed adequate. Additionally, data gathered during interviews were used to frame elements and sub-elements of the assessment so that they would be better aligned with the real world. This included the usage of terms and language deemed relatable to management when depicting elements, as well as grouping specific issues in a way aligned with management perception.

As stated earlier, it had been decided that the assessment tool would be of qualitative nature due to the hardship in quantifying innovation performance. Thus, to enable a point of reference for the results of the assessment of current innovation capabilities, a way of framing them was required. Moreover, a parallel project of developing a conceptual model for innovation capabilities was ongoing at an adjacent department within Ericsson. To include a point of reference for current innovation capabilities, as well as align the proposed assessment tool with the adjacent ongoing project, variables of a target state, an action plan to reach the goal and indicators to measure actions, were included. These variables were derived from the initial broad theoretical study, as well as influenced by the conceptual model of the adjacent ongoing project.

Furthermore, the unit of analysis had an impact on how the conceptual model was designed. Previous models had only targeted whole firms and organizations, making it unfeasible to directly utilize their reasoning. Systems theory was used as a way to make the process easier of comparing the conceptual model to previous literature. As the department can be seen as a system within a larger system, it is both autonomous and interrelated in relation to the larger system to some degree. When developing the assessment tool this was continuously taken into account and integrated.

During both the first round of interviews and during the assessment, facts about the organization and processes within it was also collected. As Ericsson is a huge international company with a large product variation and global coverage, processes and responsibilities are complex and requires input from various sources. This was to enable the contextualization of gathered data to be able to distinguish between universal and company-specific issues. This context provided a better overview of the interface between departments, as well as a context for better understanding of Ericsson's strategic intentions. Nonetheless, to make the assessment tool applicable outside the studied organization, issues deemed as company-specific were disregarded and others were generalized. When applying the assessment tool at the focal department of Ericsson, issues were once again described in their context. This is due to that it is believed that, although the assessment tool in itself is suitable for assessment of any organizations, all results should contextualized for a comprehensive understanding.

3.2 Research method and data collection

After it had been established that the research design of the thesis was a case study together with theoretical exploration, relevant methods of gathering necessary data were assessed. The research method must be aligned with the research design in a way that it provides the relevant data necessary to fulfill the purpose of the study (Bryman & Bell, 2011). It had also been established that the study should be of a qualitative nature, including the exploration of issues as perceived by employees of the studied organization. Consequently it was decided that the main method of data

collection should be interviews. However, official documents were also utilized to gather specific information, as well as to create a context for the department.

3.2.1 Sampling

The focal department of Ericsson is a large organization with more than 300 employees located at a variety of locations. When choosing whom to interview it is therefore necessary to reason how the chosen sample affects what data is obtained (Bryman & Bell, 2011). The first round of interviews mostly consisted of employees referred to by our advisor at the studied organization. Since this person was rather critical of existing innovation efforts, and thus wanted an analysis of innovation capabilities within the department, these persons may have had the same inclination. This might result in an amplified perception of to what degree issues exist and affect innovation capabilities. However, it is still believed that this is primarily advantageous since critical personnel to a larger extent might have reflected upon issues and underlying causes. Furthermore, the assumptions of overly critical employees have been recognized and considered during analysis of data gathered from interviews.

Respondents for the second round of interviews was found using the method of snowballing, as well as further recommendations from our advisor at Ericsson. Snowballing is a non-probability technique of sampling where subjects of a study is asked for further subjects to enlarge the area of study. Enabling a reasonable amount of data to be gathered for analysis (Bryman & Bell, 2011). Hence, each employee interviewed was asked to name others that would be interested in participating in the study. With an attempt to focus on employees with positions not yet interviewed, as well as with an interest in innovation. This way it was aspired that two problems would be managed; to be able to paint a picture of many aspects of the department, as well as identify people with understanding of innovation and related problems.

3.2.2 Interviews

Qualitative interviews is preferred when the study needs an apprehension of attitudes and personal values (Silverman, 2006). The established research design an research questions demanded data of a qualitative nature. Moreover, the assessment tool aimed at measuring innovation capabilities rather than innovation performance. Hence, elements of the assessment tool were unquantifiable and analysis and assessment of employees' personal opinions is necessary to gain a comprehensive view. Thus, interviews were chosen as the main method of collecting data for fulfilling the purpose of the thesis. Altogether, 38 interviews were conducted during the research.

The interviews were made with employees of various positions on several levels to achieve a comprehensive view of the state of the focal division. The goal of the first round was to gain a better understanding of the potential issues connected to innovation at the focal department of Ericsson. The second round of interviews were conducted to achieve deeper insight into issues identified during the first round of interviews. As well as to enable an assessment of the current state of the Innovation capabilities at the focal department of Ericsson. Both round of interviews had in common that the interview structure was relatively unstructured or semi-structured. Bryman and Bell (2011) states that this type of interview is preferred when the area of research is abstract or heavily relying on social interpretations. It was thus an intentional choice as it was desired that interviewees would discuss their individual perceptions and reflections regarding innovation at Ericsson.

During the first round of interviews, respondents were encouraged to speak freely about perceived problems with the organization and processes regarding innovation, primarily based on own experiences. If it was perceived the respondents had not problematized enough, follow-up questions derived from the theoretical framework were utilized to guide the respondent. This is suggested by Bryman and Bell (2011) as a way to gain deeper knowledge while still containing an open setting.

The second round of interviews were conducted to gain a deeper knowledge about problem areas that surfaced during the first round of interviews. Furthermore, results from the second round were utilized to assess the current state of innovation capabilities. These interviews were somewhat more structured, with questions aimed at specific issues gained from the previous interview round as well as the development of the conceptual model. This was necessary to gain a detailed insight into some specific issues, as guiding questions might bring up subjects that the interviewees might otherwise nog have reflected upon.

All interviews were made anonymously, and all interviewees were informed of this previous to the interview. This was to reduce any potential issues that could arise due to an employee's answers, so that they could speak as freely as possible. During the interviews, one researcher conducted the interview and asked questions and the second researcher took extensive notes. The interviews were also recorded in case pieces of information were missing from the taken notes. This might have made respondents conscious regarding what they are and aren't supposed to say. Nonetheless, the advantage of recording the conversation were larger than the disadvantages. The anonymity of the interviewee's may decrease the possibility of repeating the study, but the value in having them speak freely overweighs this.

3.3 Research quality

Qualitative research generally require data and input from several individuals, and as people have differing knowledge, questions and underlying assumptions about the world, it is impossible to establish an absolute truth about the social world. Thus, validity and reliability are complicated to confirm due to the unique nature of the research, making their relevance questionable in qualitative research. This thesis as a whole is a company specific analysis and its results are thus by definition not generalizable (Bryman & Bell, 2011). The assessment tool is to a larger extent general, but the assessment itself must be contextualized.

The two main sources of data throughout the project have been a literature review regarding Innovation capabilities and surrounding research areas, as well as open or semi-structured interviews. As the theoretical foundation of the thesis is based on existing literature on the subject and is not company-specific, it is generalizable to a large degree. Thus, it can be argued that the thesis indeed has high internal validity. However, it should be noted that the research area of Innovation capabilities is relatively novel, there are still several conflicting definitions and conceptualizations. The research design furthermore requires research methods that would be impossible to conduct in an objective or quantitative way. The level of reliability is depending on the possibility to replicate a study (Bryman & Bell, 2011). As the results of this study is highly dependent on the large number of anonymous interviews, as well as the fact that it is impossible to "freeze" a social setting, the reliability is relatively low. Consequently, it is questionable how relevant the validity and reliability, in its original definition, is for evaluating the quality of this thesis

Due to its relative incompatibility with qualitative research, there has been a discussion among researchers that the meaning of the terms validity and reliability need to be altered. Bryman and Bell

(2011) suggests the two criteria trustworthiness and authenticity. The former is essentially composed of four criteria; credibility, transferability, dependability and confirmability. These are similar to validity, reliability and objectivity, but is taking a more constructivist view that takes in account that social phenomena cannot be described as an absolute truth, but are in a constant state of revision. Authenticity takes a wider political stance on research and is composed of criteria like fairness and educative authenticity that focus on what impact the research has on society and members in the study. Another recent alternative criteria is transparency and coherence, sensitivity and context, commitment and rigor and impact and importance (Bryman & Bell, 2011). The first criteria measures how clearly and articulated the used research methods are described. The second is the author's sensitivity to potentially relevant theoretical positions and ethical issues. The third describes the level of engagement, necessary skills and the level of data collection and analysis. The fourth is how important the report is for the recipient, practitioners and the community as a whole. Overall, the report can be classified as high in all or most of these criteria, and the quality of the report as a whole would therefore be deemed high as well.

4 Ericsson – Industry context and company description

The following chapter describes the context and surrounding factors of the case study and provides an insight into the company Ericsson. The context is described by an exploration of the history and rapid change of the telecom industry. The insight consists of an outline of the company-wide strategy, as well as an overview of the organizational structure. Finally, the chapter presents how the studied department is demarcated within the organizational structure

4.1 A market undergoing rapid transformation – the context of the telecom industry

The telecom industry is characterized by rapidly evolving technology interwoven in a complex system of standards. It has been transformed by several disruptive innovations completely changing the market structure and rules. Putting considerable pressure on individual firms and requiring high coordination between involved stakeholders. Ericsson has been a leading actor in this industry since its foundation in the late 19th century and is still one of the biggest players (Meurling & Jeans, 2000). However, changing market conditions and increased competition have made it increasingly difficult for Ericsson to retain the leading position.

The technological development in the early years of telecom were characterized by major technological innovations that occurred between fairly long periods of time. Over the first 80 years of the telecom industry, most innovations stemmed from the exponential growth of users. One of these were cross-bar switches introduced by Ericsson in the 1930's. These could be dimensioned according to the amount of traffic in an area, and were one of the sources of Ericsson's competitive edge during the 20th century. In the 1970's, a change towards digital transmissions began, and Ericsson were in the forefront with their AXE-systems. This early digital switch was a product that fortified Ericsson as the market leader of the time and lead to a spectacular growth in terms of resources and personnel. (Meurling & Jeans, 2000).

Previous to the 1980s, telephone services within a nation were in most countries handled by a governmental agency, the Postal, Telegraph and Telephone service, or PTT. Winning a business deal with a PTT was of great importance, since it meant that the supplier would manage the telecom-infrastructure of an entire nation. As actors such as Ericsson, ITT and Western Electric were largely vertically integrated and supplied both infrastructure, switches and end-user terminals, these deals were highly lucrative. This also resulted in a non-volatile market with infrequent business deals with a few very large customers. After a global wave of privatization in the 1980s, the telecom market was opened up also to smaller actors such as private phone operators. These actors were either the owners of the infrastructure in an area, or they could lease frequencies on existing equipment. Thus, the customer base for telecom providers grew massively. This also led to the business deals becoming smaller in size, less infrequent and more local (Meurling & Jeans, 2000).

When PTT's were the sole customers of the firms in the telecom business, the telecom provider were chosen not only by performance or price, but also for political reasons. Firms in the telecom business thus lacked strong incentives to develop their technology ahead of competitors (Sujata, Jayendran, & Rohit, 2015). Major system innovations were also difficult to implement as there were technological standards that actors had to relate to. Major changes in the basic infrastructure would cause an

incompatibility for products made by different actors. As the industry rapidly expanded throughout large periods of time, changing all components within a system would be far too expensive. The cost of this procedure would be carried on to the customers, and as price of equipment was an important factor in the PTT's decision of provider, it was not of high priority. Thus, innovations were constricted to those that could be implemented into the existing infrastructure. This lead to that a large portion of innovations were focused on lowering costs, which Ericsson excelled at. This competitive advantage has weakened since the 1980's due to further privatization of the telecom infrastructure. The new customers of Ericsson were network operators which marketed themselves towards end users as providers of less costly calls and recently unlimited data transfer. This required improved network capabilities and created strong incentives to develop technology ahead of competitors (Meurling & Jeans, 2000).

The global wave of privatization coincided with the development of the GSM-network. Mobile telephony had been available before GSM, but there was an abundance of standards and the performance and bulky size were obstacles that prevented it from reaching a mainstream audience. Opposed to the previous analog standard NMT, GSM was a digital infrastructure which enabled transfer of digital data between users. Parallel to the development of GSM, early versions of the internet started to take form. Strong sales of GSM-compatible equipment led to a larger possible internet user base, which in turn led to an increased demand for GSM-compatible equipment. These network-effects elevated the demand for wireless data transfer and led to a rapid diffusion of GSM-equipment (Pestel, 2003)

The rapid growth in internet usage created a strong demand for equipment for data transfer. A combination of a strong demand and the fact that customers are smaller actors than previous to the privatization wave in the 1980's increases the rate of production and sales of necessary equipment. (Meurling & Jeans, 2000) The rapid development also lead to shorter product life-cycles. There is a continuous demand for higher rate of data transfer by both private consumers and other businesses, a variable that was of less importance before the internet. As the market for conventional telephone communication is shrinking, actors in the industry has to shift focus towards data transfer (Sujata et al., 2015). Currently, consumers are demanding more individual and personalized means of communicating. This includes not only communication with other users, but with connected gadgets and other connected technology. This puts pressure on actors to continuously provide technology such as cloud and encryption services (Ericsson, 2014; Meurling & Jeans, 2000).

This requires further development in Ericsson's business to align product offerings with current market demands. Furthermore, a cornerstone in the current network system is products and subsystems that are able to communicate impeccably. Ericsson therefore cannot radically upgrade their equipment to new standards if those are unable to communicate with previous network standards (Varrall, 2012). Thus, they need to align their technology with its competitors' which makes it difficult to introduce novel ideas. Mass-production of components and the rapid development of the technology has resulted in diminishing profit margins on hardware (Dedrick & Kraemer, 2006). To keep up with the shorter product life-cycles, hardware is sold in modules, where single parts can be upgraded to fit with a new standard. Due to the shrinking margins and increasing competition in sales of hardware, Ericsson along with other actors within the telecom industry are moving towards primarily providing software and services (Ericsson, 2014; Meurling & Jeans, 2000).

4.2 An overview of Ericsson

Ericsson is a global company engaged in the telecom industry. It was founded in 1876 and is one of the leading actors in its segment, employing 118 000 people in more than 180 countries. Ericsson provide software, services and equipment to enable mobile communication across the globe, supplying networks for 40 per cent of the global mobile traffic. The global headquarter is located in Kista, Stockholm. Ericsson's businesses has historically been diverse, with products and services to both other firms and private consumers. In 2001, Ericsson announced a joint-venture with Japanese technology firm Sony with a mission to sell mobile phones. However, the venture ended in 2012 when Sony bought the remnant of Ericsson's shares, and Ericsson has since focused solely on business-to-business (Ericsson, 2015).

The main part of the organization is divided into divisions based on their product areas. These divisions are called business units and consists of Radio, Cloud & IP, Support Solutions and Global Services. Business unit radio, BURA, and business unit Cloud & IP, BUIC are responsible for products affiliated with their respective technological base. BURA and BUCIP, in turn consists of several business units and design units, each with responsibility of the profit and loss as well as product development of specific product. Global Services department is responsible for offering complementary services to sold products, including installment and delivery of a product. Additionally, the department implements customization of products based on individual needs of the customer. The Business Unit Support Systems is a new department responsible for offering software to customer interaction such as mobile-commerce, TV- and media services as well as Business support systems (BSS) and Operation support systems (OSS). There is a strategic intent to increase the proportion of these services that are closer to the customer, due to diminishing profit margins in hardware. There are also company-wide Group functions such as Finance and Human resources, which also have representatives in each department (Ericsson, 2015).

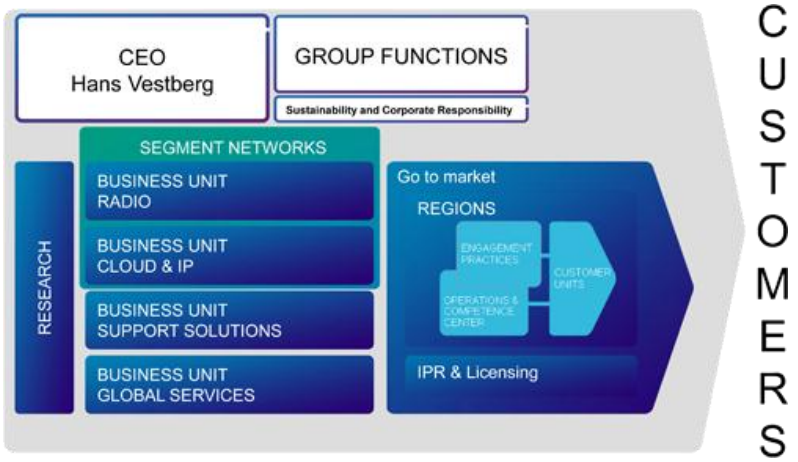

Figure 2 - The overarching organizational structure of Ericsson

Ericsson has a distinct organizational function responsible for taking the products to market through close connection with customers, as seen in the Ericsson chart. This function is divided according to geographical regions, with a worldwide presence in ten distinct regions and in over 180 countries. The division of the sales department is thus done solely based on geographical coverage and not according to product group. Thus, each regional office is fully responsible for a variety of different technologies and product areas. The sales department is responsible for negotiating and creating relationships with customers. Due to the nature of products delivered by Ericsson, relationships are often close and customers are able to have large input, as well as support (Ericsson, 2015).

The sales department has no technical expertise, but has to rely on support from each specific product area. Technological support for the sales department are delivered through production introduction support (PIDS), located in each product division of BURA. Furthermore, the sales department is also responsible for gathering information regarding customer problems and market requirements. As well as conduct some benchmarking with competitors. This information is transferred to a division with the relevant skill to make use of it.

4.3 Product department Alpha within Ericsson's organizational structure

The focus of this report is on one single department surrounding one specific product. The product will hereinafter be called Alpha and the organization surrounding the department will consequently be called Product Department Alpha, PDA. PDA is in practice not demarcated within the organization as one single department with sole responsibility of the product Alpha. Instead the demarcation consists of two separate departments called the Design Unit Alpha, hereinafter called DUA, and Business Unit Alpha, hereinafter called BUA. The DUA resides under Design Unit Radio (DURA), while BUA resides under Business Unit Radio (BURA). BUA is responsible for the profit and loss of the Alpha product line, as well as to offer a strategic, coherent and extensive product portfolio. This also includes the alignment and standardization of the product line to fit with the Ericsson system. BUA is however not responsible for either sales or product development. DUA is responsible for delivering the products of the Alpha product portfolio, including all product development and technical expertise. Thus, this demarcation is argued to be the most relevant since the two departments together are solely responsible for delivering Alpha products from both a technological and business perspective.

The shared responsibility was further emphasized by the shared strategy that was established in 2013. Through discussions and collaboration between BUA and DUA a strategic plan was derived through market and technological analysis. Moreover, the organization responsible for research regarding the product Alpha, hereinafter called RUA, is however not perceived as belonging within the made demarcation. This is due to that RUA has no responsibilities or authorities in relation to the portfolio or product area, but only act as advisors and set technological guidelines through initial technological research. Furthermore, RUA is a part of the free-standing group function research.

4.4 Company-wide strategy

Today Ericsson perceives themselves as a driving force behind what they call the networked society. Their current businesses are a combination between hardware, services and software, although they are increasingly focusing on the latter. 66 per cent of Ericsson's business was related to software and services 2014, compared to 34 per cent in 1999. They also view themselves as a transformative company, able to align its business with changes in the market structure. Currently, it is towards software and services, outsourcing or selling the former hardware divisions over the coming years. This is the result of a conscious innovation effort over the last 15 years through analysis of changes in the customer behavior and demand. By recognizing where operators perceive that value is created through the use of their services, future growing markets can be identified. This process was utilized to target IP Networks, Clouds, operations and business support systems, TV & media and Industry & Society as strategic markets for the future, as seen in figure 3 below (Ericsson, 2015).

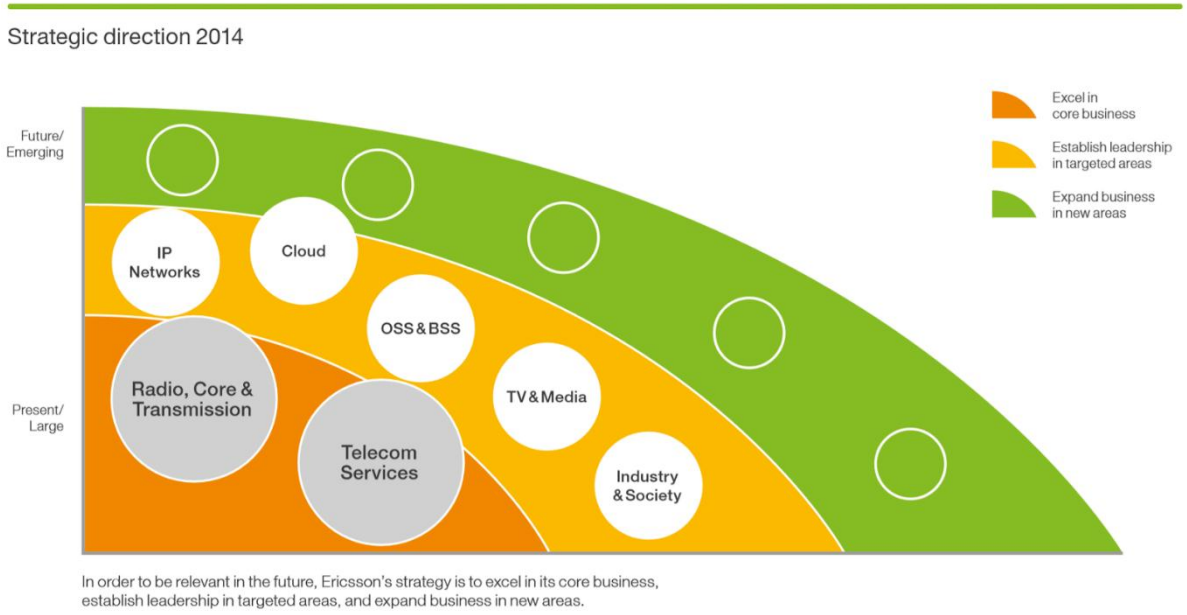

Figure 3 - Current and future strategic directions of Ericsson

The strategic intent of Ericsson starts by excelling in today's core areas, Radio, Core & Transmission and Telecom Services. These are the foundation of the envisioned Network Society by creating a high-performance common infrastructure. In addition to offering profitability today, the core areas will also act as point-of-departure for entering adjacent, targeted areas. The aim is to establish leadership in the targeted area and to stay in the forefront, while the long-term strategy is to eventually expand business into emerging areas. During the transformation process, it is seen as vital that the current core values of professionalism, respect and perseverance are kept and transferred to the targeted areas. The identified assets necessary to leverage for a successful transformation into the targeted areas, are the technology leadership and global scale and skills (Ericsson, 2015).

