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SCHOOL OF BUSINESS, ECONOMICS AND LAW

Master of Science in Innovation and Industrial Management

Enhancing the Innovation Performance by Employing Criteria

A Multiple Case Study of How Decision-Makers at Large Enterprises in Sweden Can Employ Criteria to Evaluate Early-Stage Innovation Projects

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Abstract

Background and Purpose: Innovation cycles continues to become progressively shorter, hence making it more important for companies to make the right decision regarding what ideas to develop further, and which ones to reject. Ideas emerge in the front end of the innovation process, characterized by high uncertainty and low level of available information. Suitable approaches for evaluation as well as criteria for selection is argued to help companies to manage the challenge of selecting the right ideas. In practice, uncertainty and information shortages make companies end up with using inconsistent approaches and intuition to evaluate early-stage innovation projects. Activities in the front end is suggested to have implications on the companies' performance throughout the rest of the innovation process, hence, turning the choice of which innovation project to carry forward into a key challenge of large enterprises. Consequently, this study aims to investigate how decision-makers at large enterprises in Sweden can employ criteria to evaluate early-stage innovation projects. The purpose of the thesis is further to contribute with insights regarding what criteria that can be employed and how decision-makers at large enterprises in Sweden can determine the valuation of criteria.

Methodology: The study includes an extensive literature review of several scholars highlighting different criteria that decision-makers at large enterprises can employ when evaluating ideas in the front end of the innovation process. Further, the literature review investigates how the valuation of criteria is determined. The literature is extended by qualitative semi-structured interviews where six experts within idea management and innovation management are invited. Further, decision-makers from six large enterprises in Sweden are interviewed regarding what criteria they employ to evaluate ideas in the front end of the innovation process, and how they are determining the valuation of these criteria. Interviews with enterprises were also qualitative and semi-structured.

Findings and Conclusions: This study has showcased differences between how literature and experts suggest that decision-makers can employ criteria, and how criteria seem to be practically employed by decision-makers at large enterprises in Sweden. Literature and experts suggest enterprises either to decide on predefined criteria in advance and make a rational evaluation, or to allow the decision-maker to form relevant criteria during the evaluation in order to make a holistic evaluation. A combination of rational- and intuitive decision-making was described by the literature as an alternative to the exclusive use of rational evaluation or holistic evaluation. Empirical data from case companies revealed that predefined criteria anchored in data and intuition were most frequently used to evaluate early stage innovation projects. It could be concluded that literature and experts recommend large enterprises to employ different criteria in different situations. Nevertheless, half of the enterprises did customize their use of criteria, however not to the same extent as literature and experts suggested. From the empirical data collection, two primary approaches to determine the valuation of criteria emerged. First, an enterprise can gather data to anchor assumptions with to determine the valuation of criteria. Second, an enterprise can make assumptions anchored in intuition to determine the valuation of criteria. The knowledge of the individual whose intuition were relied on, was identified as crucial. Moreover, a co-developing process could be identified in one of the case companies as well as in the empirical data collected from experts.

Keywords: *Front end Innovation, Early-stage innovation project, Idea screening, Idea selection, Idea evaluation, Idea assessment, Project selection, Decision-making and Intuition.*

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Table of Contents

1. Introduction 1
1.1 Background 1
1.2 Problem Discussion 2
1.3 Purpose and Research Question 4
1.4 Delimitations 4
1.5 Research Outline 5
2. Literature Review 6
2.1 Introduction to Literature Review 6
2.2 The Front-End Innovation 7
2.2.1 Clear Understanding of what Characterizes the FEI 9
2.2.2. Idea Screening in the FEI 10
2.2.3 Challenges Decision-Makers Experience in the FEI 11
2.3 Evaluating Early-Stage Innovation Projects 12
2.3.1 Introduction to Dual-Processing Theories 12
2.3.2 Introduction to Intuition 12
2.3.3 Introduction to the Three Ways of Evaluation 13
2.3.4 Rational Evaluation 14
2.3.5 Holistic Evaluation 21
2.3.6 Hybrid Evaluation 23
2.4 Literature Review Summary 24
2.4.1 Understanding the Context 24
2.4.2 Foundation of Analysis 25
2.4.3 Summarization of Specific Criteria 27
3. Methodology 29
3.1 Qualitative Research Strategy 29
3.2 Multiple Case Study Design 30
3.3 Research Method and Data Collection 31
3.3.1. Selection of Experts and Case Companies 31
3.3.2. Semi-Structured Interviews 36
3.4 Thematic Analysis 40
3.5 Research Quality 42
3.5.1 Internal Validity 42
3.5.2 External Validity 42
3.5.3 Internal Reliability 43

3.5.4 External Reliability 43
3.6 Research Ethics 43
4. Empirical Findings 45
4.1 Empirical Findings from Expert Interviews 45
4.1.1 Criteria Discussed and Problematized in the FEI 45
4.1.2 Factors Affecting the Choice of Criteria in the FEI 47
4.1.3 Determining the Valuation of Criteria in the FEI 48
4.2 Empirical Findings from Case Companies 51
4.2.1 [C1] Nordic Telecommunications Company 51
4.2.2 [C2] Infrastructure, Building and Urban Planning Consultant Company 54
4.2.3 [C3] Real Estate Company 57
4.2.4 [C4] Defence and Security Company 60
4.2.5 [C5] Industry Tools and Machine Company 63
4.2.6 [C6] Project Development and Construction Company 66
5. Analysis 69
5.1 What criteria can be employed when evaluating early-stage innovation projects in large enterprises in Sweden? 69
5.1.1 Comparing Specific Criteria Highlighted by Literature with Empirical Findings 70
5.1.2 The [C3] Company - Not Employing Predefined Specific Criteria 77
5.1.3 Factors Affecting the Choice of Criteria in the FEI 77
5.2 How can decision-makers at large enterprises in Sweden determine the valuation of criteria? 79
5.2.1 Determining the Valuation of Criteria by Data 80
5.2.2 Determining the Valuation of Criteria by Intuition 82
6. Conclusions 85
6.1 Answering the Research Questions 85
6.1.1 Sub-question 1: What criteria can be employed when evaluating early-stage innovation projects in large enterprises in Sweden? 85
6.1.2 Sub-question 2: How can decision-makers at large enterprises in Sweden determine the valuation of criteria? 86
6.1.3 Main Research Question: How can decision-makers at large enterprises in Sweden employ criteria to evaluate early-stage innovation projects? 87
6.2 Future Research 89
7. References 90
8. Appendix 95

1. Introduction

The chapter will start with a description of the background and the problem situation of the topic studied in this master thesis. This is followed by the purpose which the thesis aims to fulfill as well as the research question the thesis aims to answer. After, delimitations of the thesis are described. The chapter will end with a research outline, which depicts the structure of this thesis.