The strategic intent of Ericsson is reflected in how resources are allocated to innovation efforts, in the form of R&D activities, within different technologies. A large amount of resources are allocated to R&D efforts within the current core areas to retain the position as market leader in these technologies. Moreover, due to the increasing importance of software in the growing mobile networks, the investment in this area is significant. Investments in R&D concerning targeted areas, such as IP networks and cloud, are also prioritized to gain technology leadership as the market matures. Apart from R&D-investments, resources are allocated to find better ways to do things better internally, such as bringing new products to market at a faster rate or increasing the operational efficiency. Additionally, acquisition and partnering with other companies are done to strengthen synergies in core areas and accelerate growth in targeted areas (Ericsson, 2015).

Innovation efforts are also targeting identified problematic situations, identified through analytical methods such as product life cycle analysis. In PDA, it is believed that Ericsson's current technology base is competitive and no or few specific innovation efforts are conducted. In other product areas however, larger system-wide problems have been identified in relation to the product life cycle. Such as in the adjacent department Product Department Beta, hereinafter called PDB. Products offered by PDB was previously solved through the use of dedicated hardware, giving Ericsson knowledge and operations an edge. However, recent development has made software increasingly important, especially cloud-services, making hardware generic. Ericsson recognized this problem and as a result PDB was reorganized under a different business unit than PDA, highlighting the importance of

switching from hardware to software solutions. Innovation has correspondingly been given higher importance in this department, as this is deemed necessary due to the market changes. If no similar problematic market change is by management, the division is given almost full responsibility of strategic decisions regarding the product area (Ericsson, 2015).

4.5 Different geographical locations of Product Department Alpha

The company has employees in more than 180 countries, making the presence global. Many of these are employed within the sales department and their regional offices, however other functions are also present in a wide variety of countries (Ericsson, 2015). The business units are also distributed globally with representation globally. The BURA is divided into several different geographical locations, with offices in Stockholm, Gothenburg, Italy and Budapest and more, however the headquarters of the business unit is in Kista. The geographical division is not entirely aligned with business unit division of the organization, but business units such as PDA can have offices in many different countries. This non alignment and current locations of departments is often due to the legacy of specific offices.

Some central functions of Ericsson is located in the headquarters in Kista, such as research and group functions. There is also a central innovation department located in the Stockholm headquarters called New Business Development & Innovation. This department are responsible for company-wide innovation activities; including the IdeaBox, a forum where employees can register their ideas, the newly established Ericssons Garage, an own division focused on radical innovation within the company, and Ericsson academy, a set of tools aimed at helping innovation activities throughout the organization. Furthermore, each geographical site and most departments at each site, have their own innovation offices responsible for enabling innovation locally (Ericsson, 2015).

PDA was started in Gothenburg as Ericsson sought to introduce product Alpha in its product line. The location was chosen due to the rather large distance to the headquarters, giving it larger freedom. As new companies were acquisitioned and merged with the main PDA organization, new offices were opened at new destinations. This is the reason that the PDA division has offices in Budapest and Italy (Meurling & Jeans, 2000). The headquarters of PDA is located in Göteborg together with the rest of the majority of the organization. The node development organizations are also based in Göteborg, while some of its product development teams are located in Budapest. Furthermore, there are several research teams in Italy responsible for some projects. For legal reasons product development projects are however always only located in one single country. Still, all resource allocation and project responsibility is based in the management in Göteborg.

Since PDA is located in Göteborg there is a bit more freedom in how the product line and development is managed, as the managers of BUA and DUA have ongoing discussions. In comparison with PDB, which has a similar organizational structure, this freedom is highlighted. Design Unit Beta, DUB, is located in Göteborg while Business Unit Beta, BUB, is located in Kista. The distance makes the collaboration weaker and the decision-making gets unilateral, while still being close enough for continuous control and feedback. Moreover, the distance between PDA sub-departments in Budapest and BUA in Göteborg has led to a different process when developing products. There is no day-to-day contact and feedback from personnel from the BUA and consequently the design team in Budapest can have more ideas themselves put into the product without external interference. This phenomenon was noticed as the Budapest office previously had been very active in the IdeaBox

initiative, until submissions noticeably dropped. When this change in activity was noticed it was discovered that many ideas instead had been implemented directly in the products instead, as they did not receive any feedback from the IdeaBox.

5 Towards an assessment tool for innovation capabilities

The following section will describe the proposed assessment tool for innovation capabilities, which will be divided into two separate model. Initially an illustrative conceptual model for depicting components and interrelations of innovation capabilities will be discussed, with the purpose of enabling managerial understanding of innovation capabilities. Subsequently an assessment tool will be presented developed from this initial model, with the aim to act as a basis for decisions and facilitate communication regarding the subject. The chapter will start by describing principles and design choices for the conceptual model, followed by the same for the assessment tool. The section about the assessment tool will also introduce a guide of how to apply and reason when applying the tool on an organization.

5.1 Building a conceptual model

The proposed models are derived from the conducted theoretical analysis of innovation, systems theory and innovation capabilities and designed to fulfill the established purpose of respective model. Furthermore, the model is based on the proposed definition of innovation capabilities as *"A set of practices enabling the ability to continuously generate and develop novel ideas and opportunities to achieve competitive advantage through valuable and marketable innovation*.".

5.1.1 System theory and implications

The first aspect of the established definition is that innovation capabilities consist of a set of practices, shaped by the underlying structure and interaction of elements of the innovation capability system. This reasoning is derived from the systems view proposed by authors as O'Connor (2008b) which describes innovation capabilities as not just reliant on the properties of its building blocks, or practices, but the result of how these are integrated. Hence, the behavior of a system consequently arise from both the characteristics of the buildings blocks, as well as the interaction between them (von Bertalanffy, 1960). Consequently, all practices of the organization must be taken in account when assessing the innovation capabilities and it is not sufficient to study any one element in isolation (O'Connor, 2008b). Moreover, practices are not excludable by necessity in relation to each other, but rather different perspectives on what an organization consists of. Thus, an organization could simultaneously be described through its organizational structure as well as its processes.

Systems theory enables the application of the framework on different levels on the company and not solely on a company-wide level as previous assessment tools. Due to the purpose of this thesis to develop a tool that is applicable on a departmental level, this notion is vital. Systems consists of a complex set of elements in mutual interaction, not only dependent on conditions within itself, but also on conditions within the whole or superordinate units which it is a part of. In this perspective organizations as a whole are not autonomous, but dependent on events and influences from systems of which it is a part of (von Bertalanffy, 1960). The innovation capabilities of an organization is thus

highly dependent on external factors such as legacy of the company, academic paradigms and economic conditions (O'Connor, 2008a).

Correspondingly the arrangements of the innovation capabilities system within a department is largely shaped by the prerequisites of superordinate systems, like higher level management. Nonetheless systems are nested and interrelated, meaning that sub-systems are not only dependent on higher-level systems, but higher level systems are also affected by sub-systems (O'Connor, 2008b; von Bertalanffy, 1960). In the context of a firm this means that the actions of top-management affect individual departments, but at the same time activities within departments have the ability to affect top-management as well. Additionally, all building blocks of innovation capabilities present on a company-wide level are also present on a departmental level. For example, similarly to innovation strategies on a company-wide level, there will be innovation strategies specific to a single department. The influence of the company-wide innovation strategy must however be taken into account when evaluating the innovation strategy on a departmental level. Thus, it is necessary to be conscious of the influence by external influences, such as the higher level management, during analysis to be able to differentiate whom has the ability to improve a specific dimension.

Furthermore, elements of innovation capabilities are co-existing pieces of a system that has a continuous positive influence on the ability to innovate. They are not individual, time-restraint, efforts, but a constant enabling structure for innovation. The following parable might be useful to further illustrate this argument. A motorcycle consists of a large amount of subsystems, each responsible for a specific task or function of the engine. Subsystems necessary for a functional motorcycle are the electrical-, the ignition- and the transmission system. These are furthermore all co-existing ways of describing the functioning of the engine and all ever-present within it. An engine can therefore be described through its ability to create torque which is transmitted to the wheels to power the vehicle forward. It can however equally well be described through the process which transforms the fuel to heat which drives the turbines, creating mechanical power. If the driver wants to reach full throttle all individual subsystems must be able to perform at a high capacity to enable the whole system to excel. Hence, all subsystems must all work together; the electrical system fueling the ignition system which in turn powers up the engine.

5.1.2 Designing for managerial utility

The purpose of the final assessment tool of this thesis is to act as a management system facilitating managerial understanding and acting as a decision-basis. To accomplish this, the conceptual model is built upon describing innovation capabilities as consisting of building blocks, called elements, and concrete sub-elements to create a hierarchical structure. Previously, the innovation capabilities discourse has been criticized for being too abstract (Danneels, 2011). Moreover, little work has focused on how innovation capabilities can be developed and implemented in practice (Börjesson & Elmquist, 2012). This might inhibit the possibility and desire for managers and organizations to integrate the discourse in their activities. Consequently, maintaining the large disparity between academic recommendations and business practice. Efforts were thus made to generate a conceptual model that would bridge the large disparity between academic recommendations and business practice.

To simplify the design, without losing the ability to represent or measure the reality a multi-leveled design was implemented. The highest level of the model consists of six elements and their relation to each other. These elements were largely derived from Christensen (2013) RVP-framework, the model presented by Moss Kanter (2006) and resource cognition as described by Danneels (2011). The

center highlights two elements, Organizational intelligence and Innovation strategy & vision, representing the ability of *Doing the right things*. These elements are presented as central due to their fundamental necessity in developing additional elements; without understanding of the concept or importance of innovation, or value of resources, as well as an innovation strategy other practices will not be possible to be developed. Surrounding elements are organizational structures, values, resources and processes describing the ability to *Doing things right.* This demarcation will be explained further in Chapter 5.2.2.

Moreover, all organizations do not require the same performance, but a strategy or vision of innovation sets the goal of performance. Moreover, innovation capabilities have no intrinsic value in themselves, but are the means to fulfill a goal. Thus, they only have as much value as they are given by the firm due to their innovation strategy. This was identified by Rådesjö and Sandström (2013) in their assessment of Statkraft. Statkraft is active in the utility market where operational effectiveness is paramount and innovation capabilities is therefore not deemed vital. Thus, they have made a strategic decision to not focus on radical innovation, but instead on incremental innovation and to be exceptional in implementing external innovations. As a result, Statkraft formulated an innovation strategy that emphasized this ability. Subsequent development of innovation capabilities were aimed at fulfilling this goal. Coming back to the motorcycle-parable, all motorcycles are not built for the same purpose. Some are constructed for longer and more comfortable trips, while others are designed to be fast and light. Subsystems of the motorcycle are thereinafter arranged to fulfill the specific purpose of the motorcycle.

5.1.3 Delineating and visualizing the concept

The general design of the conceptual model can be seen below in Figure 3. Definitions and what individual elements consist of are explained more thoroughly in chapter 6, while this section describes the principles of the design.

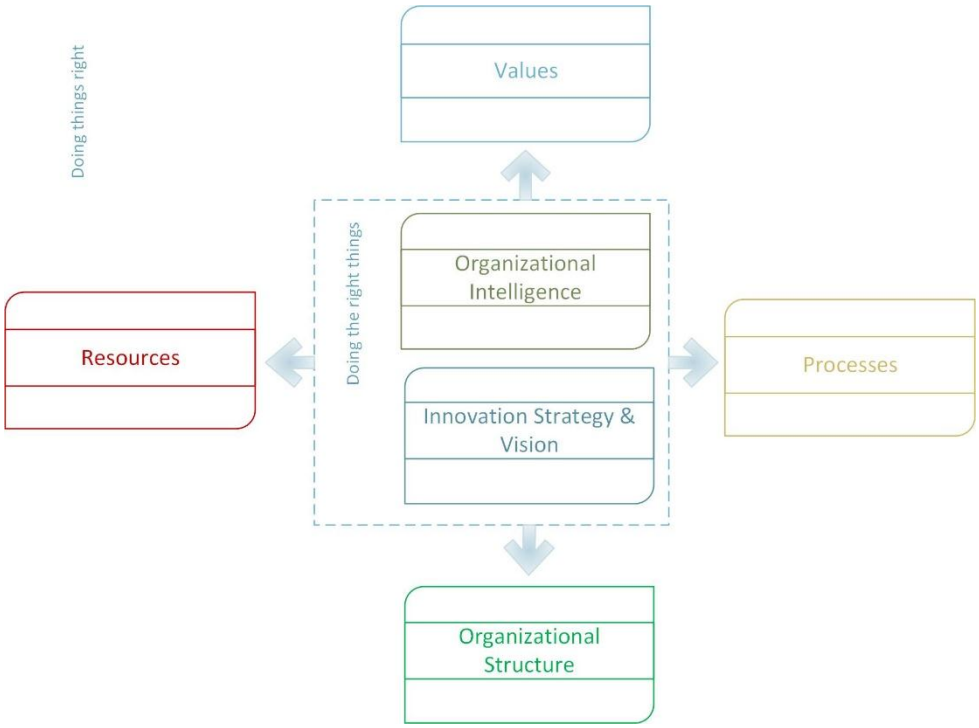

Figure 4- The proposed conceptual model of Innovation Capabilities

Elements of the proposed model can be seen as theoretical constructs, as described by Heiman (2001) as "an abstract concept used in a particular theoretical manner to relate different behaviors according to their underlying features or causes". Thus the cause behind similar actions and behavior are sought and connected to relevant theory, so that an unstructured world can be broken down to comprehensible components (Heiman, 2001). Theoretical constructs are needed to name and label non-observable phenomena and load them with theory; in a way constructs even are prototypes of theories in themselves, as they attempt to pin down non-observable data so that the theory they embody can be assessed (Jordan, 2013). They are not identical to definitions as they do not attempt to clearly define and distinguish different terms from each other, instead they intend to lay ground for an explanation.

A theoretical construct is therefore used in an attempt to solve a problem, by offering theory-derived terms that in themselves are solutions to the problem. This is exemplified by Gardner (2002) who attempts to describe why some learners perform better than others and uses the construct “motivation” to accomplish this, in such a way that the construct takes on its own meaning and other researchers are able to test the claim he makes (Jordan, 2013). In the proposed model, elements of innovation capabilities are established to label different aspects, sharing the same root causes, with influence on innovation capabilities. Each element is described through its respective solution to the problem of what is consists of that influences innovation capabilities. As a result, the element of processes for example includes all non-observable phenomena with an influence on innovation capabilities that is related to the processes of a firm.

Individual elements were gathered mainly from the conducted theoretical review and building blocks defined by previous authors as presented in table X. The elements of the highest level were chosen from articles with a perceived higher-level perspective, such as Christensen (2013), Moss Kanter (2006) and Danneels (2011). Thereinafter, to be able to offer more concrete illustrations of what each element could entail, sub-elements were sought within each element to facilitate the development of an assessment tool. The more concrete sub-elements were mostly gathered from

articles with the purpose of creating a management system, such as Assink (2006), O'Connor (2008b), Björkdahl and Börjesson (2011), Lawson and Samson (2001) and Guan and Ma (2003). To choose between the vast number of elements identified during this process, building blocks from articles were cross-referenced with data gathered from the first round of interviews. This data included real-world issues at the studied firm. Thus, data gathered during interviews could be used to frame elements and sub-elements of the assessment so that they would be better aligned with the real world and facilitate managerial understanding.

What practices innovation capabilities are described as and how these are interrelated is not an objective fact, but decided by the person responsible for conceptualizing the system. Demarcations are also largely influenced by the purpose of the conceptual model and the process of developing it. The proposed conceptual framework of this thesis was to a large degree affected by the aim to create an understandable and visual model for managerial purposes. One central point of discussion was therefore the tradeoff of being either too abstract or too concrete, leading to either being too intricate to grasp by the targeted group or losing the connection to reality. Furthermore, there was a need to include elements already present in the management discourse, as well as a focus on practices with clear real life counterparts. Additionally, it was necessary to depict the model in a way that is relatable to managers while retaining theoretical foundations such as the system view and individual elements and their interrelation. This was accomplished through basing the design on the balanced scorecard framework which has reached a widespread recognition among managers (Kaplan, 2008).

5.2 Principles of the assessment tool

The principles of the assessment tool will be divided into two blocks. The first block entails measurement in individual, delineated, elements of innovation capabilities. To ensure managerial understanding of these elements, they are concretized into more practical sub-elements and indicators. Moreover, the variables of Current, Target, Actions and Indicators are introduced to give the assessment of the current performance a point of reference and offer ways of going forward. The second block includes reflective reasoning on a system-level where elements must be understood through their context and interaction.

5.2.1 Block I – Assessment of individual elements of innovation capabilities

In line with the purpose of this study, the proposed conceptual model should be further developed to generate a tool that could be utilized to assess the innovation capabilities at a large firm. While the initial conceptual model was aimed at enabling understanding of what components innovation capabilities consists of, the assessment tool should also provide explicit linkages to concrete practices and a point of reference. To achieve this it was decided that each component of the conceptual model in turn consists of several sub-elements that aims at rooting the element in more feasible activities, making it more concrete. Moreover, the assessment tool does not only include measurement of the current capabilities of the organization. It also includes the ability to compare the current capabilities with a target level, as well as actions to reach the target and finally indicators to depict the direction of the performance.

Breaking down elements to enable managerial relevance

To enable a better understanding of each element, several sub-elements are included to cover a multitude of aspects that an individual element could entail. The use of sub-elements to illustrate an element can be exemplified by the inclusion of the sub-elements *External linkages*, *Clear responsibility* and *Bureaucracy* within the element *Organizational structure*. All of these sub-elements are concrete illustrations of what practices, with an influence on innovation capabilities, that can be labelled Organizational structure. In line with the reasoning of theoretical constructs (Jordan, 2013). The list of sub-elements is not intended to be a complete or comprehensive list of what each element is, but an illustrative set of practices. Thus, a high performance in several sub-elements would be representative of a high performance in the overall element. However, the use of sub-elements during assessment should be seen as a supporting guideline rather than a definite structure. What sub-elements are included in the assessment tool to illustrate each element is shown in figure 5 below.

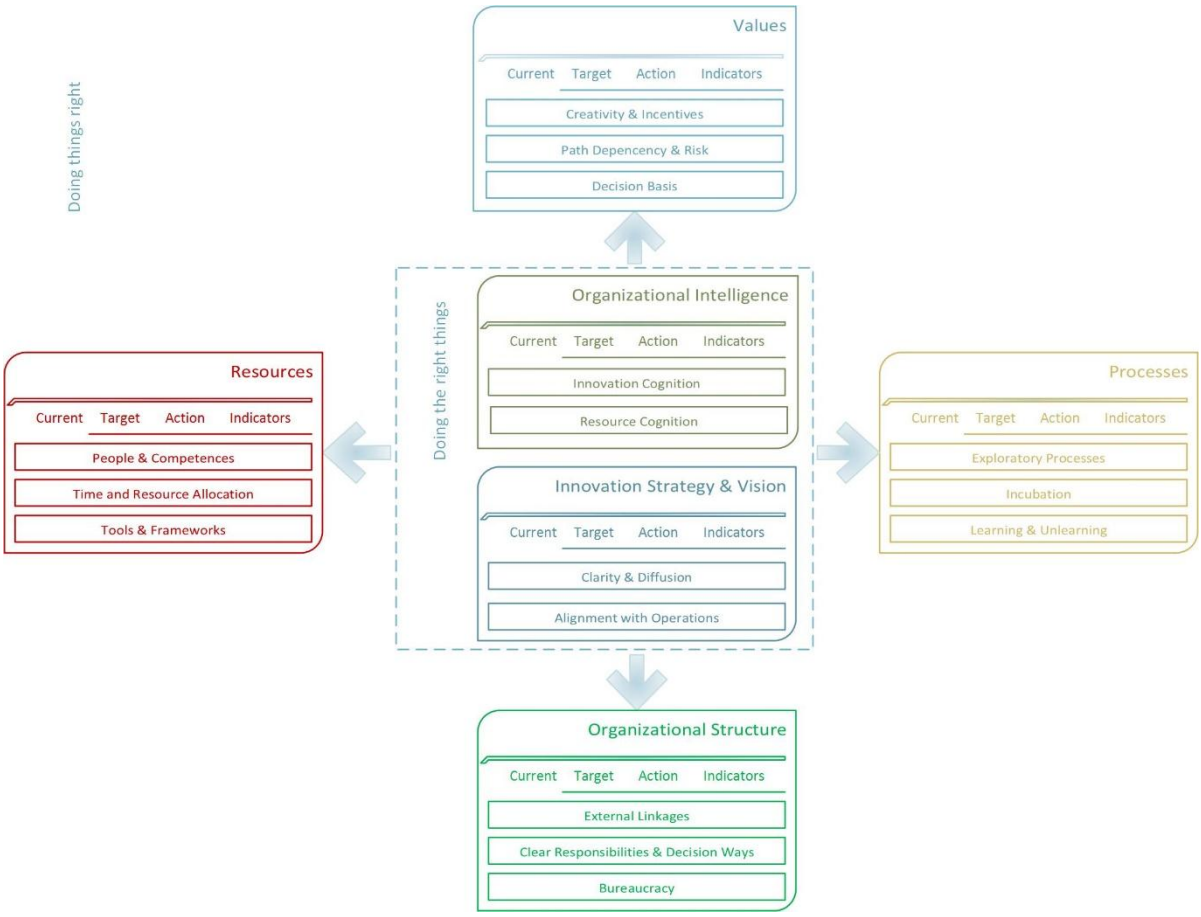

Figure 5 - The assessment tool model

The use of these sub-elements as measurements to illustrate performance in the superordinate elements are largely due to the often ambiguous nature of innovation capabilities (Danneels, 2011). It is especially hard to construct a measurement model which include the result of innovation (Saunila & Ukko, 2012), as innovation capabilities are disconnected from financial outcome both causally and temporally. Making it almost impossible to assign them a financial value (Kaplan, 2008). Moreover, financial data has been shown to be limited for decision-making, while non-financial data has been shown as being of improved utility (Lawrie & Cobbold, 2004). Nonetheless, it has been demonstrated that innovation has a strong effect on financial result as well as sales performance and productivity (Chapman, 2006; Klomp & Van Leeuwen, 2001). Another reason for issues with utilizing financial data as decision basis in relation to innovation capabilities is that intangible assets rarely

have any value by themselves, making it hard to establish connections between cost and results (Kaplan, 2008). Further explaining why indirect and subjective measures are preferred.

Decision rules

1. Ideas here are evaluated differently based on if they are deemed incremental or radical in nature.
2. Innovative ideas are prioritized in the feature backlog.
3. Decision-makers are able to identify novel value in ideas of a radical nature.
4. There are clear rules for when a project should be cancelled.

To facilitate the description of the current performance in a sub-element, a list of indicators are described in relation to respective sub-element. Indicators are seen as being illustrative of the overall performance in the sub-element in the same way that sub-elements are related to elements. Indicators are thus not a comprehensive list of everything a sub-element is, but a set of aspects presenting an exemplification of it. Since the concepts often are hard to grasp, using indicators strengthen and clarifies the construct that has been established. Indicators are primarily utilized during interviews used to gather data, as a way of guiding respondents towards potential issues. An example of indicators for the sub-element *Decision rules* is seen in the list above.

Identifying relevant measures and a way forward

Derived from the purpose of the model, the assessment tool offers a method of evaluating current innovation capabilities of the department. Thereby, answering the questions of "Am I doing well or badly?" and "What problems should I look into?", aligned with the purpose of the balanced scorecard (Kaplan, 2008). As a result of the qualitative nature of the model, the inquiry of current innovation capabilities should be of the same qualitative nature. The proposed attempts of breaking down the elements and sub-elements into manageable and concrete fragments aims at offering a comprehensive and dynamic depiction of a subject that might include anything with an impact of the performance of the organization (Saunila & Ukko, 2012). However, without any point of reference or ways to go forward this information is of no value for the firm.

Figure 6 - Factors to enable measurement of elements

To give the current performance in each sub-element a point a reference, a variable of target performance of the organization is included. The inclusion of a target variable infuses organizational strategy and visions into the assessment tool, to facilitate the concretization of strategies which are aligned with the elements of the tool. This ensures that strategies can be aimed at specific practices with an influence on innovation capabilities. Correspondingly with current performance described above, indicators might be used when setting targets to make goals more concrete. Thus, in line with the balanced scorecard, offering the ability to translate visions into operational goals (Kaplan, 2008). Furthermore, including a target performance variable helps management recognize opportunities through identifying gaps between the current and target performance. Identified opportunities can subsequently be utilized as an input when generating an innovation strategy.

Due to the inherent difficulties to measure innovation capabilities, quantitative tools cannot offer any reliable measurement (Saunila & Ukko, 2012). However the inclusion of a "current" and a "target" aims at acting as a sense of measurement of where the organization currently is and what could be achieved. This is related to the common problem of difficulties of employees and lower-tier managers to understand how their actions are connected to the ultimate business goal (Kaplan, 2008). Furthermore, it is vital to identify what actions can be taken so that measured congruities between a current and target state can be diminished or eliminated. Consequently, actions should be chosen and presented in relation to the identified congruities, to ensure that they adequately align with what management aims at achieving within an element. Thus, a problem-solving variable, close to that of the balanced scorecard, is included to identify what action is best suited for solving a specific problem (Kaplan, 2008).

To offer the ability to frame the direction of the performance as a result of conducted actions to align the current with the target, the variable of index is included in the model. The index variable is a measurement included by the assessor, which are seen as representative to the performance of sub-element that is measured. As an illustration, the index for "Clarity and diffusion" within the Innovation strategy and Vision-element might be the frequency of employees that have read the organizational strategy and perceive that they understand how it relates to them. An increase of this frequency is likely a good estimation of how good the innovation strategy is diffused in the organization. Thereby, the index is a good estimator on how conducted actions affect the direction of the performance in relation to a current and target state. By offering all of these variables in the assessment of innovation capabilities, the purpose of supporting strategic planning can be achieved. The assessment tool thus facilitates managerial understanding of how the firm perform today and what the goal is, supporting decision-making of how to accomplish the goal throughout the organization. Furthermore, it acts as a way of communicating this goal throughout the organization, creating a shared understanding.

Ensuring data of high relevance when using the assessment

To insert data about the studied department into the assessment tool, a questionnaire has been established. The questionnaire includes one question for each sub-element presented in the assessment tool, as well as probes based on the indicators used to narrow down each sub-element. Gathered data can then be analyzed and formalized using the description in chapter 6 and inserted into the current-variable of the assessment tool. Hence, the tool can be utilized to both gather and structure data into a comprehensible framework that helps the manager make sense of an unstructured reality. Offering an insight into the performance of the firm in certain elements influencing innovation capabilities, as well as how to improve the performance. The utilized questionnaire is presented in Appendix A.

Input for the variables cannot be created simultaneously, but can be determined through a back casting procedure. Meaning that a desirable future is defined and then working backwards to identify policies and programs that will connect the present to the future (Dreborg, 1996). The outset must therefore be the evaluation of the current state of the element, as the target can only be determined once there exists a point of reference. The target is not predetermined, but must be shaped from the strategic intent of the specific firm. Hereinafter, what actions are taken and what they attempt to accomplish are dependent on the congruity between the current and target state of innovation capabilities. Therefore, the actions cannot be determined prior to an established target and the assessment of the current state (Dreborg, 1996). Similarly, the index variable is a measurement of the direction of the performance in relation to the congruity between the current and target state.

However, caution must be taken when deciding upon an index to ensure that they describe and measure what is attempted (Kaplan, 2008).

5.2.2 Block II – Reflecting on innovation capabilities at a system-level

The first block of an assessment includes the individual evaluation of each elements of innovation capabilities in the proposed assessment tool. However, to achieve a more thorough understanding about the system as a whole as well as identification of interrelations and shared causes, it is necessary to assess all elements together. Coming back to systems theory, it is stated that innovation capabilities as not just reliant on the properties of its components, or practices, but the result of how these components are integrated (O'Connor, 2008b). Moreover, the performance of different components in the system might share the same root-causes. Consequently, all practices of the organization must be taken in account when assessing the innovation capabilities and it is not sufficient to solely study elements in isolation (von Bertalanffy, 1960).

In the proposed assessment tool there exist inherent trade-offs between specific elements and sub-elements, such as Bureaucracy and Exploratory processes; if the bureaucracy is excessive it implies that procedures are rigid, which is incompatible with the uncertainty and freedom required for exploratory processes. Additionally, there can be root-causes affecting several different elements and sub-elements. One such root-cause can be the existence of a deeply integrated corporate culture, which shapes both how the organization arranges its business processes, what values it has and what resources are seen as valuable.

To be able to identify these patterns and interrelations between elements, it is necessary to summarize the findings of individual elements into key insight regarding both strengths and weaknesses. Creating a list of strengths and weaknesses furthermore makes specific problems or assets increasingly transparent. Facilitating the ability to allocate resources where they are needed the most, through establishing a target state and a subsequent action plan. Additionally it is possible to recognize what aspects are inherent to the specific department and what is inherited from the larger organization. During the analysis it is therefore vital to acknowledge that the arrangements of the innovation capabilities system within a department is largely shaped by the prerequisites of superordinate systems, like higher level management. This might allow for identification of glass ceilings within the larger organization that acts as inexplicit boundaries for the department in its strive towards developing innovation capabilities.

Distinguishing between Doing the right things and Doing things right

The connection and influence between higher-level components of Doing the right things and lower-level components Doing things right are also vital to dissect and evaluate. Higher-level elements of Operational Intelligence and Innovation Strategy & Vision are seen as fundamental influences on the development and shaping of lower-level elements. This demarcation is helpful through the possibility to distinguish the practices taking place in decision-making when other elements are constructed. Each element of the two groups will be presented in detail in chapter 6.

The interaction between the elements of Doing the right things and Doing things right is multifaceted and often non-transparent. This makes it necessary to apprehend this interaction in a structured way to achieve an accurate understanding of it. Perception and subsequent mental models of managers decides what assumptions are utilized when decisions are made regarding the design of other elements of innovation capabilities. As previously stated, managers can only recognize a problem if they are fit to identify it as such and are only able to act if they understand what causes it and how

this can be adjusted (Stubbart, 1989). Thereby, mental models act as an underlying foundation when other elements are shaped. In addition, innovation capabilities have no value in themselves but are means to reach a goal. Thus, the established Innovation strategy & vision determines what the result from the innovation capabilities should be, and thereby how they should be arranged.

The process of the interaction between *Doing the right things* and *Doing things right* is similar to that of single-loop and double-loop learning as described by Argyris and Schön (1989). The high-level elements of our proposed model is in this parable seen as the problem formulation used during a learning process. The process starts by an individual trying to solve a problem through making choices of what strategies to use and actions to do to overcome the problem. Single-loop learning occurs when the individual learns from feedback gained during previous attempts, resulting in changed assumptions and thus different strategies and actions to achieve the goal. In the same way, elements on the lower-level can be arranged in a different way when previous arrangements result in not fulfilling the innovation strategy. Double-loop learning occurs when also there is a deeper assessment of the situation, thus resulting in a rearrangement of the problem formulation as goals and assumptions are reevaluated. Therefore not solely taking corrective actions within lower-level elements to achieve the same goal. Within the proposed assessment tool this equals that mental models of managers, as well as the innovation strategy of what to accomplish, is rearranged to better fit the situation that the organization is in. In turn this can completely rearrange lower-level elements in a way that mirrors the novel assumptions and fulfills the new strategy. The process of single- and double loop learning is illustrated in Figure 6 below.

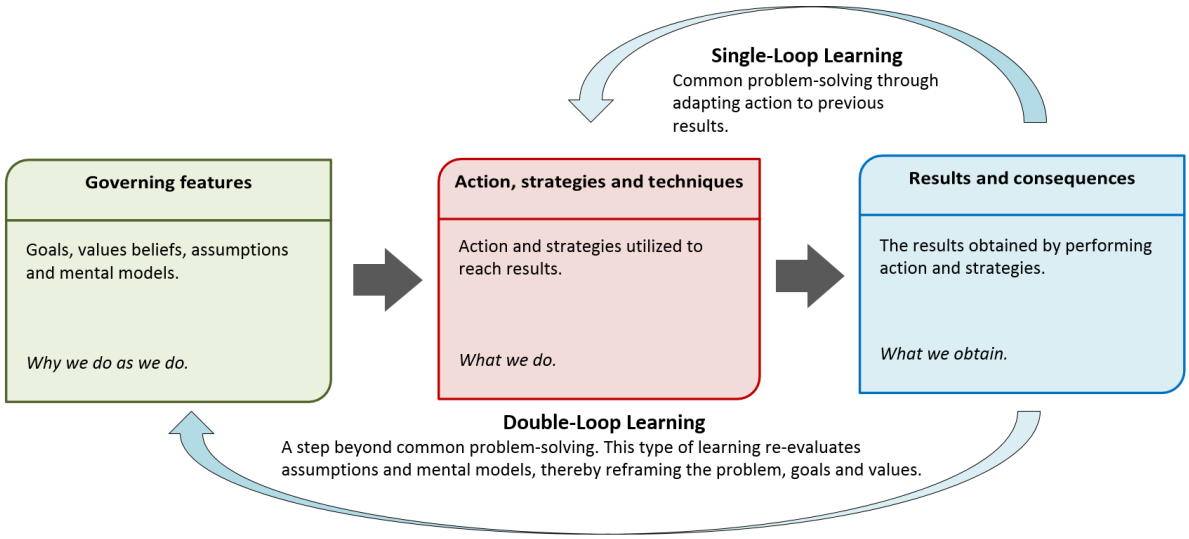

Figure 7 - Single-loop and double-loop learning, based on concepts by Argyris and Schön (1989).

This interaction can be exemplified by the interaction between organizational intelligence and the arrangement and allocation of resources. Resource cognition shapes what assumptions and perceptions there is regarding what resources are valuable and competitive. Hence, competences seen as vital for generating value to customers by managers will be prioritized when allocating resources. Another example would be the influence that clarity and diffusion of the innovation strategy has on decision basis. What innovation strategy is established and communicated affects which parameters employees will consider and prioritize when making decisions. Thereby deeply affecting the basis for decisions.

	Resources	Processes	Values	Org. Structure
Org. Intelligence				
Innovation Strategy & Vision				

Figure 8- Plotting Doing the right thing against Doing things right

Plotting the elements of Doing the right things against elements of Doing things right is therefore vital to identify conscious and unconscious interaction between the two. Initially to make mental models and assumptions visible in relation to the shape of other elements of innovation capabilities. This will enable the recognition of both conscious and latent mental models and highlight possible incongruities. Moreover, plotting Innovation Strategy & Vision and lower-level elements against each other would make the alignment of the goal itself and the means to reach it visible. Moreover, it is possible to identify if there exists opposing goals with impact of how innovation capabilities are shaped. How to plot this is presented in figure 7 above.

6 The elements of the assessment tool

The following chapter aims at describing each individual element in detail from a theoretical perspective. The previous chapter established the principles, structure and application of the assessment tool, however all individual elements must be understood to be able to describe the performance of them at a specific firm. Elements are grouped together in two overarching segments, called Doing the right things and Doing things right, whose interaction will also be described. Initially, elements of Doing the right things is presented, followed by the Doing things right and its corresponding elements.

6.1 Doing the right things

Operational intelligence and Innovation strategy and vision are seen as higher-level elements of innovation capabilities. These are demarcated from the lower-level elements of innovation, as higher-level elements are underlying cause for the design of lower-level elements. Higher-level elements tries to capture the managerial understanding of innovation and how this translates into innovation strategies and visions. Perception and subsequent mental models of managers decides what assumptions are utilized when decisions are made regarding the design of other elements of innovation capabilities. Moreover, the established Innovation strategy & vision determines what the result from the innovation capabilities should be, and thereby how they should be arranged to reach this goal.

Moreover, there is a constant interaction between the organizational intelligence and the innovation strategy and vision of the company. Initially, organizational intelligence is a prerequisite for understanding the necessity of innovation in the current market. Due to that the recognition of the importance of innovation is a necessity for establishing an innovation strategy that appraises innovation. Also included in organizational intelligence is an understanding of competitive advantages and the market structure. This understanding is a prerequisite for being able to recognize how to use innovation in a way that increases the competitive advantage. However, the Innovation strategy & vision also influences the shape of organizational intelligence. For example, a focused innovation strategy and vision will generate formalized rules and metrics, which help managers create adequate mental models of innovation.

6.1.1 Organizational intelligence

Figure 9 - The element Organizational Intelligence

The element of organizational intelligence include two sub-elements, innovation cognition and resource cognition. How humans perceive and conceptualize our surroundings shape their beliefs regarding the world and what decisions are made (Stubbart, 1989). This is equally true for managers

and their perception regarding the organization and problems within it. They can only recognize a problem if they are fit to identify it as such and are only able to act if they understand what causes it and how this can be adjusted (Stubbart, 1989). Further problems arise as managers do not generally share perceptions regarding specific problems, meaning that there are different understandings of what the problem entails and how it can be adjusted (Ensley & Pearce, 2001). Moreover, no human and likewise no manager is fully rational and will need tools and frameworks to help them understand and frame the reality (Stubbart, 1989).

Adequate mental models of management regarding the market, opportunities, threats and the firm's resources are a prerequisite for the firm to be competitive. Mental models include how managers conceptualize resources in regard to their value and competitive strength, as well as how the market is structured (Danneels, 2011). Without this resource cognition, it is impossible to identify what resources should be leveraged and enhanced to create further value and competitiveness. However, the mental model may not concur with the actual nature of resource, and may lead managers down unfruitful paths. Consequently, the ability to identify and frame valuableness and competitiveness of resources and the structure of the market is a necessity to successfully compete on the market.

To succeed in innovation adequate mental models of concepts are equally vital, including the conceptualization of value, market demand and feasibility (Langlois, 1997; Teece et al., 1997). Definitions of innovation usually revolves around novel ideas or concepts that are successfully implemented. The definition used by Drucker (1984), as innovation being the generation of new wealth-producing, or enhancement of existing resources, emphasizes the similarities that a proper conception of innovation has with resource cognition. As does the use of innovation as a verb; a process which includes the perception of a novel market or opportunity which leads to development, production and marketing towards commercial success of an innovation. Therefore, the ability to properly conceptualize and define innovation is a prerequisite to be able to succeed at it. Moreover, to facilitate a unified endeavor, as well as to avoid conflicts, it is necessary to generate a common understanding of innovation so that a whole firm has a unified vision.

A commonly described problem among incumbents is the application of current customer demand when envisioning future product launches (Christensen, 2013). However, the current and future demands are not necessarily aligned, and the ability to understand this difference is vital. The study of the hard drive market by Christensen described the divergence in current and future demand. Incumbents of the industry focused on solely increasing storage capacity, as this was being perceived as the vital aspect due to demands by their current customers. In reality, a growing segment of the market demanded hard drives of smaller size, while the storage space was only secondary (Christensen, 2013). Initially, this segment was insignificant in size and economic value and therefore not targeted by larger incumbents. However, the segment grew rapidly and new entrants had gained large market shares in the new market, making it hard for previous incumbents to keep up. Thus, the ability to conceptualize different value parameters and successfully identify their importance is vital for a firm to stay competitive.

The complexity of managing innovation capabilities within an organization is another issue among managers. Initially, innovation, and especially radical innovation, is often misunderstood or ignored by managers as it cannot be supported by established structures and processes of the firm (Börjesson & Elmquist, 2012). Furthermore, there is no generally accepted model of how innovation capabilities should be modelled, and neither is there much experience with applying existing models on firms. Especially connecting the abilities to quantifiable results is lacking in theory (Saunila & Ukko, 2012). The lack of established models makes it necessary for managers to create their own mental models of how to conceptualize and manage innovation capabilities. Nonetheless, academia

has identified certain factors that correlate with innovation success. Consequently, there seems to be some conceptualizations of innovation capabilities that is better aligned with reality. Hence, the utilization of conceptualizations aligned with reality is essential for innovation capabilities to be developed.

This is aligned with Teece et al. (1997) attempt to concretize dynamic capabilities into three separate capacities; first, sensing and shaping opportunities, then seizing these opportunities, and finally to manage threats and reconfigure accordingly. It is the manager's responsibility to be able to orchestrate all three of these dimensions (Börjesson & Elmquist, 2012). These capacities necessitates the ability of accurate sensing of what opportunities that are valuable, as well as what threats exist. This cannot be derived entirely to what knowledge a firm, and it managers, has but rather the structure that exists that generates patterns and connections to this knowledge. Thus highlighting the ability to recognize what is and what is not important (Langlois, 1997). An ability that is very similar to what here is labelled as organizational intelligence.

6.1.2 Innovation strategy & vision

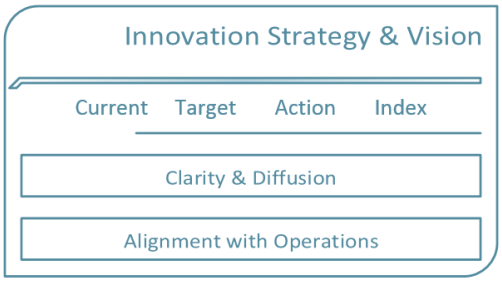

Figure 10 - The element Innovation Strategy & Vision

A firm's future business is embedded in its proposed strategy, and how it chooses to connect innovations to its strategy is of substantial value in a long-term perspective. The strategy is derived from the vision of what a firm wants to accomplish (Johnson, 2004). Thus, firms that envisions themselves as innovation leaders must establish an innovation strategy to accomplish this goal. An innovation strategy describes and exclaims how and to what extent innovation is part of its business. Thereby denoting how innovation is utilized to stay competitive. The firm's innovation strategy is thus essential for how innovation is managed at a firm (Rådesjö & Sandström, 2013).

Björkdahl and Börjesson (2011) state that the innovation strategy needs to be clear, communicated and understood throughout the firm to properly transfer the vision to the firm's employees. It has to be articulated so that employees find it clear in which direction the company is heading, as well as infuse a sense that they are part of this undertaking. Otherwise, the employees might lose attention and interest in performing operations connected to innovation. Hence a certain degree of clarity and communication of the strategy to the firm's employees is necessary to be diffused throughout every layer of the organization (Björkdahl & Börjesson, 2011; Saleh & Wang, 1993).