1.1 Background

Most companies of today are acting in a highly competitive and turbulent landscape. Growth and renewal of organizations are fundamental pillars in order to achieve long term survival. One widely adopted way for enterprises to escape competition is by innovating. (Sinha, 2016; Nicholas, Ledwith, & Bessant, 2015; Hansen & Birkinshaw, 2007; O'Connor & DeMartino, 2006). Even though enterprises engage in innovation, executives at large enterprises often ask themselves, "Why are we not better at innovation?" (Hansen & Birkinshaw, 2007).

Innovation cycles are becoming progressively shorter, hence making it more important for companies to make the right decision about which innovation projects to carry further and which ones to drop (Vacík & Špaček, 2017). One of the most consistent patterns in business is the failure of well-established firms to stay at the top of their industries when technologies or markets change (Christensen & Bower, 1996). This is further stressed by Chandy and Tellis (2000), who suggest that incumbents who do not recognize the emergence of upcoming innovations can end up with being erased from the market. Challenges related to innovation differ from firm to firm (Mitchell, Phaal & Athanassopoulou, 2014; Hansen & Birkinshaw, 2007). Some of the key challenges for firms relate to the quality of emerging ideas within the company, establishment of mechanisms to decide what ideas to fund as well as to cope with organizational resistance against ideas of radical nature (Hansen & Birkinshaw, 2007).

Having identified ideas and opportunities, companies need to choose and evaluate these. Deciding what ideas to fund, hence allocate resources to, becomes a critical task for incumbents (Goffin & Mitchell 2017; Zhang & Zhang, 2014; Martinsuo & Poskela, 2011; Christensen & Bower, 1996). Some companies are more successful at innovation than others. One major reason behind their success is suggested by Nicholas, Ledwith and Bessant (2015) to be the approaches developed and used by organizations to choose and support the most promising idea at its early stage. However, selecting the most promising idea is not a simple task for an organization (Nicholas et al., 2015). Nevertheless, the average quality of all ideas of an organization is generally higher than the quality of one single selected idea. Attention therefore needs to be directed at prioritization of tasks related to evaluation and selection of ideas to become more efficient. (Zhang & Zhang, 2014). Every organization will most likely have several innovation projects at the same time (Goffin & Mitchell, 2017). However, since the resources available of every firm for innovation projects is finite, firms need to wisely allocate the resources among projects. Furthermore, in order to decide what ideas to bet on and to make sure that the most promising ideas receive funding, an effective process for

resource allocation is needed (Zhang & Zhang, 2014; Davis, Fusfeld, Scriven & Tritle, 2001; Goffin & Mitchell, 2017).

Companies who are successful over extended periods of time are performing both exploitative and explorative activities. Exploitative activities will help companies to identify and launch incremental innovations, by exploiting current markets and products. Explorative activities will propel a more radical type of innovations, as companies are exploring opportunities beyond their immediate focus and current paths. (March, 2006). A healthy portfolio of a company aiming for growth should consist of a mix between incremental innovation projects and radical innovation projects (Goffin & Mitchell, 2017; Mathews 2003). Hence, companies need to execute both exploitative and explorative activities (March, 2006).

Innovative ideas, especially those of radical nature, often tend to make the existing capabilities of an organization to appear obsolete and weak. Consequently, this situation often results in the idea being rejected by the organization. The reason why, is that the evaluation of ideas is commonly influenced by path dependency of the firm as well as subjectivity. (Bessant, Von Stamm & Moeslein, 2011). A common problem with internal rules used for resource allocation is that these rules tend to favor status quo (Eling & Griffin, 2016; Bessant, Von Stamm & Moeslein, 2011). This implies that, on one hand, the usage of internal routines, such as decision rules and processes, can be argued to be an important part of the innovation capabilities of an organization. On the other hand, such routines can be considered to limit the organization in the selection of ideas to bet on, since companies tend to choose ideas within the current scope of the firm. Thus, successful routines for resource allocation need to be dynamic by being reviewed, extended and changed if necessary. (Bessant et al., 2011).

1.2 Problem Discussion

As earlier mentioned, challenges of innovation differ from company to company. This implies a risk of commonly applied approaches being wasteful, even harmful, if implemented in wrong situation. (Mitchell, Phaal & Athanassopoulou, 2014; Hansen & Birkinshaw, 2007). Hence, it can be argued that managers need to be highly selective regarding the choice of what innovation approaches and tools to deploy (Hansen & Birkinshaw, 2007).

Ideas emerge in the front end of the innovation process. To manage the front end is a challenging task for companies per say. (Achiche, Appio, McAloone & Minin, 2013). The front end is characterized by conditions such as high market and/or technological uncertainties, and a low level of available information. Nevertheless, activities in the front are suggested to have implications on companies' performance throughout the remaining parts of the innovation process, which is why attention should be given to activities in the front end (Koen et al., 2002; Jetter, 2003; Hammedi, Riel & Sasovova, 2011, Backman, Börjesson & Setterberg, 2007). Considering the importance of the Front-End Innovation (FEI), little studies have been conducted on the FEI, in comparison with the New Product Development (NPD) process (Koen et al., 2014).

Approaches for evaluation as well as criteria for selection in the FEI may help firms align their idea selection with their goals and resources (Martinsuo & Poskuela, 2011). Some researchers argue that a set of feasible and appropriate evaluation criteria should be decided upon beforehand in order to select ideas (Boeddrich, 2004; Eling & Griffin, 2016; Vacík & Špaček 2007; Zhang & Zhang, 2014). Researchers also emphasize the alignment between evaluation criteria and the strategy of each individual company (Eling & Griffin, 2016; Meade & Presley, 2002; Gabriel, Camargo, Monticolco, Boly & Bourgault, 2016; Carbonell-Foulquié, Munuera-Alemán, & Rodríguez-Escudero, 2004). Further, by employing criteria a firm's innovation process can become more transparent and its decisions can be more reliable (Martinsuo & Poskuela, 2011).

The aspect of flexibility of evaluation criteria is discussed by the literature. Some researchers argue that too much formality in the selection process can lead to opportunities being missed. (Gutiérrez & Magnusson, 2014; Vacík & Špaček 2007; Magnusson, Netz & Wastlund, 2014; Hammedi et al., 2011). In practice, many organizations often end up with using informal and inconsistent approaches to select innovation projects in early phases (Eling & Griffin, 206). Regarding innovation projects, an overarching issue is consequences of a high-level uncertainty. Most of the information that preferably should be considered in order to evaluate and select innovation projects, is highly uncertain and often even unknown. (Ching-Torng & Chen-Tung 2004; Goffin & Mitchell, 2017; Hammedi et al., 2011). The situation is specific for early-stage innovation projects in the FEI (Achiche et al., 2013; Jetter, 2003). Uncertainty and information shortages often make firms rely on the intuition when selecting what early-stage projects to fund (Jetter, 2003; Goffin & Mitchell, 2017). Further, Hart, Jan Hultink, Tzokas and Commandeur (2003) recognize that the literature within the field of innovation has mentioned intuition, but little is known about its qualities in evaluating new product ideas, hence early-stage innovation projects.