Lawson and Samson (2001) argues that to imbue a sense of importance regarding innovation within a firm, the innovation strategy needs to be connected to a common vision. A way to create a sense of urgency regarding innovation within a firm is to establish a vision of the firm as proactive. A proactive firm aspirates to become the leader in a market by adopting an offensive strategy. In opposite, a reactive firm follows the actions of said leader (Saunila & Ukko, 2012). Proactive firms break the established rules within an industry and therefore sets the stage for reactive competitors. Hence, proactive firms to a larger degree tend to infuse innovation in its overall business strategy than

reactive firms (Saunila & Ukko, 2012). Excelling at proactive activities while remaining successful in mainstream business requires a common vision, through an articulated innovation strategy diffused throughout the organization.

Porter (1980) describes several types of roles actors can maintain, where two of the most prominent are the role of innovation leader and innovation follower. An innovation leader aims at introducing novelties prior to competitors in an industry. Thus, an actor witnessing itself as an innovation leader should establish a proactive strategy and rearrange its innovation capabilities accordingly. For firms that do not envision themselves as innovation leaders, a proactive strategy would be counter-productive. This was identified by Rådesjö and Sandström (2013) in their assessment of Statkraft. Statkraft made a strategic decision to not focus on radical innovation, but instead on incremental innovation and to excel in being reactive. As a result, subsequent development of innovation capabilities were aimed at fulfilling this goal. Thus, innovation capabilities only have as much value as they are given by the firm due to their innovation strategy.

Moreover, a strategy is only valuable if the firm has the means to implement it. The innovation strategy must therefore be formulated in a way that makes it possible to turn it into action. Björkdahl and Börjesson (2011) describes that for a strategy to be implemented it must be translated into rules and institutions. These rules and institutions aim at affecting decision-making and day-to-day operations for innovation to permeate the organization. Parallels can be drawn to implementation of other types of concepts, such as Lean production. If the concept of lean production is implemented as something that is being performed outside of everyday work, employees will have a mindset in which they can choose between performing an activity as previously or using a lean procedure. When lean production and its mindset has been imbued into the firm strategy, employees perceive the lean procedures as the only option (Höök & Stehn, 2008). Correspondingly, an innovation strategy must be aligned with everyday work, effectively institutionalizing it, to function effectively.

6.2 Doing things rights

If higher-level elements of *Doing the right things* introduces the ability required to recognize the importance of innovation and generate a goal, lower-level elements of *Doing things right* include the means of reaching this goal. Elements of *Doing things right* can thereby be seen as the innovation muscles necessary to withhold the character of preparedness of innovation capabilities to nurse competitiveness through innovation, as described by Börjesson and Elmquist (2012). Thus, they must be designed and strengthened so that they together offer the prerequisites required to accomplish the goal stated in the innovation strategy. Correspondingly with the described systems thinking, the elements of *Doing things right* continuously interact with each other and are seen as somewhat overlapping. Processes, Resources, Organizational structure and Values are therefore all affected by the each other, often in abstruse ways.

6.2.1 Resources

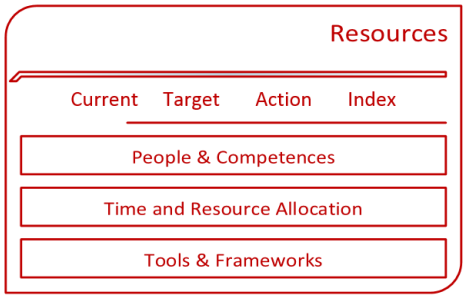

Figure 11 - The element resources

Resources, as described here, are related to the resource-based view theory presented in the theoretical foundation of innovation capabilities. Resources are tangible and intangible sources from which benefit is derived (Lawson & Samson, 2001), often represented by natural resources as raw material, human resources as labor and skills, and finally capital goods and means of production. Christensen (2013) presents resources as one of three building blocks of innovation, which consists of people, equipment, technology, product designs, brands, information, cash, and relations with external partners. It is the existence of these as well as how they are combined that provide the firms competitiveness, due to their necessity in creating organizational capacities to enable performance and reach goals. Guan and Ma (2003) furthermore describes the necessity of firms to mobilize and expand technological, human and financial resources to stay innovative, highlighting the ability to exploit existing resources for a specific purpose.

Intangible resources, derived from human characteristics, are vital due to the inherent qualities of innovation. Coming back to the definition of innovation as “the successful exploitation of new ideas” (DTI, 1994) or “A novelty that generates wealth or enhances existing resources" (Drucker, 1984), human activities become obvious. The notion of new ideas and novelty assumes human ingenuity in generating these into existence. The generation and formulation of ideas demands sufficient knowledge and human ability to be successful and valuable. Moreover, the concept of value and success bring forward perception, another human characteristic necessary for innovation. Perception is the identification, arrangement and interpretation of the world surrounding us humans (Atkinson et al., 2014). Value and success are concepts that are built upon human perception and are therefore inherently subjective. Labeling something as valuable is connected to the mental models used for appraisal and comparison of qualities of an object in relation to other objects (Stubbart, 1989). A way to achieve more diverse interpretations and problem formulations to generate novel ideas and identify contrasting qualities that are valuable is a large diversity among employees. Diversity can encompass for instance the variety of backgrounds, competencies and education of employees of the organization (Bassett-Jones, 2005).

Appraisal and comparison of qualities requires relevant knowledge and skills of the employees to be successful. O'Connor (2008b) describes entrepreneurial skills in employees as vital during these activities. These skills enable personnel to navigate in uncertain environments and identify opportunities, while possessing the skills required to implement ideas. Moreover, it is vital to attach employees with these set of skills to roles matching these competencies (Guan & Ma, 2003), so that they are utilized fully. Attaching employees with these entrepreneurial skills to unfulfilling roles could cause them to leave. Consequently, they must be given room to maneuver and support in the innovation process. Moreover, empowering such employees would allow them to fulfill their potential fully, thereby enabling innovation (Lawson & Samson, 2001). However, it might be necessary to provide frameworks and tools to guide employees and support required competencies and skills (Argote & Ingram, 2000).

Like all projects and operations within companies, innovation requires financial resources. Necessary tools and equipment must be present during innovation, as well as sufficient personnel and time. The funding of innovation introduces several problematic aspects, such as what funding channels are available and how portfolio management are handled. Generous resource allocation towards innovation increase the number of innovation projects (Lawson & Samson, 2001). However, it is not sufficient with a large number of innovation projects, but the right projects must be funded. This calls for high-performing portfolio management with a good mix of high and low risk projects in alignment with the current and future business plan of the firm (O'Connor, 2008b). A variety of funding channels is also beneficial as this offers project champions and entrepreneurial minds opportunities within the company. Thus making decision-making regarding innovation diffused throughout the organization, counteracting organizational rigidity (Lawson & Samson).

A continuous slack of resources is a managerial practice that has been connected to innovativeness of an organization (Ahmed, 1998). A slack in time for employees enables higher risk-taking and the possibility to identify values otherwise missed. This slack might be generated through not overloading employees with excessive tasks and projects (Ahmed, 1998). Continuous slack furthermore acts as a buffer for the organization, enabling the organization to reflect and adapt to internal or external changes. Moreover, a higher risk-taking is possible as employees are able to work on projects with an uncertain result (Ahmed, 1998). It might also encourage the generation of safe places, as described by Dombrowski et al. (2007), which are highly innovative. A lack of slack might be explained by a low prioritization of innovation by managers in day-to-day-activities, meaning that a low amount of conscious decisions are made to support innovation (Björkdahl & Börjesson, 2011). Suggesting that even if more resources were available, they would still not be allocated to innovation efforts.

6.2.2 Processes

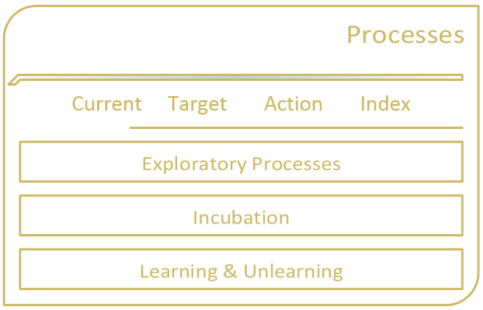

Figure 12- The element Processes

Processes are collection of related and structured activities aimed at producing a specific purpose or product. Christensen (2013) highlights these as one of the three foundations of innovation capabilities. Organizations' often structure their business into processes, as they can be highly formalized and designed to streamline its enterprises. This effectivization is often due to standardization of processes, resulting in a reduced uncertainty of its outcome. However, as highlighted by O'Connor (2008b), there is a distinct difference between what is required to excel in day-to-day operations and what is required for successful innovation. As stated earlier, it is thus not possible for organizations to support innovation through old structures and processes (Backman et al., 2007). As a result, processes aiming at enabling or generating innovation must be something outside the mainstream business of the firm.

O'Connor (2008b) instead discusses another type of processes that allows for organizational learning and exploration rather than exploitation, called exploratory processes. These type of processes are searching in their nature, favoring aspects such as knowledge creation, variety enhancement and problem formulation rather than closure and quick results. This focus is derived from the fact that during innovation of more radical nature, a formulated research question of what to achieve is often not present as customer value and performance criteria are not known beforehand (Börjesson & Elmquist, 2012). This is largely due to that market and technology development are intertwined in new and uncertain markets where innovation is common (Morone & O'Connor, 1992). Thus, elaboration and definition of latent assumptions, hypothesis generation, and testing for technical and business uncertainty are to be preferred in exploratory processes (O'Connor, 2008b).

To make processes more concrete in relation to innovation, it might be helpful to distinguish between different phases of innovation. These are front-end processes, new product development processes and commercialization processes (Koen et al., 2001). However, it should be stated that these phases should not be seen as a subsequent set of linear processes, but as a way to classify activities undertaken during innovation. This classification is also valid with the proposed definition of innovation capabilities, as it is vital to both generate and develop ideas to produce valuable and marketable innovation.

Front-end processes include activities such as exploration, opportunity identification and idea generation (Backman et al., 2007). As stated previously, uncertainty is required during these early phases, which often is something managers seek to reduce. Also, what driving factors are behind the idea and where it is generated affect the internal status of the idea, leading to that some ideas might erroneously be given a lower priority or discarded (Backman et al., 2007). As this diverging status of ideas are recognized, ideas with no driving factors or origins of low status might early on be formalized to fit the favored framework. Thus losing their originality and potential novel value. This is also highlighted by O'Connor (2008b) who states that appropriate decision criteria and divergent metrics depending on the qualities of an idea are vital. The utilization of exploratory processes in the front-end can be a way to avoid these problems.

One vital aspect of innovation is the ability to connect and implement innovation into the mainstream operations of the organization. Lawson and Samson (2001) describe this process as balancing newstream and mainstream activities within an organization. The newstream is described as the processes and resources possessed by the organization to generate ideas and create novel value, while mainstream activities are functions currently responsible for generating revenue such as marketing, sales and manufacturing. The balancing of the two requires the ability to coordinate and control day-to-day mainstream activities, while still cultivating innovation capabilities and integrating newstream offers and concepts into the mainstream.

Implementation, as described by Björkdahl and Börjesson (2011), is the ability to connect newstream and mainstream operations. It refers to the ability to implement an idea and translate it into a valuable customer offer, including the reframing and altering of business opportunities and business models. One aspect presented as paramount for successful implementation is the ability to identify business opportunities within novel ideas or technical solutions. This is due to that novel technology often opens up opportunities outside the current market scope of the firm. The development and integration of novel business models with technological development might therefore be necessary (Assink, 2006). Finally, to integrate innovation into the mainstream operations of the organization, an innovation must be commercialized and introduced to customers so that it generates revenue (Lawson & Samson, 2001). This aspect is further described as vital for successful implementation by Guan and Ma (2003), as they highlight the necessity to successfully identify customer value and

promote the firm's product to that customer. Marketing and manufacturing capabilities might thus also be included in a broader scope of innovation capabilities.

Moreover, the ability to assimilate the knowledge that capabilities contain is crucial to enable organizational learning (Lawson & Samson, 2001). Organizational learning is defined by Guan and Ma (2003) as the capacity to identify, assimilate, and exploit new knowledge essential for a firm's competitive success. Through this ability the organization is able to renew itself and adapt to changing surroundings and market structures, which is critical for successful innovativeness of firms. Capability for learning includes internal transfer of knowledge, learning from past ventures and external collaborations. To enable organizational learning the establishing of mechanisms that make it possible for knowledge to be structured and applied in a useful manner is a prerequisite (Börjesson & Elmquist, 2011). However, to be able to cope with change and adapt the organizational behavior with the new environment it is also necessary to unlearn previous knowledge and responses (Baumard, 1996; Hedberg, 1979). Thus, there must be processes or mechanisms in place to ensure that necessary knowledge is attained and diffused, while outdated knowledge or responses are abandoned.

6.2.3 Values

Figure 13 - The element Values

Of the three factors that Christensen (2013), values is the criteria by which a person decides what should and shouldn't be done. In a broader sense, values are an individual's set of internals references upon which a basis for actions are decided (Atkinson et al., 2014). Values exists on every level within a corporate environment, from maintenance to executive level, and influence what decisions an individual will prioritize. Decisions influenced by values could therefore be anything from which customers a salesman contacts to what line of business an executive wish to pursue (Christensen, 2013). Thus, it is obvious that individual values within employees have a large influence on the performance of the firm and the direction in which it is moving. Moreover, firms with superior financial performance are characterized by a set of core managerial values that reflect their business model (Barney, 1986). Christensen (2013) states that values within a firm must reflect its business model for the firm's performance to be optimal.

Values are furthermore inherently linked to the organizational culture (Barney, 1986; Hofstede, 1980). A common definition of organizational culture is provided by Hofstede (1980) which states that it is a complex set of values, beliefs, symbols and patterns of behavior. Furthermore, an organizational culture is notoriously difficult to imitate as it consists of soft parameters that are very complex, if not impossible, to describe and transfer by an outsider (Barney, 1986). An organizational culture that fosters competitive advantages are therefore highly valuable for the firm. Thus, the organizational culture is an important factor when analyzing a firm's competitive ability (Assink, 2006; Barney, 1986; O'Connor, 2008b). The willingness to learn new things and unlearn outdated

behavior, the tendency to take risks and accept uncertainty and a willingness to accept change are all aspects of the organizational culture connected to innovation capabilities (Assink, 2006). For example, a hierarchical organizational culture focused on control and regulations inhibits creativity and risk-taking, while a culture that places emphasis on change would act facilitating (Brettel, Chomik, & Flatten, 2014).

Creativity is the phenomenon whereby something novel is developed by an individual or small group of individuals working together (Amabile, 1988). Creativity is a necessary prerequisite for the generation of novel solutions and ideas. Lawson and Samson (2001) argues that creativity operates along a continuum and can be manifested in many forms. On one end, it is the force behind the myriad of minor improvements employees do in their day-to-day work. On the other end, it fosters radical ideas that can transform an entire industry. Large firms often lack the motivational capacity to nurture innovation of radical nature due to a hierarchical structure that facilitates streamlined processes more than creative solutions and experimentation. Thereby establishing values that does not encourage creativity and ideation. Thus, establishing an organizational culture that values creativity is an important element of a firm's innovation capabilities.

While creativity is necessary to come up ideas, it might be limited due to path-dependency. Resulting in novelties being shaped after molds of previous endeavors or offerings (Teece et al., 1997). Path-dependency might be the result from a rigid organizational culture where change or unorthodox ideas are discouraged. However, it could also be present for technical reasons. This is common when a product is part of a network or other system where the product need compatibility with other entities in the network. In this case, path-dependency is apparent as a novel product cannot deviate very far from its predecessor, as it still has to be compatible with its network (Zhu, Kraemer, Gurbaxani, & Xu, 2006). It could also arise from lock-in-effects due to high-switching costs (Assink, 2006).

Risk is always present when working with radical innovation, as it is inherently connected to uncertainty (O'Connor, 2008b). Firms therefore cannot know beforehand which innovations will be successful, as regular methods of planning such as forecasting sales are no more than reasonable guesses (Assink, 2006). Radical innovation by definition transform markets and may render the previous technology obsolete (Christensen, 2013). It is therefore often an unwillingness within the firm to foster these innovations, as they can cannibalize on the firm's current stream of revenue. Nonetheless, it has been proven to be a necessity for long-term competitiveness and a source for supranormal returns (McDermott & O'Connor, 2002; O'Connor, 2008b). Thus, the ability to accept that risk is necessary for success in the long run is therefore adamant (Assink, 2006).

6.2.4 Organizational structure

Figure 14 - The element Organizational Structure

The influence of an appropriate organizational structure for the ability to develop innovation capabilities has been widely discussed in literature (Assink, 2006; Lawson & Samson, 2001; O'Connor, 2008b; O'Connor & DeMartino, 2006). The element organizational structure is described by Guan and Ma (2003) as the ability to generate a clear and established structure, coordinate activities towards a shared goal and generate a supportive infrastructure. The ability to adjust the structure depending on what a specific project requires, create communication flows within and outside of the organization, establish an overlap between different phases of innovation and enabling autonomy of lower managers are other factors of organizational structure found to affect the innovation capabilities (Guan & Ma, 2003).

Often discussed is “where“ within the organization innovation should be developed, due to its impact on autonomy, control, resources and expertise (Leifer et al., 2001; O'Connor, 2008a). As suggested by O'Connor and DeMartino (2006) it has previously generally been considered that innovations should be developed by external or stand-alone divisions, before being integrated into the mainstream operations. Although, it has been shown that organizing innovation within the regular organizational structure is equally viable, if issues such as interface mechanisms between newstream and mainstream operations, external collaborations and transition challenges are managed. Innovation within the regular organizational structure also bypasses problem entailed in utilizing stand-alone innovation divisions due to detachment from the mainstream organization. Such as inability to utilize existing competencies, lack of recognition by regular management and unawareness of overlapping activities due to a lack of communication (Lawson & Samson, 2001).

Others argue that a defined team, group or division with a clear responsibility for innovation can improve innovation capabilities (O'Connor, 2008b). This clear responsibility would make sure that resources are allocated to innovation efforts, as the group would be allocated resources directly. It also enables experience and knowledge accumulation (Zollo & Winter, 2002), without it being displaced by regular routines of the company or stamped out by reified rules. Thereby allowing novelties to be developed without pressure to conform to standard operation models (Leifer et al., 2001). An increased specialization towards innovation can also be allowed without affecting mainstream operation of the company. However, it is vital that the clearly defined group is not separated from the mainstream organization without interface mechanisms. This might cause an inability to assimilate developed innovations, or even innovation capabilities, into the organization. Thus, the coupling between a division responsible for innovation should be loose enough to enable the advantages of such a group, while still being tight enough to enable the transferring of these benefits and capabilities to the mainstream operations (O'Connor, 2008b).

Previous discussions highlights the necessity of developing a clear structures for managing innovation within an organization. However, there is also an opposing view emphasizing the importance of an organic organization for enabling innovation. This view highlights the impeding effects that excessive bureaucracy of clear structures can entail (Assink, 2006; Lawson & Samson, 2001; Sharma, 1999). An organic organizational structure facilitates the organization to act more dynamic and enables more innovative ideas to emerge. This is achieved through creating permeable boundaries and diminishing the inhibiting effects that institutionalized silos and bureaucratic processes of the organization can create (Lawson & Samson, 2001). In a mechanistic organization, decision-making is centralized to high-level management. This might cause a lack of autonomy for low-level managers, which eliminates freedom required to experiment and find novel solutions. Thus eliminating the ability for ideas to emerge from lower levels of the hierarchies and be developed into successful innovation (Schilling, 2005; Sharma, 1999).

Moreover, bureaucracy might inhibit fast-moving and risky activities that needed for successful innovation through the establishing of excessive fixed rules and procedures. Fixed rules and procedures are often established to streamline and routinize mainstream operations of a firm (Assink, 2006), which is not compatible with the inherent uncertainty of innovation (Björkdahl & Börjesson, 2011). Thus intended to ensure status quo, whereas innovation in itself aims to upheave this equilibrium (Stringer, 2000). Developing innovation capabilities thus require distinctive structures and institutions not designed for preserving status quo.

Activities aimed at building alliances and relationships with external actors, as well as other boundary spanning activities are also a crucial aspect of innovation capabilities (Elmquist, Fredberg, & Ollila, 2009; O'Connor, 2008b). This issue is widely discussed in the field of open innovation, in which it proposed that the system of a closed innovation system has lost its strategic value (Chesbrough, 2006). Instead, there should be a mix of internal and external ideas taken into product development, and these should be brought to market through both internal and external paths. Also vital is the ability to search and identify ideas outside of the organization (Elmquist et al., 2009). The search furthermore includes the identification and evaluation of opportunities on the market, through the management of collaboration and extending offers together with external partners. Moreover, collaborations can help diminish development time and costs, reduce resource commitment, enable learning and increase flexibility (Grant, 2010).

7 Understanding the ways of working at Product Department Alpha

This section presents findings regarding processes, communication and organizational structures related to innovation at PDA. Initially, the differences regarding function and responsibilities between the central research department and product development at PDA is presented. Followed by how these departments are interrelated and how Technology Support acts as a bridge between them. Finally, a section describing the relationship between the Design Unit and Business Unit at PDA is presented.

7.1 The group function Research

Ericsson has a company-wide group function of research, responsible for exploration and development of technology seen as long-term prospects. This research department is divided according to the product areas of the business unit organization of the company. Thus there is an Alpha-product department in research, corresponding with the Alpha-product department of BURA. In this report this corresponding department is known as Research Unit Alpha, hereinafter called RUA. The time-horizon for technologies explored in RUA is approximately five years, as these technologies are seen as currently not developed enough to be implemented into products. Every year a general strategy regarding technology and research is developed by the management of RUA to guide employees of the department in their activities. The strategy is derived from demands and challenges that are perceived by management as vital the following 5 to 10 years. Input into the formulation of the strategy is taken from informal discussions with employees of RUA, DUA and to some extent the sales department.

There seems to be little structured communication directly from DUA with external actors, such as customers or suppliers, when formulating strategies and planning upcoming research. The communication with external actors is managed by the sales department, which also is responsible for documenting and communicating received information to RUA. Received information may include customer demands and experienced problems. The communication channels between the sales department and RUA are furthermore largely informal. The majority of input from the sales department is therefore from a few employees that have informal contact with employees of RUA. As a result, researchers of RUA often formulate problems, as well as find the solutions to them, without any input from customers. However, there is an effort from management of RUA that employees should focus on problems derived from customer understanding or scanning within and outside of the organization. Nonetheless, there is a potential to further improve customer value when initiating research.

An expressed role of RUA is to sense what direction technology and research is heading towards. Conducted research is subsequently used as input to create guidelines for upcoming product development at DUA. There is no expressed goal that the findings of research conducted at RUA should be integrated into product development in DUA. Moreover, all formal communication between RUA and DUA is through managers of the two departments. Further knowledge transfer between the departments is therefore reliant on informal contacts and meetings between employees of them. Nonetheless, a goal of RUA is that knowledge gained should be transferred to the DUA, so that they have the possibility to infuse this knowledge into future products. To facilitate this, RUA tries to utilize the same tools and language as the DUA to decrease the gap between the

departments and facilitate the transfer of ideas between them. However, the outcome of research activities are mainly patents for general technology and solutions, seldom resulting in specific products. Instead, many technologies are presented by Ericsson at events like the Mobile World Congress, due to their large inventive step and novelty factor (Ericsson, 2015).

In the last years there has been increased collaboration between the RUA and DUA through a multitude of interfaces. Today, RUA is active in supporting the product and portfolio strategy developed by BUA and DUA, by providing input regarding the direction that the technology is heading towards. Moreover, information about research activity in RUA is continuously presented to the BUA and DUA management, to be used as input during planning of the portfolio. Specific projects have also been conducted together regarding the development of hardware identified as vital for future technological development.

7.2 Technology Support as a bridge between research and product development

The gap between the research and product development is bridged through a distinct Technology Support department, hereinafter called TS, within DUA. TS has two main responsibilities within the DUA. Initially to understand the context in which the product will be used, thereby enabling the department to recognize potential opportunities and challenges. Secondly, they have higher level architectural and infrastructural responsibility of the product line, ensuring that all products are related and that product development is converging. The timeframe of relevant technologies at TS is slightly shorter than that of RUA, ranging between 3 and 5 years. The strategic focus of the department is to support a product portfolio which satisfies the demand of current customers as well as the demand that will emerge in the established timeframe. To accomplish this, the department collaborates with RUA to recognize what technologies will be relevant from a strategic perspective. Since TS is a part of the customer-driven DUA, input gathered from this collaboration is utilized to align the portfolio of products with current and future technology development and customer requirements. Thus acting as a link between the forward-looking RUA and customer-oriented DUA.

Moreover, TS is the owner of the technology leadership goals for the PDA and responsible for introducing an economic reasoning in technical decisions of strategic importance. To accomplish this, the department collaborates with suppliers and internal technical experts to gain knowledge about trends in the industry. They are also responsible for developing business cases based on conducted trend analyses, to enable PDA to leverage its product portfolio and create and capture value on the market. The main reasoning of how to create and capture value is to focus on developing and providing products with a clear customer value. Moreover, the focus on customer value is perceived as a clear distinction between TS and RUA. This distinction means that TS management primarily focuses on development of technologies within the current product area and the demands of current customers.

The demarcation between responsibilities of TS and the rest of DUA is not perceived as equally sharp, although a distinct difference is that DUA has clear product responsibility. This is based on that DUA develops concrete products for customers, while TS defines a higher-level product architecture and identifies how to fit specific technologies and products within this architecture. Thus, TS creates guidelines and requirements for DUA regarding the overarching architecture of the product portfolio, which DUA adheres to when developing concrete products and specific solutions.

7.3 Interaction between the design unit and business unit

DUA is wholly responsible for the development of novel products and have full design responsibility of the product line. However, DUA generally get directives to develop products fulfilling certain demand or requirements from BUA and TS which are used to create a backlog. A directive is accompanied with a budget for the development of the specific product, making BUA an internal client of DUA. The systems department of DUA, together with operative product owners, translate demanded functions into a concrete technical solution. Technical solutions are delivered back to BUA to confirm that this is what is actually demanded and start a dialogue regarding subsequent product development. The product development is divided into two node development organizations corresponding with the primary technologies, here called NDO1 and NDO2. There is also a supporting function within DUA called R&D Operations with the purpose to improve the operations of the department. Innovation support is located within this function.

Directives from BUA of what products or features to be developed are generated through technical feasibility analysis and strategic decisions on how to arrange the product portfolio. Strategic intent and feasibility analysis are done concurrently to ensure the creation of customer value as well as to align product development with the overall technical trends. As previously mentioned, the strategic intent is established together with TS and RUA. The input from RUA and TS also aims at concluding whether a product is aligned with the current and future technological base. Moreover, customer problems and demands can be transformed into customer requirements documents by the sales department, which are submitted to BUA. These are utilized to create internal backlogs of required features for upcoming products, which in turn are forwarded to DUA. However, it is perceived that technical analysis and strive towards technical leadership is the dominating reason for initiating product development.

When a directive is delivered to DUA, a product leader defines a coherent product document with a concrete list of requirements and features. The features of an upcoming product is defined through the previously established backlog. A time frame and budget is assigned based on the amount of features. As stated, many features of the backlog are generated by BUA, but it is also possible that ideas from the product development teams are included. However, ideas of all types share the same backlog and what features are chosen to be implemented is decided by the team leader and product owner. A development team, also called a node, is created to develop the product within either NDO1 or NDO2, depending on what technology the product is related to. The development teams are cross-functional and a fitting team is assigned to a product development project. The team can thereinafter start implementing features of the backlog. Still, there is freedom within the project of how to interpret and implement features of the backlog.

Furthermore, necessary technical features of products outside the technical area of DUA are requested from other business units focused on the specific function. This is the case with certain software, where requirements are defined by DUA and delivered to the departments responsible for Operational and Business Support Systems. These departments have the knowledge and skill necessary for development of software for customer interaction. Additionally, there is an interface towards the sourcing and supply division, located within the Global Services, which is responsible for contact with suppliers, choice of technology and input material prices. This has an effect on the development activities of the DUA, as input from Sourcing and Supply must be taken into account when designing a final product. The production facilities also has input in the product design choices, due to their responsibility of production cost and logistics.

8 Assessing the innovation capabilities of Product Department Alpha

This chapter presents the findings of the case study at PDA. It is based on interviews conducted at PDA and PDB as well as a review of official documents. The assessment tool presented in chapter 5 and 6 has been utilized to assess the current innovation capabilities of PDA, while PDB has acted as a frame of reference. Initially each element will be assessed individually during Block I, followed by an analysis using a systems perspective where elements are seen as interrelated in Block II. Assessment in Block II includes both general insights gathered from the review of strengths and weaknesses of elements, as well as the interaction between elements of Doing the right things and Doing things right.

8.1 Block I – Assessing individual elements of innovation capabilities

The following section will present the findings acquired during the application of Block I of the assessment tool at PDA. The findings are divided so that each individual element of the assessment tool is assessed in isolation. Differences and similarities between PDA and PDB are presented to create a point of reference.

8.1.1 Organizational intelligence

Managers of PDA generally have an adequate understanding of the innovation concept and its divergence from invention. However, adequate mental models about the concept does not seem to be shared within the department. Instead, there are variations in the perception of what actually constitutes innovation, which has resulted in different ways of working with it. One identified difference is that technical employees tend to focus on technological novelty aspects of the innovation concept, while business employees highlights that innovation revolves around the creation of value. One example of challenges derived from a divergent understanding of innovation was mentioned at an interview with a manager in DUA. The respondent described a specific idea assessment case where he was responsible for whether an idea should be approved or not. The respondent's individual interpretation of innovation is that it entails immediate creation of value for current customers. The idea pitchers were from a technical department and stated that their idea was a solution that would create value in the future. The manager stated that the idea was not an innovation, as the respondent interprets it, as no value was added to current customers and did not approve the idea. According to another respondent the idea pitchers still disagree with the decision, as they believe it to be an innovation due to value it will create in the future. This example implies that there is no shared common understanding of innovation.

Almost all respondents perceive an earnest will of Ericsson to excel at innovation, as it is a part of the organizational legacy. This is illustrated by quotes such as "Just look at the history of the organization. 125 years survival through moving away from areas that have stagnated and towards new markets.". The earnest will to excel at innovation became apparent during interviews, as almost all interviewed managers emphasized the necessity of innovation for Ericsson to stay competitive. However, it is perceived that there is no formulated strategy of how to achieve this in PDA. As a result there is divergence of how different managers perceive that the will of excelling at innovation

should be implemented. Consequently the will is materialized in different ways, depending on whom is manager of a specific department. In some departments, there is a managerial perception that this is achieved through not micro-managing projects and giving employees and development managers the trust and freedom required to autonomously find solutions. While the importance of developing processes that supports innovation is highlighted in other departments, due to different managerial perception.

Almost all respondents believe that the understanding of the current market and customers to be corresponding with its actual arrangement. Knowledge regarding the market is continuously revised through the employment of processes for handling and analyzing information regarding customers. There is also an understanding of that the market is changing and that the department must react to this. The recognition of a changing market is stated as the reason why innovation has been increasingly highlighted by management the last years, especially by higher-level management. On a company-wide level Ericsson has responded to the recognized change by formulating a strategy for targeting new areas, such as cloud and TV & media. Target areas are continuously updated so that they are aligned with shifting market landscapes. Moreover, each department is responsible for seizing opportunities of the target areas within the scope of the department. However, it is perceived that the difference of new markets and customers that target areas entail are not yet fully recognized. Instead, solutions and elements that add value to current customers are often perceived as value-adding to novel types of costumers as well. Although, what adds value can be different for novel customers, such as car producers or fire departments, compared to current customers of network operators. The demands of novels type of customers should therefore be further explored.

Moreover, most respondents believe that top-management of PDA has a good comprehension of how to incorporate innovation into the business of the department. However, due to the technical nature of the company, the technical aspects of innovation often gets prioritized when solutions are sought. Thereby, problems are approached from a technical point of view. While other qualities, such as easier-to-use and easy installation, often have lower priority. This prioritization is believed to be institutionalized in the structure of DUA. The department is built upon the ability to develop products and solutions which offers a competitive edge. This is done by finding novel technical solutions to old problems that are better and more effective. Thus, the innovation conducted by DUA will mostly be of a technical nature. One manager furthermore mentioned that innovation of a technical nature was preferred, as it offered a way to milk cash cows as they became commodities.

The use of innovation to leverage products as they became commodities was also discussed at PDB, however they arrived at a different conclusion regarding how innovation could leverage these products. Mangers of PDB stated that they perceive innovation as a way to incorporate specific value propositions into products, which are communicated to customers. Thereby avoiding the possibility of the product becoming a cheap commodity through product differentiation. As a result, it was perceived that innovation was not used to make products, or processes, slightly better and more effective to the same extent at PDB. This approach towards innovation as a competitive device was not discussed by any respondent at PDA. One manager at PDA stated that the technical standards of networks made product differentiation unattainable. As all parts of a network must share the same qualities, it was perceived as difficult to offer customers products that were different than those of Ericsson's competitors. Furthermore, it was stated that end consumers of the network, mobile phone users, did not know, nor care, whom had created the infrastructure that their mobile phones were used in. Consequently, the two product departments have different perception on how to utilize innovation to leverage products facing commoditization.

Moreover, several respondents at both PDA and PDB stated that opportunities of a non-technical nature were not seized to the extent that they could be, due to prioritization of technical excellence. One mentioned opportunity, was the creation of products that were easy to install and use. Currently, products generally require trained and skilled staff to set up and service, which adds additional costs to customers purchasing products from Ericsson. Furthermore, different systems by Ericsson have different interfaces, so customers need to have knowledge about several different systems. Consequently, there are additional costs for customers which might not be necessary. These additional costs are not captured by Ericsson, which means that there might be potential for additional revenues in this opportunity. According to one respondent this issue was currently addressed by one specific project. This project aims at creating a communication interface that "translates" communication between two different systems of Ericsson, thereby making installation of networks easier. This was seen as very value adding for customers through lower installation costs, especially in markets with lower possibilities to hire skilled workers due to large salary differences. However, the project is only targeting the interface between two specific systems and similar solutions in other interfaces are not reflected in the current product offering.

The overlooking of similar opportunities is a possible threat in the future as novel type of customers might behave differently. Current customers of PDA are usually network operators, due to their size installation costs are only a minor item of expenditure. Customers in new customer segments might not be able to spend as much as network operators for installation of a system. When targeting these markets, requirements such as simplicity in use and installation should therefore be considered. It was furthermore stated that a similar reasoning was present in the former mobile phone business, where technical solutions were prioritized by Ericsson. However, most were however not interested in technical excellence, but valued other aspects such as a simple user interface and elegant design.

8.1.2 Innovation strategy & vision

There was a large disparity in responses regarding the existence of any articulated innovation strategy, and if it exists, what it is. Some respondents claimed that they perceived it as a vague statement saying "We need to get better", while others said that they had not heard of any enunciated strategy. This implies that there is no widely recognized innovation strategy. The most elaborate strategy in relation to innovation identified during interviews, is that innovation is perceived as a mean to accomplish the implementation of lean and agile methods. Innovation was also spoken about as a way to make products and processes less costly and more effective. One manager at PDB supported the perception of innovation as a mean through stating that innovation is, like quality, something that should not be decoupled from other activities. Instead it should permeate all activities in the department without necessarily being labeled as innovation efforts. This might imply that there is a focus on process innovation, rather than product innovation. Moreover, it was identified that other visions or goals are recognized as more important than innovation at both PDB and PDA, such as a shorter time-to market, called TTM, and cost-cutting. However, as stated, innovation is seen as a vital tool in reaching these goals.

There have been an increasing amount of activities aimed at supporting innovation capabilities at both PDA and PDB. However, most respondents didn't recognize activities as a part of a coherent innovation strategy or vision. This further implies that there is no clear innovation strategy communicated to employees, and if so, it has not been diffused among them. Thus, there is no shared understanding among employees of what the department want to achieve with innovation. This makes it difficult for employees to align their activities to support or reach a common vision. As a result, innovation is not organically infused in daily activities among employees as much as it could

be. This can be compared with how management has worked with a vision of shorter TTM, which is clearly articulated and diffused among employees. Therefore, employees understand how their activities can be altered to support this vision. The communication of an innovation strategy and vision, together with the increased number of activities, would aid employees in a similar way. Thereby helping them to align their activities with an innovation strategy and vision.

Moreover, there is a matter of prioritization between different strategies of the company. During interviews, it was mentioned that strategies supporting shorter TTM-, and cost-cutting to gain competitive advantage were supported by top-management to a larger extent than any innovation strategy. When implementing strategies this could lead to that initiatives with an impact on shorter TTM will be prioritized over initiatives related to innovation. More importantly, as previously stated, it was recognized by several respondents that goals related to cutting costs and shorter TTM was always prioritized in the mindset of employees during every day work. This could materialize itself in that executing tasks from the backlog in an efficient manner was always prioritized before considering if the tasks of the backlog was actually valuable. It was mentioned several times that innovation is seen as something “extra” rather than something of uttermost importance. As a result innovation was not infused in daily activities to the extent that it might be, but undertaken if there was some slack time.

Still, all interviewees had recognized that the company-wide strategy of Ericsson named innovation as vital for the survival and competitiveness of the company. This is also evident when reviewing official documents such as the annual report, in which innovation is a fundamental part. However, only a few respondents believed that this vision was translated into institutions or day-to-day activities that encouraged innovation. A discrepancy between the answers by managers and other employees regarding this was recognized in both PDA and PDB. Most managers stated that the vision was clear and that all employees was responsible for innovation activities. At the same time, other employees did generally not know how the company-wide innovation vision should be implemented in their job. Nonetheless, many respondents believe that an innovation strategy is to be formulated soon. The topic of innovation is increasingly discussed and embryos of a strategy is talked about, although not put on paper. The lack of a clear strategy was more recognized by PDB, where almost all interviewed managers saw this as an area of improvement and stated that a concrete innovation strategy was currently being developed.

During several interviews it became apparent that innovation predominantly was approached from a reactive manner, rather than proactive. One way this became obvious, was that innovation often was mentioned as necessary to keep up with the market, instead of going beyond competition. This viewpoint seems derived from the perceived nature of the market, where all parts of the network must be able to communicate with each other. Thus, all novel products are restrained to the network that already exists. Overall, a reactive approach to innovation was more noticeable in PDA than PDB. The more proactive approach at PDB materialized itself for instance through the, previously mentioned, use of innovation as a method of product differentiation. One respondent mentioned that the reason for the more proactive approach of PDB was due to a specific challenge and following adjustment that occurred a few years ago. At that time it was identified that the product line of PDB was not competitive in the current setup. Resulting in the formulation of an entirely new strategy by BUB and DUB, which was heavily focused on innovation as a way to overcome this challenge. Nonetheless, one proactive approach has been recognized in both PDA and PDB. Both are very active in setting standards for future networks. This way they are actively shaping an environment in which they have an advantage, rather than reacting to external market changes.

There is a large focus on technical aspects when it comes to strategies related to innovation. However the implementation of these goals are not always optimal, as seen in the goal of technical leadership in the field of information and communication technology. This goal is implemented by building an image of PDA being in the forefront technologically, through presentations of novel technologies at venues as the Mobile World Congress in Barcelona. Technologies presented here are often the result of technical exploration by the group function research and not by product development departments. Neither is the existence of presented technologies automatically communicated to product development departments. Thus, technological breakthroughs by RDA are not necessarily transformed into products.

8.1.3 Resources

The technical competence of PDA, necessary to achieve competitiveness through technical development, is seen as present and utilized by all respondents. Moreover, most employees view the technical competence of PDA as one of the biggest advantage of the department. However, competencies outside the core technical areas are not perceived as being present to the same degree. Neither is it believed that different types of competencies are distributed throughout the departments. Soft competences, such as knowledge about user experience or customer understanding, is seen as scattered or not present at all in most employees. Instead, most positions in the department is built upon the ability to solve specific technical solutions for products being developed. Thus, even though individuals with a certain position might have other competencies, they are not able to utilize these competencies due to the description of the position. Consequently, the existence and utilization of competences outside of core technical areas can be viewed as slightly low compared to the very high technical competence.

Most employees share a similar background as engineers and most managers have risen from technical occupations to their managerial positions. Thus, they tend to share a strong focus on technical aspects of innovation. A lack of diversity regarding knowledge and background might lead to that aspects of innovation outside of the shared focus gaining a lower priority. If managers value technical skills more than softer ones, they promote technicians to a large extent, which could lead to lower amount of managers with strong non-technical competencies. This tendency was also identified as present during the hiring process, which means that it is difficult to introduce new types of competencies in PDA. Additionally, PDA has a low personnel turnover and a process of rearranging competencies would be slow. Furthermore, several respondents stated that a majority of employees are white middle-aged men with similar experiences, which also affects the overall diversity of culture and competencies.

Nonetheless, there are several ongoing initiatives to educate employees within new areas of knowledge and to diversify their competences. Initiatives include a company-wide set of online tools in form of Ericsson Academy, as well as frequent workshops and lectures. However, most respondents mentioned that online tools are seldom utilized. Moreover, many employees have not heard about their existence. Workshops have received positive feedback, but since most events are optional, a relatively small amount of invited employees attend. Especially when it comes to workshops of subjects outside specific technical knowledge, such as customer understanding and user interaction. The reason for this might either be due to a weak interest for the subject or a shortage of time.

A lack of allocated time for innovative work is by many respondents perceived as a significant obstacle for innovation at PDA. Interviewed developers generally stated that they do not have any

time to reflect upon their activities or more unorthodox solutions due to a high work load. There is always a task lying in the backlog that has to be executed, which leaves little time for reflection or innovative work. In these situations, it is furthermore indicated that solutions that requires extra time is not appreciated due to the work pressure. However, a common remark is that time will be available as long as an employee is strongly passionate about an idea and is willing to pursue it. PDA has introduced a system where employees may be granted time outside of their ordinary tasks to work on ideas. The requirements for this time to be granted differs between individual managers, depending on their willingness to take risks and the perceived quality of the idea. Thus, employees may be hesitant to engage in innovative activities as it may be unclear if they will be able to pursue it further. Furthermore, it requires a specific type of personality of the employee; someone with entrepreneurial skills that are willing to spend a few weeks on an uncertain project.

All respondents agreed that a lack of time for innovation is a challenge, but there are contrasting views on how this issue manifests itself in everyday work. While many employees state that allocating time is a possible solution, such as scheduled time specifically aimed at reflection upon solutions, others propose that free time in itself doesn't increase innovative work. Instead, it is argued that if employees were to get 30 minutes of "innovation time" on scheduled occasions, many would see it as extra time to finish regular tasks. Allocating time could also be seen like forced creativity, which generally isn't well received by employees. It is instead proposed by several managers that the envisioned lack of time is connected to work structure and culture. Innovation should not be confined to a certain time frame, but should permeate all parts of an employee's work. In essence, time slack within processes along with an innovative mindset would be more productive than allocating time to specific occasions. The challenge with finding time for innovation in everyday work is perceived as being larger in PDB than PDA.

There are tools such as Business model canvas and value mapping available through the company-wide service of Ericsson Academy. At both PDA and PDB, there are also a variety of coaches and innovation groups that aid employees when developing ideas and guide them towards the proper channels. This type of tools and support functions are necessities to aid employees in developing an idea into a proposition and to raise awareness of innovation in general. Awareness of the existence of coaches, and their role in the department, has increased as they have held both classes and workshops. However, when asked about how employees believed that they could take help from existing tools, almost nobody had actually done or thought about it. Instead, most said that they most likely would make informal contact with innovation coaches and ask them what to do. These coaches are therefore perceived as the most valuable tool and support for innovation at both PDA and PDB.