Even though available information is spares and perceived as unreliable, decisions regarding what early-stage innovation projects to fund must be taken (Goffin & Mitchell, 2017). Martinsuo and Poskuela (2011) emphasize the importance of making the right decisions in the front end, since it both reduces risks of failure and costs in later stages. Consequently, by having an effective evaluation process in the front end, as well as employing appropriate criteria, the overall performance of innovation can be enhanced (Ibid.). Hence, it is of interest to investigate how decision-makers at large enterprises can employ criteria to evaluate early-stage innovation projects, and more specific what criteria that can be employed in large enterprises as well as how decision-makers can determine the valuation of such criteria.

1.3 Purpose and Research Question

The purpose of the thesis is to investigate how decision-makers at large enterprises in Sweden can employ criteria to evaluate early-stage innovation projects. The purpose of the thesis is further to contribute with insights regarding what criteria that can be employed and how decision-makers at large enterprises in Sweden can determine the valuation of criteria. By conducting a literature review as well as interviews with six experts within the field and six representatives from different case companies, the authors of this thesis aim to contribute with insights to fulfill the purpose. The authors of this thesis aim to fulfill the purpose by answering the following research question:

- How can decision-makers at large enterprises in Sweden employ criteria to evaluate early-stage innovation projects?

In order to answer the main research question, it appears relevant to investigate the two below sub-questions:

1. What criteria can be employed when evaluating early-stage innovation projects in large enterprises in Sweden?

2. How can decision-makers at large enterprises in Sweden determine the valuation of criteria?

1.4 Delimitations

For the thesis to be conducted with an appropriate focus, the authors of this thesis have decided upon some delimitations. First, the authors of this thesis recognize their limitations in resources. Consequently, the authors have chosen to conduct a smaller multiple case study, more specifically six case companies and with one representative from each case company. Executing a larger multiple case study would have been of interest, however in order to answer the research questions properly with limitations of resources in mind, the authors considered the focus as appropriate.

Another delimitation of this study is the decision-maker perspective. The choice of the decision-maker perspective consequently results in that this study solely examines one perspective when investigating the evaluation of early-stage innovation projects. Other perspectives could have been included in this study as well, such as employees working with early-stage innovation projects but without a decision-maker role. Even so, the decision-maker perspective was chosen since it is the decision-makers who have the responsibility to screen ideas in the front end. Further, decision-makers both evaluate and select ideas based on criteria, hence determine whether the idea will receive further resources and be further developed or not.

Furthermore, the researchers of this study decided to conduct a multiple case study. The researchers acknowledge that it would also be interesting to conduct a single case study. A single case study would have yielded a deeper analysis. However, the multiple case study is seen as more appropriate to answer the research question since it is advantageous in terms of grounding suggestions in several

empirical evidence. Hence, by examining multiple cases, a wider exploration of the research questions is reached.

Last, the study of the thesis is conducted by qualitatively interviewing decision-makers at large enterprises about how they evaluate early-stage innovation projects. The thesis therefore applies a retrospective. The authors of this thesis recognize that it would be interesting to study the evaluation of early-stage innovation projects in real-time, such as conducting participant observations during evaluation-meetings. However, when conducting qualitative interviewing the interviewees can reflect on the evaluation process and generate rich answers, hence yield a deep understanding of the context to the study.

1.5 Research Outline

This thesis is divided into six areas, which are introduction (1), literature review (2), methodology (3), empirical findings (4), analysis (5) and, conclusion (6). The research outline is illustrated in Figure 1 below.

Figure 1. Research outline. Compiled by the authors.

2. Literature Review

This chapter will present all literature that has been reviewed and retrieved by the authors in order to answer the main research question of this thesis; "How can decision-makers at large enterprises in Sweden employ criteria to evaluate early-stage innovation projects?", by providing insights about the two sub-questions; "What criteria can be employed when evaluating early-stage innovation projects in large enterprises in Sweden?" (1) and "How can decision-makers at large enterprises in Sweden determine the valuation of criteria?" (2).

2.1 Introduction to Literature Review

In order to specify purpose and research questions of this study, an initial review of existing literature was conducted within the area to gain a comprehensive impression of the topic. The review was made within the field of idea management and innovation management and, allowed the authors of this thesis to develop well established and valid arguments for why the subject of the thesis is of interest. Moreover, the initial literature review was necessary since the authors of this thesis aimed to engage in what is already known within the area of this study. By making the review, the authors of this thesis were able to establish an understanding for what theories and concepts that are relevant in this area.

As soon as the scope of the study was specific enough, a systematic literature review was conducted in order to establish a theoretical framework. The different sources of literature that have been used are scientific articles and books. To find and retrieve literature from such sources, several databases were used. Databases used were accessible through the Library Portal of the University of Gothenburg. Examples of databases frequently used are Google Scholar, Emerald, Business Source Premier, Scopus and GUNDA. The initial review of literature resulted in emergence of several keywords. The emerged key words are: Front-End Innovation, Early-stage innovation project, Idea screening, Idea selection, Idea evaluation, Idea assessment, Project selection, Decision-making and Intuition. These keywords were used in different combinations to search for literature to base the theoretical framework. Literature will be presented in this chapter in separate sections. These sections are 2.2 The Front-End Innovation, 2.3 Evaluating Early-Stage Innovation Projects and 2.4 Literature Review Summary. The Literature Review Summary aims to provide the reader with a clear overview of the content of the chapter as well as the foundation of analysis for this study.

Initially, the chapter will explain the first phase of the innovation process, in this thesis referred to as the FEI. The aim of the section is to help the reader to navigate in the innovation process and hence understand at what point in the process the focus of this thesis is put. In order to examine the research question of this thesis, a clear understanding of the FEI is needed, both of what's happening in the FEI as well as the characteristics of the FEI. Typical characteristics of the FEI are arguably important to understand since it may have implications on how ideas are evaluated and why. Having established an understanding of the FEI and its characteristics, next part of this chapter zooms into the idea screening process in the FEI. By giving the reader an understanding of the idea screening process, this thesis aims to generate a more detailed understanding of the evaluation process and the

gathering of information within the FEI. Further, decision-makers have a significant role in the idea screening process; therefore, it is arguably important to understand their role and the challenges they face in the FEI. Thus, the chapter will outline challenges which decision-makers experience when evaluating early-stage innovation projects in the FEI. Reasons for why decision-making is complex as well as how decision-makers can manage the complexity are presented.

Moving from the context of the FEI, to address how decision-makers can employ criteria to evaluate early-stage innovation projects in the FEI. Next section introduces dual-processing theories as it can be used to understand how these decisions can be made. Following, an introduction to intuition is presented were the authors of this thesis aim to present their interpretation of intuition. Based on the introduction to dual-processing, following section presents three ways of evaluating early-stage innovation projects in the FEI, namely the rational evaluation (1), the holistic evaluation (2) and a hybrid evaluation (3). These three ways of evaluation is further explained individually in later sections of the chapter in order to reach an understanding of how decision-makers at large enterprises in Sweden can employ criteria to evaluate early-stage innovation projects.

Firstly, the thesis outlines the first way of evaluation, namely the rational evaluation. Following, the thesis presents several researchers that has been included in this study to investigate specific criteria that can be employed when rationally evaluating early-stage innovation projects in the FEI. Consequently, each researcher and the criteria they suggest is presented one by one. Afterwards, the second way of evaluating, namely holistic evaluation is presented. Lastly, the third way of evaluation is presented, the hybrid evaluation. The three ways of evaluation yield examples of how decision-makers at large enterprises in Sweden can employ criteria to evaluate early-stage innovation projects which contribute to the purpose of this thesis.

The last section of this chapter constitutes of a summarization of the chapter which aims to give the reader an overview of all previous sections and provides the foundation of analysis for this thesis.

2.2 The Front-End Innovation

The process of innovation can be divided into three parts. See below, Figure 2, for an overview of the innovation process. The innovation process starts with the first part, namely the Fuzzy Front End (FFE), and continues with the NPD process. Lastly, the innovation process finish with the third part, commercialization. (Achiche et al., 2013; Koen, Bertels & Kleinschmidt, 2014). However, naming the first phase of the innovation process FFE, implies that this part of the innovation process is fuzzy and mysterious due to uncontrollable as well as unknown factors. This definition and the attitude it may bring to the organization are suggested to result in difficulties in deciding who bears the responsibility to manage activities of the initial part of the innovation process. Further, the word “fuzzy” has been argued to imply that this part of the innovation process never can be managed. (Koen et al., 2001). With this in consideration, some researchers have adapted the notion FEI, instead of FFE (Koen et al., 2001). Even though the word “fuzzy” is erased from the description, Koen et al. (2001) still suggest FEI to be subject to high uncertainty and lack of information. In practice, FEI and FFE are often used as synonyms. The reason why, is that activities in the FEI are still

challenging since the initial phase of the innovation process is characterized by a high uncertainty and complexity. (Florén & Frishammar, 2012). Thus, the authors of this thesis will view FFE and FEI similarly since they have the same characteristics but will use the term FEI as they argue that the initial part of the innovation process do not have to be mysterious and hence is possible to actively manage. Reid and de Brentani (2004) and, Auerswald and Branscomb (2003) consider early-stage innovation projects to be in the phase between the R&D and the NPD process. On the other hand, Chang, Wei and Lin (2008), consider early-stage innovation projects to be both in the first part of the innovation process (FEI), as well as the first part of the NPD process. The authors of this thesis have chosen to define early-stage innovation projects as being in the FEI.

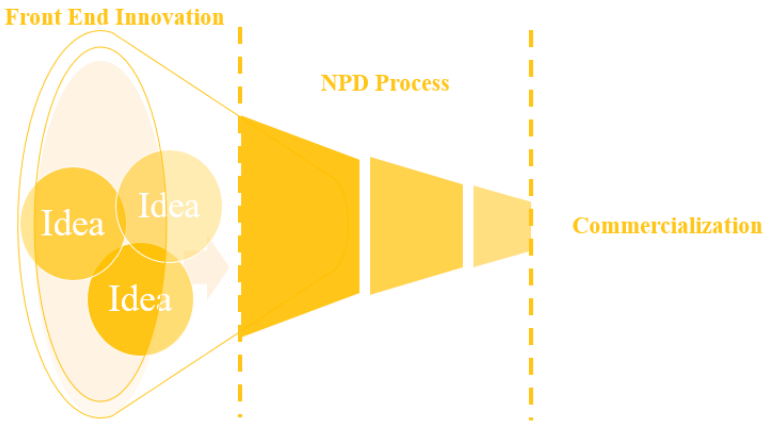

Figure 2. The innovation process separated into three parts. Derived from Koen et al. (2002).

In the FEI, ideas mature from being recognized as an opportunity to the creation of concepts (Achiche et al., 2013). See Figure 3 for an overview of what happens in the FEI. The arrows which are directed towards the figure are symbolizing the starting point of early-stage innovation projects. Hence, an early-stage innovation project starts either at idea generation or opportunity identification. At the start, the early-stage innovation project is an idea or an opportunity. Koen et al. (2002), define ideas as "the most embryonic form of a new product or service". Kudrowitz and Wallace (2013) are discussing an idea as existing of two parts. Firstly, a problem that intended users are having and secondly, a proposed solution to address the problem (Ibid.). Dean, Hender, Rodgers and Santanen (2006) describe the quality of an idea as how well a proposed solution is solving a defined problem. Further, Dean et al. (2006), suggest that the solution needs to be possible to implement for the idea to be of high quality.

The arrow pointing away in Figure 3, represents an early-stage innovation project leaving the FEI. The early-stage innovation project has been developed into a defined concept. Koen et al. (2002) define a concept as "having a well-defined form, including a description (written and visual), primary features, customer benefits, and an understanding of the technology needed". The early-stage innovation project, in the form of a defined concept, leaves the FEI either directly to the NPD process, or through a Stage-Gate process entering the NPD process afterwards. In the Stage-Gate process, a concept is further developed before entering the NPD process.

Attention is given to the FEI since this part of the innovation process can enhance the value, amount, and probability of success of high-profit concepts. (Koen et al. 2002). Furthermore, pre-development activities, as such in the FEI, greatly impact on the NPD process in terms of performance, speed and innovativeness (Jetter, 2003). Both Hammedi et al. (2011) and Backman et al. (2007) also recognize the importance of pre-development activities which the authors argue to play an important role in innovation success. Nevertheless, the FEI is a critical component of the NPD process since it determines what ideas and concepts that will be further developed in the development and commercialization (Koen et al., 2014). This is confirmed by Martinsuo and Poskela (2011), who particularly emphasize the importance of tasks related to evaluate ideas and concepts on the FEI.

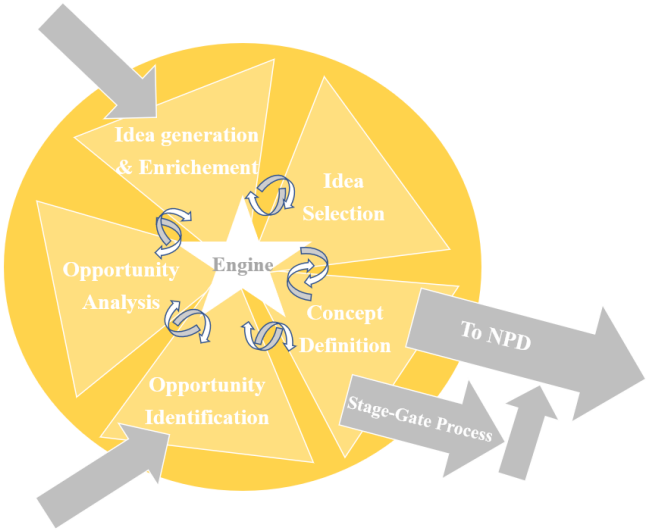

Figure 3. An overview of the FEI accustomed to the development of new concepts. Derived from Koen et al. (2002).