The existence of aiding tools should be more thoroughly communicated to employees. Several respondents stated that there may be tools available, but very few can define their specific content. Reasons for this could include that the presentation of these aids are blurry or vague, leading to that employees are unsure to what these tools aims at facilitating. Furthermore, several respondents that are aware of these tools and guidelines state that they perceive them to be unnecessary. This in turn could result from a perception that tools and frameworks inevitably implies linear innovation processes, which opposes the respondent's notion of creative work. This implies that it is also necessary to communicate of their existence in a way that also argues their necessity.

8.1.4 Processes

The existence and performance of exploratory processes are highly dependent on what demarcations are used when describing the function of the department. RUA, which is outside the made demarcation of PDA, is responsible for researching and developing technologies that might be possible to utilize in upcoming products and consistently utilizes exploratory processes to accomplish this. Employees of RUA are highly educated and empowered to define questions, identify problems and come up with solutions autonomously. Furthermore, they can freely choose what technologies they perceive as interesting and explore this area to identify what aspects might be interesting to investigate further. The department continuously reformulates guidelines aimed at aligning research with what the department aims to achieve. This is done to ensure that all research of the department is relevant to current and upcoming technological trends. However, RUA is not responsible for transforming these technologies into something concrete, such as products or features.

There are no straightforward channels between the research of RUA and product development of DUA. Neither are there any strong incentives for researchers at RUA to focus their exploration on technologies that might be useful in future products. Instead, the main responsibility of RUA is to assess technologies with future potential, with no requirements of results being inserted into concrete products. Incubation of ideas and possible innovations from RUA to PDA are therefore perceived as not straightforward. Neither are technologies developed by RUA generally known by employees at PDA, as formal communication channels between the departments exist between management of respective department. It might therefore be of interest to assess if channels, regarding both communication and technology transfer, between RUA and DUA could be improved.

Processes of the initial stages of innovation are not equally explorative in DUA. Instead there are frameworks and rules to follow when exploring new areas, with the purpose of making innovation more streamlined. Rigid rules and frameworks also decrease the freedom of employees, which is advantageous when exploring more novel ideas and concepts. At DUA, a product innovation often starts with the initiation of an operational plan of upcoming development from BUA, together with input from stakeholders such as RUA, the sales department, marketing and the systems department. The operational plan is then subjected to formalized analysis, including a SWOT-analysis, prioritization of features and wanted position. The use of formalized processes when assessing potential innovations is advantageous for identifying valuable aspects for incremental innovation. Although it might act inhibiting for being “radical in your thoughts”. Still, it is possible for individual employees to autonomously conduct exploratory processes and explore more uncertain areas themselves. Ideas and opportunities derived from these exploratory processes can either be transmitted to the IdeaBox for review or through informal discussion. Besides autonomous activities of individual employees, processes of the initial stages of innovation at PDA are designed to facilitate incremental innovation based on technical features within the boundaries of Ericsson.

Knowledge gained through customer understanding activities is utilized as input when defining new products, by translating customer demand into concrete features that are inserted into new products. Almost all customer contact is currently administered by the sales department, including communication necessary for customer understanding. Several respondents mentioned that the lack of direct communication with customers lead to that customer knowledge, gathered mainly by the sales department, is filtered several times before reaching DUA. Moreover, most respondents did not know of any methods for identifying values outside the current customer base. Thus, is might be challenging to explore new markets or novel types of value. At PDB, one manager described a utilized method aimed at overcoming this challenge. The method was developed as it was recognized that customer analysis was not enough to grasp what future behavior would entail. Instead it was recognized that the shape of content on Internet and behavior of over-the-top players, such as

Google, Apple and Netflix, set the pace of the development. Correspondingly, these were constantly assessed and mapped out to see what would be required of their products in the future.

Incubation of ideas into the development organization can take different ways depending on the "size" of the idea. Generally, novel products are defined through an early formalization process which tries to translate features into clear customer value together with user stories, a time estimate and number of sprints. This formal document is then reviewed by a product activation board consisting of members from BUA, DUA, the systems department and RUA. If they perceive the formalized idea as valuable for customers, the product will be introduced in the backlog and initiated sooner or later. Thus, novelties are not organically transformed into offers or products, instead they follow formalized decision ways and separate stakeholders, following guidelines for identifying value. As previously stated, there is no direct way of transferring ideas developed by RUA into product development at DUA. Smaller ideas are kept within DUA and can be translated into features that are directly put in the backlog. Other times, small ideas are integrated into a product as a feature with the nearest manager's consent, avoiding any formalization. Available processes are perceived as effective in relation to incremental innovation, as value is known in these cases, however they are not suitable for radical innovation.

Another incubation channel for ideas, both small and large, of employees at PDA is the company-wide IdeaBox, which is an initiative started by the group functions. The IdeaBox is supported by a site on the intranet, where ideas can be submitted for assessment by innovation drivers within each department and, if accepted, the idea owner can be offered time to explore this idea. Interviewed employees did generally not trust the IdeaBox, perceiving it as a way to "blow off steam", rather than a way to get their idea development. Workshops revolving around idea development are seen as more productive for establishing high-qualitative ideas in the DUA, however workshops were often aimed at solving specific problems rather than exploring novel ideas. The only straightforward way of incubating ideas of employees into DUA mentioned during interviews was the insertion of minor solutions into the hierarchical backlog used in the agile process. Thus, the general perception of employees is that it is difficult to get your idea accepted into product development. At the same time, managers generally stated that they believe that there is a lack of good ideas coming from employees. This implies that there is a discrepancy between managers and employees regarding where the challenge of incubating ideas exist.

Several respondents stated that it was difficult to get ideas approved, as it is perceived that ideas derived from formalized procedures have priority over ideas generated from other sources. Thus, it is perceived that informal discussions with decision-makers is more productive than submitting ideas to the IdeaBox as formal comparison with other ideas are avoided. Nonetheless, one specific interviewed developer successfully got ideas into the development organization several times through the formal procedures. The respondent mentioned that he spent a lot of time on weekends and nights experimenting and developing ideas, which he then continuously discussed with his managers. This implies that a dedicated person, with a genuine interest of innovation, behind an idea is needed to succeed in this process. This is to some extent advantageous as idea champions might be necessary for an idea to become good enough to deserve becoming a product, as well as to screen lesser ideas. Although, it might also imply that the internal status of the idea is affected by whom is the idea champion and where it was generated, while the actual value or opportunity of an idea is not the main consideration.

Most respondents perceive that organizational capabilities and the competency base are constantly being rearranged and designed to fit the market requirements in a very good manner. From a larger perspective, competencies regarding technical knowledge have been adjusted to fit a more software-

heavy market. This has been done through reduction of personnel with skills that are deemed to be of lesser importance, while new ones have been employed. Education and workshops for employees are continuously done to communicate necessary skills and knowledge. In PDA, education is divided into three subjects, called technical leadership, customer understanding and innovation. It is perceived that it is simple to get people to stay updated in their technological field, due to a genuine interest in technology of most engineer's. However more effort is required in other subjects, such as customer understanding and innovation. One challenge with organizational learning of novel technologies is that external consultants are used for some large product development projects. This makes organizational learning a challenge as some expert knowledge is kept outside the organization.

Non-technical factors that might add value to a product, such as usability, manageability and simplicity are not factors that are historically prioritized at Ericsson. As previously mentioned, this was a challenge also present in the no longer existent mobile phone business. Ericsson developed premium technological solutions with great performance, while customer appreciated other factors. A similar situation might arise in other businesses of Ericsson, as engineers with technical competencies are decisions-makers of upcoming development. This might lead to technical excellence, which is something previous and current customers appreciate. However, new types of customers in novel market might not appreciate the same value propositions, but others such as products with high usability and simplicity. Competencies required for this type of value propositions might be underdeveloped due to the current setup of learning processes.

Finally, the unlearning of previous assumptions on customer demand of technical leadership might be necessary, to enable the learning of new assumptions which are more aligned with the demand of new types of customers. Moreover, technical unlearning is perceived as hard due to the inherent qualities of the products. This is due to that all products of PDA must be able to connect to the existing network, thereby requiring an interface that can speak to it. A respondent mentioned that one result of this was that programming languages used in current products were from an older generation, in comparison with other industries. However, since all products in the network is written in this code, there is hardship to update the language to a new one while maintaining the ability to communicate to previous products. Moreover, the ability to leverage the large installed user base and monetize the cash cows of today is a major competitive advantage of Ericsson. Consequently, it is not deemed feasible to develop systems that are not built upon the old network. It should however be noted that this type of capability might further on become a rigidity if there are rapid changes on the market.

8.1.5 Values

There is a general perception throughout PDA that creativity is something that is encouraged by managers. The output of DUA is dependent upon employees coming up with novel solutions or ideas and no manager would therefore ever say that creativity *per se* is unwanted, but rather expected. This is also most likely due to the heritage of Ericsson being an inventive firm that has produced groundbreaking innovations in the past, and still does. Thus, creativity is woven into the culture of the company. It is furthermore stated that engineers have a natural tendency to solve problems with unexpected solutions, and there is a certain pride in finding these. At DUA the problems or assignments to solve are usually defined by managers higher up in the hierarchy before being transferred to technical personnel. This is highly suitable for creating incremental innovations, as problems are derived from input by relevant stakeholders of the products, such as customers and production facilities. Nevertheless it is less optimal for more radical innovation, as problems and

wanted outcomes are already defined when constructing a solution. Allowing uncertainty regarding the outcome of projects is difficult with this setup, but is a necessity for radical innovation. Furthermore, it was stated by a respondent that there are elements of taylorism imbued in the organizational structure. This means that some employees *think* and some *do*, resulting in that technical personnel is not really encouraged to think outside the box.

In practice, the appraisal of creativity depends on each individual manager. If a manager perceives that an idea takes too much time away from everyday operations, it might generally not be appreciated. There is generally a high pressure to complete everyday activities at both PDA and PDB, through the demand of implementing the content of a vast backlog with a predefined timeframe. Consequently there is not much time allocated to act on creative ideas. Moreover, since the directives for how to take an idea forward are perceived as vague by employees, there is a feeling that acting on creative ideas require more time than what is actually needed. Several interviewees furthermore stated that they believe that the outspoken enthusiastic stance towards creativity isn't acted on as much as it could by managers. On the other hand, interviewed managers stated that they perceive that there is a lack of creative ideas from employees. This is a chicken or the egg situation, as a lack of ideas might lead to managers losing their interest in developing ideas, while employees sense that managers lack enthusiasm and thus might be reluctant to pitch ideas. It is therefore necessary that each manager recognize their responsibility in encouraging creative ideas.

There are numerous ongoing efforts to stay technologically relevant and competitive. The group function of Research and the systems department within each product division continuously explore technical trends and new possibilities. This exploration is constantly aligned with customer demand, through dialogues with the sales department and PA of each product line. Additionally, there are analysts and technicians that test and prototype upcoming technologies and their fit to market. There is also a company-wide technical roadmap that incorporates new technology that product divisions must take into consideration. However, when implementing the technical roadmap a significant amount of strategic decisions quite often seems to be short-term. Likewise, the organization is built upon incentives to invest in short-term development projects, which leads to departments investing in projects that result in a quick and safe return on investments. This becomes a challenge regarding the development of breakthrough innovations, as they by definition requires a higher degree of uncertainty. Innovation is often seen as a zero-cost activity, and resources are therefore allocated to safe projects, leaving few or no resources to more radical innovation projects. This implies that there is an organizational culture with low acceptance of uncertainty. However there are many tools and guidelines available internally that could be used to overcome the avoidance of uncertainty.

Responsibility of technological foresight is divided among RUA, TS and DUA. RUA focuses on cutting-edge technology that is five years or more ahead in the future, while DUA focuses on technology that is being implemented in one or two years' time. TS, a part of DUA, acts as a bridge between them. As previously stated, technical roadmaps are formulated on a company-wide level and decisions regarding its implementation are made through discussions between managers of RUA, TS and DUA. Moreover, decisions regarding whether a specific product should be developed are made by a product activation board consisting of managers from the same departments. For a product to be approved, an idea must be formalized through following an existent document requiring identification of customer value, user stories and a time estimate. The amount of risk-taking using this process is low, as the system is designed to support the development products similar to current offerings and aimed at current customers are approved.

Large firms are often affected by path-dependency, as previous actions influence what decisions are deemed viable and valuable later on. In relation to Ericsson, the technology in itself is further creating path dependency, due to that novel products most often must be able to connect with previous products in the network. Moreover, several respondents mentioned that there are industry standards that must be fulfilled. Meaning that entirely novel features might be difficult to implement without competitors' products also supporting them, as this would mean that end users wouldn't be able to use them. Nonetheless, several respondents mentioned that this usually was thought of as an advantage by management, due to Ericsson's ability to leverage the large installed base of their products. Thus, path dependency was not described as a problem by most managers. Currently this perception seems to be correct, however solely taking input from current user base may lead to current competencies becoming rigidities if the demand structure changes.

Whom to contact when discussing novel ideas, and how decisions regarding their approval are made, are perceived as very vague. If the idea is related to current offerings and provide clear customer value, there are relatively straightforward ways of implementing it. Although the way forward is significantly more blurry if the idea is not a concrete improvement of existing offerings. It is believed that decision-ways and decision-rules concerning ideas are not communicated adequately, as both managers and technicians are unaware how they are arranged. Employees with tasks directly connected to innovation are aware of procedures, but are unsure if they would be labeled as formal. Many decisions are instead made in informal situations such as coffee breaks or at lunch. The absence of clearly communicated formal procedures might exclude personnel who does not have informal connections to decision-makers. Still, almost all respondents stated that informal communication is encouraged from management and that coordinating innovation coaches minimizes issues that might arise from unclear decision-ways.

The rules or guidelines for how an idea is evaluated are somewhat ambiguous. It is known by most respondents that only ideas an articulated customer value are, but the specific bases for evaluation are unclear. Furthermore, ideas that does not fit the department of the employee pitching it should be presented to managers at other departments. Although, the owner of the idea must take own initiative when contacting managers of other departments, which is perceived as a large threshold. Moreover, all departments have their own frameworks for evaluating ideas, meaning that it is difficult for employees to describe an idea in an advantageous manner. Innovation coaches are seen as an aid regarding this issue, as they support employees in formulating ideas in a manner that makes value clear.

8.1.6 Organizational structure

The organizational structure that comprises PDA is vastly complex, which is inherent to an organization of its size. It results in a multi-layered hierarchy necessary for division of responsibilities and to break down complex projects into more manageable tasks. Moreover, due to the complex products of Ericsson, and PDA, departments are divided so that relevant knowledge is available in respective department. In this complex environment, a specific team responsible for innovation can be a valuable resource. Neither PDA nor PDB has such a department, as there is no clearly defined team with responsibilities for innovation, instead innovation is everybody's responsibility. There is one employee at PDA responsible for raising awareness and guide other employees in innovation activities, where PDB has a team that works part-time as innovation coaches. These are not responsible for results of innovation, but solely acts as a supporting function. Instead, the responsibility of being innovative belongs to all employees of the organization. This allows for an organic innovation progress, but it requires strong supporting functions and knowledge of the set-up.

Current external linkages of PDA are towards customers, suppliers, universities and companies of the science park at Lindholmen. Communication with customers is seen as highly important by all respondents and a significant part of the business plan. It is even stated that it is a goal to be seen as a partner, rather than salesmen, by customers. Communication with customers are foremost done by specialists focused on this specific task within the sales department, which is located in an entirely separate part of the organization. Information gathered during customer contact is sent to managers at DUA and BUA, which reworks the information into problems that are transferred down the hierarchy. Moreover, the communication with customers have little or no focus on innovation, which is seen as something to be incorporated ahead. Furthermore, there are ongoing efforts to strengthen the customer understanding within PDA, through seminars and workshops as well as customer sharing videos. The outcome of these efforts is dependent on the number of attendees at each activity, visiting representatives and how representative of customers' needs they are. Continuous, and more direct, contact with a diverse group of individuals within the customer organization would possibly retrieve more valuable feedback.

Establishing links to suppliers with a focus on innovation is something that is being increasingly looked into, but at the moment respondents are unsure to what extent it is existent. On the contrary, some respondents state that suppliers are seen as a possible threat, as there is a fear that they might use potential ideas to their own advantage. Collaborations with universities include the use of master thesis students focusing on specific issue, but also exploration of cutting-edge technology. This collaboration is mostly focused on advanced technology, and rarely on softer areas. Moreover, the Lindholmen-site is located in a local technology cluster, Lindholmen Science Park, with several high-tech firms in close proximity. PDA and other departments occasionally cooperates with these firms, but cooperation is mostly kept on an informal level. Informal interaction is a valuable source for exchange of ideas, but there is a sense among some respondents that it would be valuable to utilize the science-park further. Overall, there is a multitude of linkages to external actors, and most respondents see the value in these linkages, but it is believed that they are not used to the extent they could be.

Open innovation is currently not widely regarded nor utilized to a large extent in neither PDA nor PDB. When questioned why, one manager mentioned that this is probably due to an aversion of losing or undermining the large revenues that Ericsson receive from their licensing business. Entering alliances with suppliers or other external partners require deals including valuable intellectual property. This is done in many cases, but with precaution. Precaution towards open innovation might also be related to the perception of how to achieve technical leadership, which by many interviewees is seen as the internal capacity to develop advanced technology. Internal research and development activities are therefore highly valued, to sustain the image of technical leadership. Together, the perception of technical leadership and legal precaution have resulted in little focus on open innovation. The resulting challenge of this is that there might be opportunities derived from ideas of external sources that are not currently exploited.

Excessive bureaucracy is seemingly non-existent and perceived as no issue. The bureaucracy has been decreased over the last years, and what remains is inherent to a firm the size of Ericsson. On the contrary, it is stated that there might be too few procedures overall to facilitate innovation. This is evident when an idea is taken beyond the ideation phase, as there is confusion on whom to turn to. Thus, an idea may be stuck in transfer due to a lack of clear instructions. A cause of this might be a silo-thinking among departments, described by several respondents. Silo-thinking manifests as a trouble with communication between different NDOs and between DUA and BUA. Currently, information often must go up the hierarchy before being delivered to another unit, which inhibits

cross-functional communication. There are specific teams aimed at facilitating cross-functional communication, but it is stated that these groups are limited and not utilized to their full potential. Furthermore, the gap between business unit and design unit is perceived as bigger in PDB than at PDA, due to a different geographical distribution. DUB is located at Lindholmen and BUB is located in Kista, while BUA and DUA to a large extent are located at the Lindholmen site. Respondents state that the close proximity between BUA and DUA substantially improves communication between the departments due to the possibility to achieve informal contacts.

As technology has to be transmitted through the bridging TS, the exchange of technology between RUA and DUA is of high importance. This might be needed to find the right position for the technology within the product line, but decelerate the process of innovation. As a result, smaller competitors might have a shorter time to market for breakthrough technologies, even though Ericsson were first in researching or pre-development of them. Furthermore, the employment of area product owners with sole responsibility of specific products might introduce challenges. These product owners are responsible for identifying, defining, and presenting to NDOs what is needed in a certain product. This responsibility comes with similar authority and it is therefore vital that employees in this position have a vast amount of skills required to correctly perceive what adds value to a product. Several respondents said that the position is loaded with much responsibility and tasks. Leading to that potentially valuable features and opportunities may go undetected.

There are no assigned responsibilities for innovation apart from the dedicated innovation coaches. It is instead perceived that all employees are responsible of being innovative. A manager at PDB likens it to quality, as it is every employee's responsibility to ensure high quality in what they do, and that innovation should be viewed in the same way. Recognizing every employee as an innovator works well for smaller ideas, as these are sent directly into regular operations, but it is stated that it is more complicated with larger ideas. This is largely due to that there is a reluctance to "step on each other's toes", which means that a manager might be hesitant to take an idea further as a similar idea might be developed somewhere else in the organization. Ideas that are more radical might therefore be seen as risky, as they are less similar to current solutions. Along with the challenges in cross-functional communication, it is therefore difficult for employees to know whom to contact when they have an idea.

Moreover, there is no clear demarcation of responsibility between PDA and surrounding departments. Thus, innovation is primarily conducted within safe boundaries of the product that each department is based around. As a result, products close to the boundaries sometimes "falls between chairs", as they are perceived by relevant departments as outside their responsibility. This narrow view of responsibility seems to be due to that the business unit of each department does not recognize that they have any defined responsibility of exploring areas surround the current product area. Neither are they allocated the budget necessary to do so. The purpose of BUA is to manage profit and loss of the Alpha product line, as well as to offer a strategic, coherent and extensive product portfolio. All investments in product development, carried out by the DUA, is therefore done to strengthen the pursuit of this goal. Besides, there is no specific department responsible for exploring areas surrounding current product areas. Meaning that a team or function with a dedicated innovation responsibility would be highly valuable.

8.2 Block II - Reflecting on a system-level

Going back to systems theory, it is stated that it is not enough to assess each element in isolation. All practices of the organization must be taken in account when assessing the innovation capabilities of

an organization (O'Connor, 2008a, 2008b). The previous chapter described findings of each individual element in detail, which will be summarized in this chapter as a list of strengths and weaknesses of each element. To enable a system view, the interaction between elements will then be presented. Initially, interrelations and trade-offs as well as implications of innovation capabilities as a system will be discussed. Followed by a description of connections between Doing the right things and Doing things right. Finally, a short comparison of PDA and PDB will be described as well as identified differences between the perception of managers and other employees.

8.2.1 Finding patterns and interrelation between elements

All elements of a systems are interrelated and a change in one element will therefore affect others in unconceivable ways. To assess the current state of innovation capabilities at PDA it is therefore necessary to look at elements both individually and at the behavior that arise due to the interaction of them. To identify interrelations and patterns, strengths and weaknesses of each element, discussed in the previous chapter, will be summarized. Patterns, such as root-causes and trade-offs will then be discussed.