2.2.1 Clear Understanding of what Characterizes the FEI

In order to reach a clear understanding of what characterizes the FEI, a comparison of the FEI and the NPD process has been made, see Table 1. The comparison reveals that the FEI is characterized by being unstructured, unpredictable, uncertain, and chaotic (Koen et al., 2002; Florén & Frishammar, 2012). This is in contrast with the NPD process which is the opposite according to below table (Achiche et al., 2013; Koen et al., 2002). Furthermore, the FEI is characterized by conditions such as high market and/or technological uncertainties, and a low level of availability of valuable information (Achiche et al., 2013; Jetter, 2003). Goffin and Mitchell (2017) describe innovation projects as characterized by uncertainty rather than risk. Further, uncertainty is described as when *no objective probability data are available* (p. 236), which is the opposite of risk where probabilities of different outcomes are considered as known (Ibid.). Mitchell et al. (2014) also recognize that innovation projects are characterized by uncertainty. Further, the researchers argue that the level of uncertainty will change as the project is making progress, hence, making the uncertainty more prominent in the FEI (Ibid.). Due to the characteristics of the FEI, it is challenging to decide which ideas to develop further and which ones to reject (Barczak, Griffin & Kahn, 2009).

Hammedi et al., (2011) also emphasize that evaluators are facing a high degree of uncertainty and ambiguity while making these decisions in the FEI.

	Front End Innovation	NPD Process
Nature of Work	Experimental & often chaotic. Can't schedule invention.	Disciplined and structured with goals through a project plan.
Date of Commercialization	Unpredictable or uncertain.	High level of certainty.
Funding	Variable. Many projects are "bootlegged", others need funding to proceed.	Projects are budgeted.
Expectations of Revenue	Often uncertain, with large amount of speculation	Predictable, with enhanced certainty and documentation as the product release date is coming up.
Activities	Research is conducted in order to minimize the risk and optimize the potential.	Process development team.

Table 1. A comparison of characteristics between the FEI and the NPD process. Derived from Koen et al. (2002).

2.2.2. Idea Screening in the FEI

In the FEI, ideas are generated and then screened. According to Kahn, Kay, Slotegraaf and Uban (2013), idea screening is a process where ideas are evaluated and selected, to be forwarded in the project portfolio. In most contexts, the problem lays in selecting the ideas rather than generating them. The challenge is to select the ideas which yields the most value to the organization. Selecting is critical to both the health and the success of the organization. (Koen et al., 2002). In the idea screening process, there are people whom have the responsibility to screen ideas (Kahn et al., 2013). In this thesis, we refer to these people as "decision-makers". During the process of idea screening, decision-makers evaluate ideas (i.e. idea evaluation) and select ideas (i.e. idea selection), hence determine whether ideas will receive further resources and be further developed or not (Koen et al., 2002; Kahn et al., 2013).

An idea selection process can constitute of several decision gates. See Figure 4, for an example of an idea selection process. Considering that the idea is attractive for the organization, the appropriate next step is to gather more information. After having gathered and analyzed the new information, another decision round usually takes place. (Koen et al., 2002). Further, Figure 4 reveals how more and more information is gathered with time in the process. In line with this, Goffin and Mitchell (2017) state that innovation project selection is seldom one sole decision made once in the beginning of the project. Hence, innovation project selection can be viewed as an iterative process (Archer & Ghasemzadeh, 1999). Even though the innovation project selection process is iterative and, hence have several decision gates, this thesis focus on the evaluation reaching a decision for early-stage innovation projects.

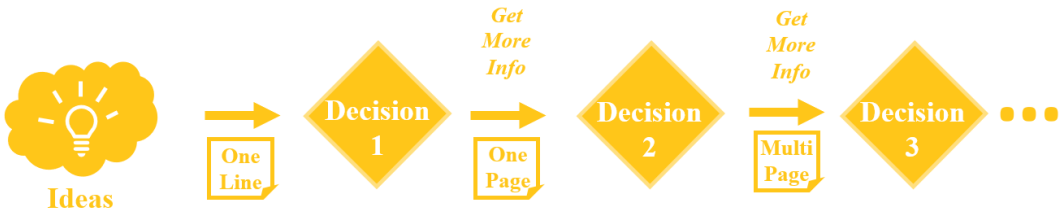

Figure 4. A generic example of an idea selection process. Derived from Koen et al. (2002).

Selection of ideas may range between activities such as simply an individual's choice, formalized predefined portfolio management method, or a multistage process characterized by complexity. Furthermore, the literature reveals no single best practice in how to evaluate early-stage innovation projects. (Koen et al., 2002). Even though the idea screening process vary in its nature, between and within organizations, decision-makers face the challenge of choosing whether to accept or reject an idea, hence further developing it or not (Barczak et al., 2009). The decision-maker play a role in the idea screening process, therefore next section will cover decision-makers in the FEI and the challenges which they face.

2.2.3 Challenges Decision-Makers Experience in the FEI

Decision-makers are being forced to make choices under pressure and when there is a lack of information, such as in the FEI. (Pfeffer & Sutton, 2006). Kornish and Ulrich (2014) recognize that a challenge decision-makers can experience where available information is lacking when evaluating the idea, making it more difficult to evaluate the idea properly. An opposite problem may be related to a potential overload of information, which makes it difficult for decision-makers to reject information that is irrelevant to the organization and the context. (Pfeffer & Sutton, 2006). Baba and Hakemzadeh (2012) acknowledge that individual experience and judgement of managers will affect how they perceive and utilize evidence for decision making. This is a result from the bounded rationality of humans, making the decision processes different from the one suggested by theory (Baba & Hakemzadeh, 2012). Furthermore, a challenge acknowledged by Frishammar, Floren and Wincent (2011), is that decision-makers can experience uncertainty in the FEI partially because of unclear described or underdeveloped ideas.

On one hand, there are researchers who believes that managers need solid evidence in order to effectively make the right decisions. If organizations take decisions based on valid evidence, the payoff will be significant. (Pfeffer & Sutton, 2006). If decisions are made without enough reliable evidence, resources will be wasted and the future of the firm may be damaged (Baba & Hakemzadeh, 2012). Evidence-based management is concerned with the ability of adapting and using previous experience and information by a systematic collection of evidence. The evidences will later be used in order to deal with new problems. (Huff, 2016).

On the other hand, there are arguments for why traditional, evidenced-based project management is not appropriate to use as source of theoretic base for innovation project management. For early-stage innovation projects in stable environments, evidence-based project management will continue to be a valuable practice. The challenge of dealing with innovation lies in determine when to go beyond the

available evidence. When uncertainty related to an early-stage innovation project is high, established evidence becomes less valuable. Since circumstances will change and new ones will emerge, direct response will be more appropriate. (Huff, 2016).

With regards to the high level of uncertainties in the FEI along with that decision-makers face challenges in evaluating early-stage innovation projects, it is interesting to further investigate how decision-makers at large enterprises can employ criteria to evaluate early-stage innovation projects. Therefore, the next section will consider different ways in which decision-makers can evaluate early-stage innovation projects.

2.3 Evaluating Early-Stage Innovation Projects

Decision-makers in large enterprises in Sweden can evaluate early stage innovation projects in different ways. As described in section 2.2.3, decision-makers can either make decisions based on evidence or go beyond available evidence to make decisions. This section will, with a basis in dual-processing theories, present different ways of how decision-makers at large enterprises in Sweden can employ criteria to evaluate early-stage innovation projects. Before this thesis present different ways of evaluating early-stage innovation projects, an introduction to the dual-processing theories and intuition will be presented.

2.3.1 Introduction to Dual-Processing Theories

The dual-processing theories distinguish between nonconscious (system 1) and conscious (system 2) processing (Dane & Pratt, 2009). Even though dual-processing theories focus on reasoning, Evans (2003) recognizes that these theories are also relevant in areas such as judgement and decision-making. In terms of judgement and decision-making, these two information processing systems are frequently combined (Dane & Pratt, 2009). System 1, the nonconscious processing, is linked to intuition, whereas System 2, the conscious processing, is connected to rational argumentation (Evans, 2008). System 1 is described as automatic (Schneider & Shiffrin, 1977), experiential (Epstein, 1994) and implicit (Evans & Over, 1996). In contrast, System 2 is described as controlled (Schneider & Shiffrin, 1977), rational (Epstein, 1994) and explicit (Evans & Over, 1996).

2.3.2 Introduction to Intuition

Before this thesis introduces the three ways of evaluating early-stage innovation projects, the authors of this thesis want to present their adapted definition of intuition. Dane and Pratt (2007) consider intuition to be judgements that emerge from associations which are rapid, nonconscious and holistic. Eling, Griffin and Langerak (2014) have defined intuition for decision-making as “a seemingly unsubstantiated attitude toward a decision alternative or course of action that communicates the result of unconscious processing to the conscious mind of the decision-maker”. This definition is in line with what Hodgkinson, Sadler-Smith, Burke, Claxton and Sparrow (2009) states about intuition, that it is a judgement for a course of action. The authors also argue that it is with “an aura or conviction of rightness or plausibility, but without clearly articulated reasons or (Ibid.). Further, Gore and Sadler-Smith (2011) consider intuition to yield a direction but does not yields a reason why. The

authors of this thesis have chosen to define intuition as "an unsubstantiated attitude toward a decision alternative or course of action without yielding a reason why". The definition is partially supported by the already mentioned researchers. To reach a better understanding of intuition, this thesis will distinguish intuition from both insight and instinct. Insight can be explained as an explicit conscious awareness both of a solution and of a reasoning that supports the solution. Such insight can be sudden in nature, often referred to as an "eureka" moment. (Eling et al., 2014). In contrast, intuition for decision-making is an unsubstantiated attitude toward a decision alternative or course of action (as defined by Eling et al, 2014). According to Gore and Sadler-Smith (2011), intuition serve as a forerunner to insight, since it reaches the conscious mind of the decision-maker before insight does. However, not all intuitions become insight. Instinct, on the other hand, can be explained for example as autonomous reflex actions. (Hodgkinson et al., 2009).

2.3.3 Introduction to the Three Ways of Evaluation

The next two sections will consider these two processing systems, resulting in different ways by which decision-makers at large enterprises in Sweden can employ criteria to evaluate early-stage innovation projects. Initially, the conscious system processing will be described, since Koen et al. (2002) consider it to be the mainstream way for idea management. From here on this thesis refer to this way of evaluation as the "rational evaluation". Secondly, the nonconscious system processing will be described, from here on referred to as the "holistic evaluation". Lastly, this chapter finishes with considering a combined evaluation of the two complementary processing systems, which this thesis refers to as the "hybrid evaluation". See Table 2 below for an overview of the three ways of evaluating early-stage innovation projects.

Ways of Evaluation	**Rational Evaluation 2.3.4**	**Holistic Evaluation 2.3.5**	**Hybrid Evaluation 2.3.6**
Description	**Prefer analysis, before intuition** • Based on specific criteria • Formal selection process **Specific criteria** • Employed in a set of criteria • Predefined • One-dimensional • Narrow	**Prefer intuition, before analysis** • Based on holistic criteria and/or specific criteria • Informal selection process **Holistic criteria** • Loosely articulated • Not predefined • Broad • Multi-dimensional **and/or Specific criteria** • Same as in rational evaluation, but <u>not</u> predefined	**Jointly applied** The rational- and the intuitive evaluation are combined. Can be combined in different ways and sequences. Can be complementary and mutually reinforcing to combine.

Table 2. An overview of the three ways of evaluating early-stage innovation projects. Compiled by the authors.

2.3.4 Rational Evaluation

Traditionally, the most prominent way of rationally screening ideas has been to apply a set of formal, predefined and specific criteria (Magnusson et al., 2014). Koen et al. (2002) states that organizations employ specific criteria, which are predefined, in order to assess whether an opportunity is attractive to the organization per say. A specific criterion is narrow in its nature and is a measure of one characteristic or dimension of an idea. (Magnusson et al., 2014). Having such a set of criteria, characterized by objectivity, is important in the idea selection process (Koen et al., 2002). Martinsuo and Poskela (2011) emphasize that organizations employ a set of criteria in order to evaluate and screen ideas. Some researchers argue that a set of feasible and appropriate evaluation criteria should be decided upon beforehand in order to select ideas (Boeddrich, 2004; Eling & Griffin, 2016; Vacík & Špaček 2007; Zhang & Zhang, 2014). Moreover, Magnusson et al. (2014) state that it can be argued, based on Sadler-Smith and Sparrow's (2008) structure for decisions, that specific criteria decisions are more in line with a tight decision structure which prefers analysis in front of the sole use of intuition.

In order to make specific criteria decisions, the first step is for people with appropriate expertise to evaluate ideas based on several specific criteria. (Magnusson et al., 2014). When values are estimated, different rating factors are applied in order to decide the weight ratings for each criterion. The rational evaluation aims to assess certain characteristics of an idea in order to make it possible for organizations to compare ideas against each other. Which characteristics to asses and what criteria to employ is dependent on the context. (Ibid.). As the rapid pace of innovation today are forcing organizations to deploy a faster, leaner and more agile innovation process, even formal processes for evaluating ideas need to be flexible (Cooper, 2009). Employing different evaluation criteria for different projects is one way of achieving flexibility while screening ideas (Cooper, 2009; Hart et al., 2003).

There are several advantages of implementing specific criteria, such as easily allocating responsibility and having control, enhancing the understanding of intention and expectations of what kind of data that needs to exist, and raising the quality of communication between those involved (Ibid.). Martinsuo and Poskela (2011) show that the employment of specific criteria greatly and significantly impacts competitive and business potential in the FEI. Regarding the structure of the idea selection process, there are authors whom recognize that without any formal decision process, such as the rational evaluation, most ideas will fall into a black hole and organizations will hence miss the opportunity of realizing them (Soukhoroukova, Spann & Skiera, 2012; Koen et al., 2002).