Table 2 - Summary of findings from the assessment of individual elements

Organizational intelligence	
Strengths	**Challenges**
• The definition of innovation has been discussed and taught among employees. • The current market, and how it is changing, is continuously being assessed. • It is well understood that innovation is, and has been, vital in Ericsson's 125 years of success. • There are methods and models for predicting upcoming changes through analyzing over-the-top players.	• There is a wide variety among managers of how to interpret the innovation concept and how to utilize it. • The demand structure and value assessment of new types of customers, or in new markets, is not thoroughly analyzed. • Technical solutions are mainly prioritized before other types of solutions due to latent mental models in the company. • Technical personnel and business personnel often have different understanding of innovation and value.
Innovation Strategy & Vision	
Strengths	**Challenges**

• Existence of a company-wide innovation strategy. • Overall perception that innovation is gaining more attention and importance in strategy. • Actively taking part in standard-setting as a strategy to gain competitive advantage. • Clear vision regarding technical excellence throughout all divisions.	• Lack of a well-defined and communication innovation strategy in PDA. • Innovation not prioritized in relation to TTM and cost-cutting which are more integrated into other activities. • The overarching innovation strategy is could be more thoroughly implemented into institutions or activities throughout the department. • Reactive view on innovation rather than proactive, as innovation mainly is mentioned as necessary to keep up with the market, instead of going beyond competition.
Resources	
Strengths	**Challenges**
• Very high technical competence internally. • Enormous amounts of experience, installed base and worldwide presence. • Innovation coaches and groups are ready to aid employees when necessary. • Has supporting frameworks at Ericsson academy that could facilitate procedures.	• Soft competences, such as entrepreneurial skills, are less valued than technical competences • Innovation support functions does not seem to be utilized at their full potential. • A perceived shortage of time for reflection and other innovation activities.
Processes	
Strengths	**Challenges**
• Great processes when conducting incremental innovation. • Agile and lean processes have space for innovation if given. • There are many identified ways of ideas to reach incubation and implementation. • Technical and business departments work together to identify value and define products.	• Lack of straight-forward processes for larger ideas or more novel products, especially outside current customer base. • Lack of exploratory processes as ideas are formalized early and a low level of uncertainty is allowed. • A seemingly large discrepancy between managers & employees regarding ability to get ideas approved. • Lack of ways of assessing potential value

• Competence learning and unlearning are continuously done.	outside the current customer base.
Values	
Strengths	**Challenges**
• Creativity is generally always encouraged. • Innovation is perceived as something inherent to Ericsson. • There is a culture of problem solving and of bringing forward elegant solutions. • Ideas outside day-to-day operations are often well received and are often engaged in by employees.	• Daily operations are prioritized to a so large degree that there innovation is less prioritized. • Current technical competences are more highly valued than soft, or emerging, competences. • Indications of a Tayloristic organization, where some employees think and some do. • The forward-looking time-frame seems to be very short among technicians and first-level managers.
Organizational structure	
Strengths	**Challenges**
• Very low bureaucratic issues. • Almost all departments are present at the same site which facilitates sharing of ideas and creative thinking. • There are large possibilities to external linkages to e.g. universities and science-park.	• Very complex organizational structure makes it difficult to get an overview of the department. • DUA and BUA are parts of different organizations with partly different goals, which could create a discrepancy in different funding priorities. • Lack of clear responsibilities when it comes to innovation apart from innovation coaches. • Too little cross-functional communication.

The items of table 2 above are not ordered according to any classification, but presented following the same structure used in previous chapters. Certain strengths and challenges most likely have a

larger impact on innovation capabilities, however the magnitude of them have not been assessed. In a similar manner, some of the items are easier to improve or fix than others, which likewise have not been assessed. It is furthermore of importance to notice that all elements include a mix of strengths and challenges. This is inescapable due to an inherent trade-off between the performances of individual elements. At the same time, identified strengths and challenges of different elements might share root-causes. These become discernible when presenting them alongside each other. Furthermore, as stated previously, there is no optimal way of arranging innovation capabilities, but they are only means to fulfill a goal. It is therefore necessary to examine findings of each element in relation to the goal that they aim at fulfilling.

A technical core of Ericsson, and specifically PDA, is one identified root-cause which manifests itself along several dimension; in resources the technical focus leads to technical competence being preferred during both training and hiring, in processes technical exploration is preferred over other types of exploration and regarding values there is a prioritization of technical brilliance over soft competencies. Since the technical core affects the innovation capabilities of PDA along several elements, the influence of it should be made conscious when going forward. Making the technical core conscious would affect the arrangement of innovation capabilities in a positive direction, leading to improved decision making.

The importance of time available for innovation is discussed in several studied articles. It was also highlighted as fundamental by almost all interviewed developers and managers close to development. Nevertheless, managers higher up in the hierarchy responded that it was not feasible to set aside time for innovation, as budgets for product development were designed to not include any slack. Instead it was said that developers should incorporate innovative thinking in everyday problem solving and independently take time from other tasks to work on innovation. Thereby incorporating innovation into their regular workday. Thus, managers higher up in the hierarchy believed that time for innovation was dependent on how employees prioritized between completing everyday tasks and conduct innovation. Consequently, there is a clear connection between the resource of time and values surrounding innovation and creativity. Most developers did however recognize that implementing features of the backlog was prioritized over innovation due to time constraints. Thus, it is necessary that managers communicate that innovation sometimes should be prioritized before executing backlogs to subordinates, to enable non-compulsory innovation.

Moreover, perceived responsibilities of PDA due to the organizational structure largely influence how processes are designed. During interviews, several managers said they perceived that radical innovation was not a responsibility of PDA. As a result, clear customer value or certain success of a project was of importance for it to be approved through the idea evaluation process. Accordingly, processes were designed to accommodate incremental innovation, and exploratory processes were primarily utilized by RUA. All projects required a clear pre-defined value for current customers as well as a time frame of completion. Thus, processes supporting radical innovation were not identified at PDA, as it was not believed to be within their responsibility.

Moreover, due to utilized mental models and inherent values, the perception of engineers as problem solvers also affected what processes were present in product development. Management perceived that engineers' main capacity to a large extent is to find solutions to problems that are already pre-defined. However, defining a problem is a fundamental aspect of exploratory processes required for radical innovation. That developers rarely define problems themselves thereby impedes the ability of DUA to conduct radical innovation. Moreover, what processes are present can also be said to be dependent on the values of the organization. As certainty and clear customer value are highly valued, it is primarily processes in line with those views that are prioritized.

An overarching discovery was that it was generally incremental types of innovation that were discussed. Almost all ideas and examples that were discussed during interviews were relatively small, revolving around incremental improvements that could be implemented on already existing offerings. More innovative products were almost always derived from decisions of management further up in the hierarchy, and rarely organically developed through insights by employees either at PDA nor PDB. Furthermore, most products of a more innovative nature were derived from assessment of the target areas of the company-wide strategy, done by management. However, It is believed that it is of importance that radical ideas are derived from all levels of the organization, including both top management as well as developers.

A reason for this is that it is perceived that both PDA and PDB are solely responsible for innovation within the current product line. This perception might be reasonable in relation to how budgets seems to be allocated within parts of Ericsson, however it is not optimal for facilitating innovation. As there is no central innovation department at Ericsson, the innovation labor must be distributed throughout the organization. If department managers perceive their responsibility as revolving around the current product line, nobody will perceive innovation outside current products as their responsibility. Thereby leaving radical innovation outside the responsibility of all departments. Thus, innovation capabilities required to generate incremental innovation is believed to be stronger that those needed for radical innovation.

Another root-cause almost always present in large companies, is the inherent resistance against radical innovations that act discontinuous on the market. A disapproval of radical innovation was identified as present both at PDA and PDB, with implications across several elements. Both processes and resources were aimed at conducting incremental innovation, leaving little time and ways of identifying value outside the current customer base. At the same time the organizational structure was arranged according to product responsibilities. All products or innovation outside the current product line was therefore, as stated, seen as outside their responsibility by both PDB and PDA. Moreover, RUA had no product responsibility. Thus, implementing cross-functional functions to catch products outside of current product lines would be highly valuable.

8.2.2 Product department Alpha as a part of a larger system

Furthermore, due to the purpose of the report to focus on one individual department within a larger company, it is also necessary to highlight interrelations with the larger system of which it is a part of. Although, management of both PDA and PDB stated that the departments were sufficiently autonomous to more or less act as standalone firms within the larger firm. Still, there is for instance a company-wide innovation strategy with an influence of the innovation strategy of the department. This company-wide strategy is then used as a guideline when the department develop their own innovation strategy, setting up boundaries of what can and should be done. Core values of Ericsson is also something with a large influence on the values of each individual department, of which the technical core is one aspect previously mentioned. Another affected aspect is that processes to some extent are formalized on a company-wide level, which each department must adhere to.

Available resources is also mostly dependent upon decisions made at a management level above the department. This is due to both PDA and PDB each year being appointed a budget according to last year's operations and a forecast of upcoming years. This budget sets boundaries and shapes activities that the department take part in. As stated, this had an influence of perceived responsibilities of the departments regarding innovation. Moreover, taking even larger systems into discussion it is also obvious that the culture of Ericsson is aligned with Swedish corporate culture of low bureaucracy and

a flat organization structure. Regulations of nations also largely affect how the firm is structured and what processes are allowed. Finally, zooming in on the departments within PDA, it was obvious that there were differences also between them. The most apparent was a large difference of values in the business-minded business unit and the technologically focused design unit. Several respondents spoke about this difference and how it shaped the communication between them.

8.2.3 Interaction between Doing the right things and Doing things right

As previously described there is a connection between Doing the right things and Doing things right. Mostly due to that organizational intelligence and innovation strategy & vision is a fundamental necessity in developing and shaping additional dimensions. This has repeatedly shown to be of great importance, as the shape of elements is not always conscious, but depend on mental structures and implementation of strategies that might be obscure to managers. Moreover, there is also influence in the opposite direction, as mental models and strategies will be affected by for example what values and resources that are present. A short description of identified connections is presented in Table 3 below.

Table 3 - Identified connections between elements of Doing the right things and Doing things right

	Organizational Intelligence	Innovation strategy & vision
Resources	All managers highlighted that innovation is not about technical excellence, but about the value that is created. However, as soon as value is to be added a technical solution is sought. Technical leadership is prioritized, leading to decreased importance of other factors such as usability, manageability and user experience. Most managers stated that time allocation is not about scheduling time, but employees should take time for themselves out of their workday. Thereby, there is no need for slack in time. That is not the message that is sent down to designers and developers, who perceive that daily tasks are more prioritized.	A vision of technical leadership is always present in Ericsson, as well as vision of where the company is heading from a technical standpoint. Today cloud, IP and media are areas which are targeted when developing new products. Resources, in terms of time and competencies are thus aimed at these targeted areas. Although, it should also be highlighted that there are other areas outside technical visions that might have value in themselves, such as easy-to-use, easy-to-install and design-aspects which today are not mentioned.
Processes	Management primarily recognize value and demands from current customers and all processes in relation to innovation is designed accordingly. This results in formal processes where value must be known beforehand. Thereby, a low level of uncertainty is seemingly	The current strategic focus includes decreased time-to-market and the lowering of manufacturing costs to gain a competitive edge. This vision entails a lot of inherent goals, such as that cheaper alternatives is better and that shorter time for processes are valuable. This is not necessarily compatible with a strategic

	allowed as budgets are set to a certain amount of sprints to achieve the planned product. However, innovation in a larger context means that not everything can be known beforehand and uncertainty must be allowed to explore possible designs and values. Thus, exploratory processes and less formal ways of incubation of ideas might be designed to target this.	focus on innovation, although they are not necessarily excludable either. However, lean and agile processes are focused towards TTM and cost-cutting goals of which innovation might be a part, other times innovation might be suffering. For example lean implies that all waste should be cut, however in relation to innovation it is never possible to surely know beforehand what will be waste and what will be valuable.
Values	Creativity is highly encouraged by management, but creative solutions might not always be appreciated in practice. This creates a discrepancy between management's thoughts on creativity and how they actually act to improve it. As creativity is encouraged as long as it doesn't take time form regular operations, it is apparent that the importance of daily operations strongly outweigh the necessity for creative solutions. This influences the behavior of managers closer to the operations as well. Ideation is important, but ideas has to be realized to be valuable. Moreover, mental models of value largely affect the evaluation process of ideas. The outcome of the evaluation can therefore be entirely different depending on who makes the decision.	If PDA focuses on a specific subject in its strategy, it transmits a message to its managers that this subject is positive and worth investigating. Thus, a strategy for example focusing on lean will make employees imbue lean in their line of thinking when drawing up ideas and product plans; influencing their perception of value. Furthermore, while management views Ericsson as a technical leader, employees in general tend to view Ericsson not as a proactive firm, but rather as a follower. This perception of the firm may affect the employees' attitude towards innovative activities. Focus seems to be be directed towards catching up instead on developing totally new offerings, be it products or services.
Organizational Structure	To what extent suppliers can be seen as partners in relation to innovation is discussed by several respondents. It is also stated that customer interaction is highly valued, but has seemingly few contact points. Collaboration is sought, but since there are several gates between customers and technicians, information may be lost. Aiming at low bureaucracy and high employee freedom, but results in confusion due to too few described procedures. "Everybody is an innovator" may result in that nobody	A possible innovation strategy apparently hasn't reached all managers, which results in confusion on what the manager's role is concerning innovation. This might also be a reason for the seeming lack of collaboration with suppliers and customers. The strategy is overall focused on technical leadership, and the organizational structure is thus divided into separated departments handling each product. This strategy is effective for improving performance of each product, but it lacks exchanges of knowledge and ideas between product lines. It also means

	knows who to contact when an idea takes place. Products are divided into smaller groups, which might be great for ideas for incremental innovations, but it decreases the possibility of cross-functional knowledge sharing. Ideas that doesn't fit directly into these silos are difficult to place. This is equally true for ideas that "fall between chairs" within departments and between departments.	that the entire department has to be restructured for bigger changes.

It is important to keep in mind that innovation capabilities in itself have no value, but is only a tool to reach a goal. This goal should be established as a strategy, followed by efforts to enable the achievement of the goal. In table 3 above it is evident that the communicated innovation strategy influences the design and performance of Doing things right-elements. Strategies that are better communicated, as shorter TTM and reduced manufacturing costs, as well as the implementation of lean and agile methods are often prioritized as these are perceived as clearer. This results in them being implemented to a larger degree, for instance through being a more significant parameter during decision-making by employees. Examining table 3, it is also clear that mental models and perception largely affect how innovation capabilities are designed to reach this goal. The result of this is that the arrangement of innovation capabilities might be improved. This become apparent in for instance the apparent reluctance of uncertainty in all innovation processes and excessive technological focus regarding innovation. Nonetheless, it is noticeable that the importance of innovation for staying competitive is recognized by all managers.

Moreover, there is a congruity in how management further up in the hierarchy speak about innovation in official documents and how it is implemented. During interviews it was perceived that higher-up managers generally encourage innovation, and feel that it should be empowered by giving the responsibility of implementation to managers further down the hierarchy. However, these managers does not seem to view innovation is their main responsibility and thus prioritize other activities believed to be of higher importance. Including managing the implementation of features of the backlog, as well as not exceeding allocated budgets and not overrun deadlines. Moreover, most of managers working within product development does not have innovation managing as a priority. Instead, focus lies on other challenges. Thus there is a risk that the importance of innovation loses significance in the decision-stream from top-management to operations.

Opposing goals between different departments were identified in some cases. For instance, this seemed to be a challenge in the interaction between the BUA and DUA. BUA has responsibility of profits and losses of the product line and therefore tend to focus on short-term success in business. The purpose of DUA on the other hand is to generate a portfolio consisting of products as competitive as possible, especially from a technical standpoint. Consequently, there must always be discussions between BUA and DUA of what they want to achieve and how they should do this, to manage both short-term and long-term competitiveness. Nonetheless, there were cases when secondary goals of subdivisions seemed to oppose the overall greater good of the company as the strategy was implemented with low understanding of how it fit in the overriding context. One clear example of this at PDB was that the systems department perceived that their responsibility was to keep all technologies aligned so they function together as a system. Large technological

breakthroughs tend to utilize different technical foundations, which made communication within a network increasingly difficult. Thus it was by themselves believed that their role to a certain degree was to slow down the pace of integrating major innovations into the system so that the own sub-department would be able to keep up. Here, an incorrect mental model of the role of the systems department lead to an erroneous interpretation about how they should act in relation to innovation.

Finally, it is sometimes noticeable how mental models of competitive advantage shape the structure of the organization and how a goal is approached. One identified example is the perceived importance of being the recognized technological leader of the market. This was done through presenting novel, forefront, technologies at conventions so competitors and potential customers could see how far ahead Ericsson was in a technical aspect within the area that PDA Is responsible for. The technical leadership was therefore not equally focused on product development on radical innovation aimed at upcoming markets, or the creation of new markets. The group function of research is solely responsible for exploring and developing technologies, without any obligation of them becoming products. Furthermore, the organizational structure to support the implementation of these forefront technologies into concrete products is an area for improvement. Thus, what is recognized by top-management as constituting technical leadership is reliant on promoting the image of being so, rather than the ability to produce actual products. In this aspect the organization might be seen as thought leaders and not action leaders.

9 Discussion

The concept of innovation capabilities is becoming increasingly discussed and researched in an academic context. The discussion does not have a single point of departure, but has emerged out of theories as varied as resource based theory, discontinuous innovation, idea management and leadership. The discourse of the subject is therefore varied and there are as many perceptions of the concept as there are articles. Moreover, the concept has gained traction in a business context, due to the fact that companies has understood that innovation is vital for success. Almost all larger management consultant firms are presently offering innovation services. However, there is also a large disparity in the discourse used by management consultants, as they also approach the subject from different perspectives. How to succeed at innovation is therefore given a wide array of responses using different discourses. At the same time it is perceived as increasingly important for staying competitive.

The main purpose of the report was derived from this background, as the thesis aims at contributing a conceptual model that can act as a bridge between an academic and business context. Followed by further developing of this conceptual model into an assessment tool to enable the thesis to generate business value. The assessment tool aims at providing managerial understanding of the current performance of innovation capabilities that could act as a basis for decisions and facilitate communication through a shared understanding. Followed by the application of the assessment tool at PDA in an attempt at evaluating the current innovation capabilities of the organization. The following chapter presents reflections and insights gained during the process of the thesis.

9.1 Design consequences due to established purpose of the assessment tool

The identified challenges and gaps in current literature and discourse of innovation capabilities were continuously used as parameters when making decisions regarding the design of the proposed conceptual model and assessment tool. The large divergence in discourse was largely due to the simultaneous emergence of the subject in two context, business and academia, with entirely different culture and purposes. Bridging the two contexts meant not only cherry-picking the aspects that was perceived as best from the two contexts, it also meant that many aspects had to be left out. Academia tend to aim at gaining a deeper understanding of a subject, often through a hermeneutical approach, leading to complex arguments and concepts being utilized. A reason that academic knowledge regarding innovation capabilities has not been utilized in managerial environments to a large degree, is due to that this complexity and deeper understanding that is inherent to academia do not align well with a business setting. As the purpose of the assessment tool was to facilitate managerial understanding, the subject had to be presented in a way that is seemed more concrete. Leading to a risk of losing some depths of analysis and the ability to generate a deeper understanding of the topic.

Due to this trade-off, it was decided that sub-elements was to be used to concretize elements while at the same time giving the elements a coherent theoretical description. Thus, using sub-elements as a way to translate abstract elements into something more tangible. However, too extensive concretization of innovation capabilities makes them lose theoretical legitimacy. This is always a trade-off. This was also an influencing factor when the model was hierarchically designed with a clear visual presentation. A key point was to make it understandable without any previous academic

insights on the subject. Still, innovation capabilities is a complex subject and making the conceptual model too simple would result in vital aspects of it being lost. Hopefully, design choices have diminished potential losses with either making it too abstract or too concrete, thereby fulfilling the purpose of the assessment tool.

However, translating abstract elements into more tangible sub-elements and indicators can also result in a narrowed perception of what the element encompasses. This results in that users of the assessment tool might believe that anything not present in the element is unimportant. Practices and factors not included in the assessment tool might therefore be forgotten or dismissed. As Thus, it is important to highlight that the sub-elements are not meant to be a comprehensive list, but an illustrative set of what the elements actually entail. From a theoretical viewpoint this is solved through introducing the concept of theoretical constructs as a way to define and delineate elements and sub-elements.

The inclusion of organizational intelligence, and as a result managerial perception and cognition, was an academic contribution of the thesis. Aspects of cognition and perception has previously been a part of dynamic capabilities, which is one theoretical foundation of innovation capabilities. However, previous attempts at creating assessment tools for innovation capabilities have not included this aspect. Nonetheless it is believed that the managerial ability to recognize the significance of innovation, opportunities and valuable resources is a prerequisite for the development of innovation capabilities. The study at PDA strengthened the belief that the inclusion of organizational intelligence was vital for correctly conceptualizing innovation capabilities.

To facilitate the purpose of the assessment tool to act in a motivational manner for managers, the role of managers should be integrated into the model. This allows them to recognize that their commitment and understanding is of uttermost importance in shaping the innovation capabilities. This was accomplished through focusing the organizational intelligence on managerial understanding required to shape innovation capabilities. Still, several respondents mentioned that management commitment in itself was a major aspect that affected whether the firm succeeded or failed regarding innovation. Moreover, several articles of the literature study also highlighted the importance of commitment, such as Saleh and Wang (1993). Thus, management commitment could be necessary to include as a stand-alone element in following assessment tools

As the model was designed to be able to be utilized as an assessment tool, it had to be comprehensive for managers. Basing it on the basic layout of Balanced Scorecard offers several benefits. Balanced Scorecard is furthermore designed with the presence of connecting links between elements, which is a substantial part when describing innovation capabilities and strengthens manager's understanding of connections between elements. The choice of using balanced scorecard might impair the academic strength of the assessment tool, as it is aimed at being supporting managerial decisions. The inclusion of target, action and indicators in the assessment tool should also be comprehended from this perspective. Providing managers with a mental model to frame upcoming activities to a wanted change, as well as control this with clear indicators. However, the balanced scorecard is an instrument that is instantly recognizable by managers which decreases the need for even further simplification, preventing the assessment tool from losing substance and validity.