Moreover, specific criteria have received criticism such as that it is oversimplifying a complex decision by determining the valuation, i.e. putting a score, on a criterion. Another type of criticism is that specific criteria are seldom independent. (Rochford, 1991). Even though such criticism has been conveyed, many researchers and practitioners are unified in recognizing the significance of having these types of well-defined decision criteria (Carbonell-Foulquié, Munuera-Alemán & Roudríguez-Escudero, 2004).

Mitchell et al. (2014) state that what criteria to employ is dependent on type of organization, nature of the project and, at which stage the project is at. Goffin and Mitchell (2017) agree with Mitchell et

al. (2014) and recognize that there is no best practice regarding predefined specific criteria since a set of factors can't be chosen which fit all contexts or circumstances. Martinsuo and Poskela (2011) emphasize that the current understanding for project evaluation is that organizations should include predefined specific criteria which are both qualitative and quantitative in nature.

A formal decision process aims to commit resources to a project or an idea, resources such as time, funding and people. (Koen et al., 2002). Koen et al. (2002) recognize that most formal processes starts off with having an individual or a group looking at a limited amount of information of an idea. The rational evaluation, with its rational analysis, has traditionally been the response from executives in order to deal with high uncertainty in a complex business environment (Sadler-Smith & Shefy, 2004).

By applying a formal process and rational decision-making, evaluators of early-stage innovation projects in the FEI can ensure that the evaluation is in line with company specific requirements such as the company's innovation strategy and revenue goals. At the same time, this kind of evaluation process is actively preventing decisions from being affected by personal interests of the individuals who are evaluating. (Eling et al., 2015). Moreover, results derived from a study conducted by Eling and Griffin (2016), reveals that the highest idea success rate of ideas is associated with organizations who employ a formal process for all evaluations in the FEI, regardless if the early-stage innovation project is incremental or radical in its nature. A formal selection process can ensure that all available information regarding the early-stage innovation project is properly analyzed and prevent important decision criteria from being overlooked (Cooper, Edgett, and Kleinschmidt, 2001). A formal process is further suggested to have the advantage of making projects comparable with each other (Carbonell-Foulquié et al., 2004; Martinsuo & Poskela, 2011). Furthermore, organizations tend to experience formal decision-making processes as more legitimate and rational than informal processes, such as the holistic evaluation (Gutiérrez & Magnusson 2014).

However, there are also researchers who argue that too much formality in the assessment and selection process can lead to promising opportunities being missed (Gutiérrez & Magnusson, 2014; Vacík & Špaček 2007). Reasons why, can for example be since formal assessment and selection processes risk to limit creativity of organizations as well as being highly time-consuming (Magnusson et al., 2014). Furthermore, a fast-paced, ambiguous and uncertain business environment in combination with an overload of available data, is suggested to decrease the efficiency of rational analysis (Sadler-Smith & Shefy, 2004). Results from a study conducted by Martinsuo and Poskela (2011), implies that formal processes for assessment of an idea is negatively, but non-significantly, associated with the innovation performance of an organization. However, the same study also revealed that employing criteria for idea evaluation is significantly associated with the promotion of business potential and competitiveness in the FEI (Ibid.).

2.3.4.1 Specific Criteria Employed in Rational Evaluation

The authors of this thesis will present what different researchers in the area purpose in terms of how decision-makers can employ criteria to evaluate early-stage innovation projects. Below, Table 3 reveals what researchers which will be addressed in this section. Table 3 further depicts the reasons

why the authors of this thesis have chosen these researchers. Following, this section outlines a more detailed argumentation for why the researchers are addressed in this study.

First, Rochford (1991) presents a framework of evaluating early-stage innovation projects by constructing a screening process in the FEI, constituting of "Typical screening criteria". The authors of this thesis argue that this is useful since Rochford (1991) herself emphasizes that this type of screening method is appropriate in the determination of whether ideas in FEI are relevant or not for the organization per say. Second, Koen et al. (2002) present "Evaluation criteria in concept selection". The authors of this thesis argue that the proposed evaluation criteria are appropriate since the concept selection is part of FEI, and hence part of the evaluation of early-stage innovation projects. Third, regarding the "Systematic learning and discovery" by Paulson, O'Connor and Robeson (2004), these specific criteria are concerned with assessing radical innovation projects. The authors of this thesis acknowledge that the framework is specifically for radical innovation projects, even so the authors of this thesis argue that it is relevant for this study. When progressing with a radical innovation project, decision-makers need to take decisions without complete information (Nicholas et al., 2015). Nevertheless, Backman et al. (2007) recognize that uncertainty is high in the FEI, especially for radical innovations. For early-stage innovation projects in the FEI the characteristics are fairly the same, namely unpredictable, high level of market/technology uncertainty and there is a lack of valuable information (Achiche et al., 2013; Jetter, 2003). Since there are similar characteristics, the authors of this thesis argue that the framework of specific criteria for radical innovation can yield potential insight in how to evaluate early-stage innovation projects, which involve all different types of innovations. Lastly, the "Multi-criteria analysis" by Goffin and Mitchell (2017) is argued to be relevant to this thesis since it is specifically designed to evaluate early-stage innovation projects. Moreover, it is recently published in comparison to the other articles which makes it up-to date and hence relevant to include in this study.

To summarize, the authors of this thesis argue that these four frameworks, constituting of specific criteria, add insight in what criteria to use when evaluating early-stage innovation projects. Below sections will outline the different frameworks one by one, and later these will be compiled (See section 2.4.3).

Researchers	Reason Why Included
Rochford (1991)	Appropriate in determining the relevance of ideas in a screening process, in the FEI.
Koen et al. (2002)	Evaluation criteria appropriate since concept selection is part of evaluating early-stage innovation projects in the FEI.
Paulson, O'Connor & Robeson (2004)	Aimed at radical innovation which carries the same characteristics as early-stage innovation projects in the FEI.
Goffin & Mitchell (2017)	Designed for the evaluation of early-stage innovation projects in the FEI.

Table 3. An overview of researchers which will be covered, along with reasons why these are included in this thesis. Compiled by the authors.

2.3.4.1.1 Specific Criteria Suggested by Rochford (1991)

Rochford (1991) divides the typical screening criteria into two groups which are called initial criteria and secondary criteria. The initial criteria constitute of whether the idea is relevant to the company or not and, whether it is an impossible project or not. The secondary criteria ranges from market, product feasibility, time, financial and others. See Table 4 below, constituting of the two groupings with their respective specific criteria. This type of screening method can be practiced investigating whether ideas are relevant or not, to discover uncertainties, describe potential problems and to get commitment into these early-stage projects (Rochford, 1991). Rochford (1991) acknowledges that one or more methods for screening may be used, and that these can be categorized as both qualitative and quantitative. Furthermore, the author emphasizes that qualitative methods, yes/no methods, are used in the primary stages of screening and quantitative methods are used in later stages. Hence, for early-stage innovation projects qualitative methods should be used according to Rochford (1991).