9.2 Implications of systems theory

Using systems theory in the creation of the conceptual model and assessment tool introduced both problems and benefits. Initially, it was noticed that demarcations of different elements were rather vague and seemed to be so throughout studied literature. Leading to different authors defining similar aspects as different elements, as well as giving them different importance. When system theory was taken into account, the interrelation of different elements is given a large importance. Thus, root-causes can be shared by different elements and overlapping of elements could be included in system analysis and interrelation between elements. Moreover, the influence of sub-systems and larger systems of which the department is a sub-system on departmental innovation capabilities was also treated using implications of systems theory. The interrelation between subordinate and overriding systems are treated as something inherent in the assessment tool, meaning that the larger context of the department must be taken into account. Thereby it is possible to identify what potential there is for creation of innovation capabilities within boundaries set by the superordinate system of which the department is a part of.

Systems theory revolves around the idea that the system is integrated, meaning that the behavior of the system arise from the interaction of the components as well as the internal structure of components. During the application of the tool at PDA it was found that it was necessary to include further methods of analysis to cover this interrelation. Summarizing findings in individual components to identify common causes and similarities was therefore utilized to structure the systems analysis. Moreover, the impact of higher-level components of Doing the right things on lower-level components in Doing things right was identified. As a result a system-wide analysis was included as an own analysis effort. However, this analysis is not as structured as the analysis of each individual component. A deeper understanding of innovation capabilities and systems theory is thus a necessity during system-wide analysis, to be able to identify patterns and abnormalities.

9.3 Insights of the case study at product department Alpha

The surrounding of Ericsson has drastically changed the last few years, and this is also true for individual business units such as PDA. This is due to a fast technical progress and changing markets as a result of deregulations and privatization. Ericsson has responded accordingly through new technologies and solutions, answering to new demands. This involves the development of early digital switch boards and mobile data network equipment and services, including 3G and 4G, as well as the increased demand for data transmission. Innovation has been a constant necessity in accomplishing this transformation. Thus, innovation is in the blood of Ericsson and has arguably been the main reason for the success of the company. After the study the perception is that this is still the case at PDA. The whole product organization at Ericsson is built around the ability to stay competitive from a technical aspect. The company is constantly searching for novel and better ways to offer customer telecommunication that is on the technical forefront. Thus, innovation is the core of Ericsson’s business.

Several times during interviews, respondents mentioned a growing competition. Some of these competitors are perceived as having substantially larger R&D departments than Ericsson in terms of number of people. Ericsson must find a way to stay competitive in this increased competition. Moreover, it has been seen over and over again that incumbents in general tend to focus their efforts on existing offers, opening up for new entrants in market spaces created by radical innovation. This is due to that mechanisms that facilitates incremental innovation and existing operations might act inhibiting to an often more uncertain and disorderly process of radical innovation.

It is the author's belief that the only way to continue staying relevant and competitive on the market is to actively enhance and develop the innovation capabilities of the organization. Well-functioning innovation capabilities demands a balance between continuously introducing incremental innovations for existing products while simultaneously working on more radical offerings. It is perceived that there is currently a very strong emphasis on short-term competitiveness at PDA, with an attention towards increasing performance on existing product offerings. It might therefore be of importance to overlook and assess the balance between short-term and long-term competitiveness to ensure that the firm maintain technical leadership in an increasingly competitive industry. Key insights of the study, within each element of the assessment tool is presented in table 2 in chapter 8.

9.3.1 Product Department Alpha and Beta compared

It was established that two separate departments were to be evaluated in the case study for two reasons. Initially to verify if the assessment tool was capable of capturing small disparities in the current state of innovation capabilities, which should be present in departments with large similarities. Secondly, a study of a second department would generate a point of reference. This would allow the assessment of the arrangement and performance of inherent traits affecting the innovation capabilities specific for PDA in relation to another department. The study showed that it was possible to find and illustrate differences in performance in individual elements of the assessment tool. It was also possible to use PDB as a point of reference to establish what traits were specific for the department and how the performance of those diverged.

The state of the innovation capabilities at PDA and PDB are somewhat similar. This is an outcome of the firm from a systems perspective, as both departments are embedded in a larger system comprised of Ericsson as a whole. As elements within a system are interdependent, both PDB and PDA are connected and dependent on the conditions of higher levels in the organization. Even as they are comprised of roughly the same type of competences, values and organizational structure, PDB initiated the awareness of the department's state of its innovation capabilities prior to PDA. A presence of personnel with a genuine interest of the subject might be a key factor to this event. Interested employees in key positions in the hierarchy is furthermore important to actually implement the innovative values that Ericsson is pursuing. An employee with low interest or a skewed perception of the concept of innovation could distinctly obstruct the innovation capabilities of a department.

It seems that PDB has done more, and started the process earlier, than PDA and thereby also that they are one step ahead of PDA regarding awareness of the situation. This higher awareness is perceived as largely be due to that problems with the product in comparison to competitors were identified a few years ago. Moreover, the product is in a later position in the product life cycle. As a result, it was decided that a new competitive edge in terms of offering and business model was required. To accomplish this a large amount of innovation was necessary to reroute operations. Due to that a clear and considerable problem had been recognized, it was identified that innovation required additional awareness to overcome this problem. For example, PDB has a specific group that were formed to aid employees to find a place for ideas that didn't directly fitted into current operations, which is a support function that is currently missing at PDA.

One shared core conception is that both department share the view that innovation is vital for the survival of Ericsson. Although in both departments, employees stated that this might be true in discussions and decisions in top-management, but when innovation attempts were implemented they did not withhold. Instead, there was a perception that innovation was a "nice-to-have", while

short-term victories and short-term profitability was almost always preferred. This was a root-cause for many challenges identified across the elements. Coming back to the presented model, mental models and conceptions of organizational intelligence decides how innovation work is arranged.

Although the perception is that PDB has had a head start compared to PDA in regards to innovation, several respondents in PDA stated that they felt that the division was improving quite rapidly. The same statements were not identified in interviews at PDB. The last few months, several education programs, lectures and workshops has taken place while innovation coaches have gained much more attention. At the same time it is believed that the innovation department in PDB has not experienced the same positive development. Instead, their authority and area of influence is perceived to decrease. As innovation capabilities is perishable, this might soon result to a shift in places between the departments.

During the process of interviewing experience of what areas usually lead to interesting answers when exploring, and how to formulate the questions were gained. As well as a generally better atmosphere during interviews as experienced had been gained, leading to more relaxed respondents. This naturally resulted in interviews offering more insights and deeper understanding of subjects discussed. The study started with two rounds of interviews with employees in PDA, before moving on to similarly structured interviews with employees at PDB. As a result, interviews with employees at PDB generally entailed more exploration of the respondents thoughts regarding the subject. Thus, there was a perception that PDB employees had more thorough, and to some extent also better, reasoning regarding the subject. Although this might be due to that interviews were of higher quality.

9.3.2 Conflicts in perception of problems between managers and employees

One recurring challenge throughout all elements is that there are different perception between employees and managers of the department regarding what the main inhibitors for innovation are. This challenge was equally present in both PDA and PDB. The discrepancy became apparent during discussions regarding several individual elements, such as values, processes and resources. Often the challenge arose from that the managerial views of the performance of certain aspects were much more positive than other employees. Managers often perceived the structure to be functioning, while at the same time they also recognized that the result was not always satisfactory. This was several times said to depend on other employees not identifying existing information or solutions. Or that employees did not utilize or commit themselves enough.

At the same time several other employees stated that the structure was not adequate for supporting innovation. Often due to a perceived lower prioritization of innovation in comparison with other strategic objectives. One mentioned case of this was in relation to available time for innovation, which divided managers and other employees. Managers stated that it is the employee's responsibility to take time, and there is a possibility to pitch own ideas and work on own projects. The problem stated by managers was instead that employees did not commit themselves enough to actually pitch ideas or take time to work on own ideas or projects. Other employees instead stated that the workload and pressure to complete this is so high, that they perceived other activities as not equally important.

One cause for this might be insufficient communication between managers and other employees, leading to lesser knowledge about the function of existing supporting structures. This was obvious in some cases as supporting tools and processes were said to exist by managers, while other employees seldom had knowledge about them. No respondent stated that they had ever used any such supporting tool. Furthermore, values said to be vital by managers, were often not perceived as such

by other employees. Instead, these were seen as window dressing by management rather than something of actual importance. This includes the priority and significance of innovation, whose mentioning was noticed by employees as increasing. Nonetheless, it is still not perceived as important as executing other activities. Thus, the value and importance of innovation must be empathized by management to ensure permeation in the department.

9.3.3 How the study affected the findings

The demarcations made to define the PDA as the BUA and DUA affect the results of the study to a certain degree. The responsibility of BUA and DUA is on products, including product portfolio, and the development of these. This explain lack of radical innovation to some degree as it might be perceived as outside the area of responsibility. Nonetheless, the study has also shown that RUA have no product responsibility, leaving products that are adjacent to a current product line or novel products without any owner in the current organizational structure.

The impact of the study during the process of it should be highlighted. During the study several respondents highlighted that they had seen a large change in how much innovation was discussed at PDA. A new innovation strategy was in the making and the management of PDA and PDB had several times had workshops and discussions with innovation drivers of how to improve the innovation capabilities. It is believed that the study and awareness and development of innovation capabilities has two clear connections. Initially the study itself was introduced as one method of improving the innovation capabilities and thus a symptom of an already increasing emphasis of innovation by management. Also, the study itself might be seen as a symbol of innovation gaining in status and questions regarding it will be further discussed. This was seen at least once, as an interview with a manager finished and the first thing the manager did was to meet with the innovation driver to book another manager-meeting.

The perceived fast pace of increasing awareness noticed by some employees have implications on the results and use of this study. Some aspects of the empirical findings could as a results of this presently be seen as somewhat outdated, and it would therefore be important to proceed with on-going updates of the data for it to remain relevant. It also opens up possibilities for future theses to compare future states to the present state, which could be of interest to evaluate if the perceived change is a continuous or an isolated event.

9.4 So what do we talk about when we talk about innovation?

Returning to the background and purpose of the study, it is established that the contemporary discourse of innovation and innovation capabilities is diverse and hard to navigate. Especially for non-academics. The topic has emerged from a wide variety of contexts, both academic and business oriented, simultaneously. Thus, a main purpose of this thesis was to generate a model that would overcome the diverse discourse and facilitate the understanding and communication of innovation capabilities and how to manage it. The discourse and design of the assessment tool was continuously chosen to facilitate managerial understanding. Which, as seen in chapter 8.1 and 8.3, entailed both trade-offs and problems. During the study, large problems regarding how the concept of innovation and innovation capabilities were perceived and discussed became evident. It was perceived that different respondents spoke about entirely different subjects, even though they had been briefed on the same definition of innovation. Even larger disparities were registered when discussing innovation

capabilities and causes of identified issues, often derived from different understandings of the concept.

One recurring example of discrepancy of understanding was the distinction between incremental and radical innovation, which in this thesis became increasingly obscure. The study started out with a focus on radical innovation, however during the study it was recognized that employees and managers generally did not perceive the distinguishing characteristics of the concept. There was however a recognition about the existence of “small” and “large” ideas, although without any comprehension of what the difference entails. This complicated interviews as the divergence between the understanding of the interviewers and interviewees became apparent. Leading to confusion by interviewees when the authors attempted to raise this question. As well as problems with analysis of the answers of interviewees. The answer to this problem was to redefine the innovation capabilities concept so that the scale of amplitude, or discontinuity, of the innovation was less discrete and more continuous.

One of the main findings of the case study at PDA was that there were large disparities in how different respondents imagined the area of innovation and how to succeed at it. Several times during the study, problems related to diverging understanding of innovation was mentioned. Often due to different understanding about the subject in different departments within the firm. A clear divergence of understanding was found when comparing the perception of the subject among technical and business personnel, who rarely shared the same values and basic assumptions. Even though all employees are highly educated and has been briefed in the subject, the divergence persisted. No common understanding of basic concepts is a major inhibitor in further discussions on how to achieve goals. The use of the tools and frameworks as a way of communicating a common mental model should therefore be very valuable. However, more basic assumptions should also be discussed between the decision-makers as well. Thus, it might be necessary for companies to initiate the development of innovation capabilities with exhaustive education about innovation, before attempting to discuss how to succeed at it.

Coming back to cognition theory, an adequate and shared understanding about an issue is required to be able to discuss and manage it. A problem is only solvable if it is identified as such and what causes it is understood. To support human decision-making, tools and frameworks to aid understanding of reality and how to act on it are needed. Tools and frameworks act as goggles that helps the user conceptualize how the reality can be demarcated and what causal relationships that exists. Moreover, perceptions need to be shared within an organization to facilitate the discussion of causes and solutions. It is believed that the proposed assessment tool can act as these goggles. The assessment tool helps management identify problems as such, underlying causes and how to manage them through action plans. Furthermore, the assessment tool aids the organization in the creation of a shared understanding among management and a basis out of which decisions can be made and communicated. Nonetheless, the fundamental issue is not to understand what we, as authors talk about when we talk about innovation. It is to establish a common discourse within the organization *what we talk about when we talk about innovation*.

10 Conclusion

The purpose of this thesis was threefold; to discover if it is possible to conceptualize innovation capabilities in a pedagogical manner, to generate an assessment tool for innovation capabilities at large firms and finally to map out and evaluate the innovation capabilities at PDA. The purpose was deemed motivated due to the largely academic focus in previous attempts to conceptualize innovation capabilities, creating a gap for conceptualizations suitable for acting as a mental model also outside the academic world. As a result a conceptual model was established, built around previous literature on the subject, utilizing both individual elements as well as using system theory. Moreover, interviews were conducted with employees at PDA to adapt the elements to identify actual problems at the department. The model deviates from previous models by introducing a two-level system, as well as introducing systems theory to put emphasis on the importance of interaction of elements. Moreover, the model was structured into two levels. The higher level, called Doing the right things, introduces elements which tries to capture the managerial understanding of and commitment to innovation and how this translates into innovation strategies and visions. While the lower level, called Doing things right, can be seen as the innovation muscles necessary to withhold the character of innovation capabilities to nurse competitiveness through innovation.

The conceptual model was further developed into an assessment tool for evaluating innovation capabilities at a single department. It was modeled to make abstract parts of the concept of innovation capabilities appear more concrete and useful in practice. To facilitate managerial understanding and ability to correctly frame problems, each element was concretized through the inclusion of descriptive variables. The assessment tool was inspired by the well-known Balanced Scorecard-model to facilitate understanding and usage by managers. The tool also connects current capabilities to a target level, as well as infuse the ability to create action plans and indicators to establish a vision and track progress.

To assess the current state of innovation capabilities at PDA, semi-structured interviews were performed with employees at various hierarchical positions. The performance of innovation capabilities at the department was assessed through analysis of both individual elements of innovation capabilities and the interaction between them. Key insights include that root-causes exist that affect several elements in a negative way, such as the high focus and valuation of technical competence within the firm. This has an impact on what innovations are created, the corporate culture and innovation processes. Also, the corporate-wide earnest will to excel in innovation and creativity permeates the corporate culture, the shape of the organization and processes in the department. It was also found that there is a discrepancy between managers and employees regarding the cause of specific problems, often due to a lack of clarity and communication. As a summary, it is believed that there is an inherent will at PDA to succeed at innovation and an understanding of its importance. However, an innovation strategy should be formalized so that this will can be focused on specific issues and tasks for more successful innovation efforts.

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Appendix A - Questionnaire

Resources

People and competencies

What are your views on the existence and mix of people and competencies within the organisation when it comes to innovation?

[Probe]

The required competencies for innovation is present in the operation.

The diversity of employees, regarding culture, history, knowledge and gender, are adequate.

There is a good mix of competencies in the organization.

Personnel with key competencies are attached to suitable "innovation-roles".

Time and resource allocation

What are your views on how time and other resources are allocated to activities related to innovation, such as exploration, reflection and problem solving, in your department?

[Probe]

Systematic? Freedom to manoeuvre?

There is time to reflect on new ideas and solutions.

The best solution is always sought after, not just the solution first identified.

There is start-up time and reflection time within product development projects, to enable evaluation during their existence.

There is a variety of funding-channels for ideas within the company.

Tools and frameworks

Are there any tools or frameworks available for managing and assessing innovation?

[Probe]

Relevant tools and measures to control and asses innovation performance within our company are available.

There are guidelines or frameworks available to guide and support work with innovation.

Supporting guidelines or frameworks distinguish between radical and incremental innovation.

Processes

Exploratory processes

Do you perceive that your department undertakes sufficient efforts to explore novel business or technological opportunities?

[Probe]

Are there efforts to explore opportunities without any clear problem formulation or customer value established beforehand.

Research to acquire new knowledge, opportunities and identify new customers. Identifying improvements of existing customer offerings.

There are continuous efforts to explore novel customer offerings and solutions.

Ideas are shaped and explored without rigid control, before being formalized into a standardized product document.

Our company explores new business models when developing radical innovation.

Incubation

Are there effective ways to incorporate novel ideas or solutions into the development organization - and subsequently implementing them into products or customer offers?

[Probe]

There are formalized ways for bringing ideas with incremental innovation qualities to the market.

Ways of incorporating or evaluating ideas.

There are ways for bringing ideas with radical innovation qualities to the market.

There are formalized ways of connecting research with development.

It is possible to test an idea through prototyping.

Learning and unlearning

Has Ericsson worked with advancing, rearranging or shifting the competencies of the organization to stay competitive in a changing market?

[Probe]

Experiences from previous projects are utilized in new projects.

There are continuous efforts to identify new competencies to keep up with changes in the market, such as new technological development or customer behavior.

There is continuous training of employees to keep competencies up to date.

Knowledge and competencies are often transferred between departments through rotation of employees.

The capabilities and resources of the company is often re-evaluated to be aligned with the current situation.

Values

Creativity and culture

Are creative solutions or unconventional ideas encouraged - and are they utilized or implemented by your department?

[Probe]Creative solutions often receives a favorable response. Employees approach problems with creative solutions, even if the outcome is uncertain.

There are ongoing efforts from our company to create an creative and innovative environment.

There are clear incentives for employees to conduct incremental innovation in our company.

There are clear incentives for employees to work with radical innovation in our company.

Path dependency and risk allowance

Explain how your department handles issues of staying relevant both technologically and business wise - and appraises future opportunities?

[Probe]

Novel technical solutions, outside the current technical base, are explored to satisfy future market and customer needs.

We continuously question why or how things are done in our company.

There is a good mix of radical and incremental innovation projects.

The commercial value is allowed to be uncertain in the initial phase of a project.

Novel business opportunities and models, outside of the current customer offerings, are continuously explored.

Decision basis and rules for innovation

Do you perceive the rules for decision making and evaluation of novel ideas to be clear and appropriate for enabling innovation?

[Probe]

Ideas here are evaluated differently based on if they are deemed incremental or radical in nature.

Innovative ideas are prioritized in the feature backlog.

Decision-makers are able to identify novel value in ideas of a radical nature.

There are clear rules for when a project should be cancelled.

Organizational structure

External linkages

Explain how your department collaborate with, or assess, external actors to enable innovation?

[Probe]

Such as:

with universities

with customers

with suppliers.

We systematically compare our offers with our competitors'.

Clear responsibilities and decision-ways

Is it clear and appropriate how mandate and responsibility is allocated at Ericsson in relation to innovation?

[Probe]

It is clear whom is responsible for approving novel ideas or solutions. Are these suitable for this authority?

It is clear what my department's responsibilities are for incremental innovation at our company.

It is clear what my department's responsibilities are for radical innovation at our company.

Employees and managers with ability and desire to innovate have the room to do so.

Bureaucracy

Do you perceive that there is inhibiting bureaucracy today compared to how you would like to work with innovation?

[Probe]

Skunk works or other non-sanctioned projects are allowed.

There is freedom in the development process to come up with novel solutions.

Innovation is governed by management with competencies and incentives to pursue it.

The entire process from idea exploration to commercialization is clearly structured and allows innovation.

Innovation strategy & vision

Clarity and diffusion

Do you perceive that there is a clear strategy for innovation, and is it well known among employees?

[Probe]Our company has a clearly articulated strategy for innovation.

The strategy for innovation is affecting how I or my department work with innovation.

Our strategy for innovation is well known and understood among employees.

There is a clear vision of where the company is heading.

The strategy and vision of our company is proactive rather than reactive, focusing on how to excel rather than to benchmark and act on this.

Alignment with operations

Do you feel that the innovation activities in your department is derived from, or connected to, an innovation strategy?

[Probe]

There are sufficient efforts to translate the innovation strategy into action.

The technical development is clearly aligned with the targeted core areas of the future vision.

The technological strategy is clearly aligned with the business strategy.

There is a sense that the whole organization is moving in a common direction.

Innovation cognition/ operational intelligence

Innovation cognition

Do you perceive that Ericsson, and your department, understand what innovation is, the importance of it and how to work with it?

[Probe]

Our company understand what innovation is.

Our company understand how to work with innovation.

Our company is interested in innovation.

Our departmental management understands their role in enabling innovation.

Our departmental management understands their role in creating incentives for innovation.

Our departmental management use relevant tools and measures to control and assess innovation efforts.

Resource cognition

Does Ericsson, and your department, understand how the market is structured and how to compete in it?

[Probe]

Our company understand what its main competitive advantages are.

Our alleged competitive advantages are derived from a proper perception of the market and what resources are competitive.

Our company understand the current technological progress.

General

What do you think is the largest facilitator/inhibitor when it comes to innovation at Ericsson?