Initial Criteria	
Is the idea consistent with company objectives?	
Is the project "do-able"?	
Secondary Criteria	
Market	Size - current & potential Growth - current & potential Appeal Role for the company
Product	Uniqueness Exclusivity - in terms of patentability
Feasibility	Product development Technology Production Personnel Financial
Compatibility	Organizational infrastructure Personnel & managerial experience and expertise (e.g. marketing, sales, technical, production, financial, customer/market needs)
Time	To develop idea Commercialization
Financial	Investment required Costs Profitability
Other	Gut feel Is it realistic? Probability of success

Table 4. Typical screening criteria. Derived from Rochford (1991).

2.3.4.1.2 Specific Criteria Suggested by Koen et al. (2002)

In a formal decision process, Koen et al. (2002) put emphasis on that decision-makers should adapt a positive attitude rather than being negative and, hence looking for ideas to kill. By being positive, Koen et al. (2002) mean asking how an idea can be helped or modified to become more attractive to the organization. In order to facilitate prioritization and selection of the best ideas, the organizations

need a method to determine which ideas have the highest valuation. At the same time, the financial metrics, were recognized as inappropriate for ideas other than those being characterized by incremental in nature. Koen et al. (2002) introduce evaluation criteria in concept selection, hence in FEI. See below Table 5, derived from Koen et al. (2002), which depicts overarching criteria along with their respectively specific criteria.

Overarching Criteria	Specific Criteria
Market	Market size Market growth Market drivers Market access Potential market share
Competency	Business infrastructure Customer familiarity Core competency
Competitive issues	Proprietary position Leadership position Cost position Key competitive advantage Sustainability of position
Time factors	Time to sales Full commercialization Competitive time advantage Operating at break-even
Technology	Technology availability Technology readiness Technology skill base (people & time)
Financial	After-tax operating income Maximum cash hole Revenue stream Business potential

Table 5. Evaluation criteria in concept selection, including both overarching criteria along with their respectively specific criteria. Derived from Koen et al. (2002).

2.3.4.1.3 Specific Criteria Suggested by Paulson et al. (2007)

In the next framework for specific criteria, "Systematic learning and discovery", Paulson et al. (2007) have three principles. First, every project needs to have a stand-on-its-own evaluation. This is done by examining the project in the light of challenges related to technology, market, organization and resources. Second, interrelationships between innovation projects are necessary to evaluate. Lastly, every innovation project in the portfolio need to be assessed relative to a several additional aspects of the firm. For example, the firm's strategy, constraints, business model, innovation capability, and competition. Paulson et al. (2007) suggest eight different overarching criteria that should be investigated when evaluating radical innovation projects, see Table 6 below. Within the eight overarching criteria, there are several specific criteria. However, the authors of this thesis have not included the eight overarching criteria "portfolio health", since these specific criteria evaluate the portfolio rather than the innovation project. According to Paulson et al. (2007), the purpose of this tool is not to put a monetary value at innovation projects. The reason why, is that their research has

shown that a high-level uncertainty is related to radical innovation investments makes it not sensible to refer to numbers. However, if economic valuation is preferred, the tool is designed to capture information that will provide superior approach to make evaluation in monetary terms. (Ibid.).

Overarching Criteria	Specific Criteria
Project's Impact on Company Renewal (1)	Growth among new customers and in adjacent businesses Potential applications New technical and market competences Higher margin of value chain (VC) or new VC Impact on current business and company strategy Require team to develop/leverage internal networks
Project's Impact on Company Growth (2)	Address threat to maintaining or growing top line business Aggregate market potential New path or growth for firm Appropriate from a technology and market development perspective Position to capture value based on evolving business model Reasonable time to expected first revenue
Project's Impact on the Market (3)	Ahead of competitors - both established and potential Partially funded by external resources Enthusiastic customers Enthusiastic stakeholders Solves a problem poorly addressed Potential to set new standard Solution to regulatory threat Market benefits - not possible before
Project's Impact on the Portfolio (4)	Synergistic effects to other projects Unique - not cannibalize other projects Killed project = portfolio suffer Balancing portfolio
Team Capabilities and Pace of Project (5)	Team leader Experimental orientation Considers emerging technologies, markets and manufacturing processes Experience of innovation process Significant progress is made, regarding limited resources
Firm Capabilities for this Project (6)	Aligned with strategic intent Executive support Available resources Partnerships can be leveraged Convenient path to the market Chance to make technical advances Competitive landscape Organizational commitment Leverage and extend competencies
External Environment's Impact on the Project (7)	No regulator barriers No competing approaches to solve the problem Low social or political implications from customers

Table 6. Seven categories for evaluating on a project level. Derived from Paulson et al. (2007).

2.3.4.1.4 Specific Criteria Suggested by Goffin and Mitchell (2017)

The multi-criteria analysis is a method which facilitates a comparison of projects along with decreasing the danger of relying too much of one factor (Goffin & Mitchell, 2017), hence including several specific criteria in the evaluation. First, the authors recommend finding general dimensions, namely opportunity and feasibility. Opportunity is defined as "a measure of value that may result from the project" (Goffin & Mitchell, 2017, p. 230), whereas feasibility is defined as "a rough measure of how attainable that might be for the company and hence the effort or investment that may be required to bring it about" (Goffin & Mitchell, 2017, p.230). Goffin and Mitchell (2017) have found generic examples of specific criteria within the two dimensions. Find Table 7 and Table 8 below, depicting specific criteria and explanations divided in the two dimensions opportunity and feasibility.

Opportunity Specific Criteria	Explanation
Market size	Size of potential market, or number of potential adoptions, reasonably available
Sales potential in a defined time	Sales volume of number of adoptions anticipated in a defined time
Synergy opportunities	Possible additional benefits to other projects, or possibility of new opportunities in combination
Customer benefit	Identifiable benefit to customers (internal or external) or potential adopters
Competitive intensity in the market	Number or significance of the competition
Increased margin, or benefit per unit	Improvement in margin (e.g. cost reduction or price premium) compared to existing products; or benefit by adoptions
Business unit cost reduction or simplification	Towards cost reduction or simplification of business process
Industry/market readiness	How easy will it be for customers or adopters to take up the product, do they have to change their behavior or process
Market growth	Anticipated growth rate of market
Future potential	Product is a platform for future products or could open new markets beyond the project time frame
Learning potential	Will improve the knowledge or competence of the business
Brand image	Will improve the image of the company with investors, customers, or stakeholders
Customer relations	Project is important for retaining key customers

Table 7. The dimension opportunity and examples of specific criteria. Derived from Goffin and Mitchell (2017).

Feasibility	
Specific Criteria	Explanation
Product differentiation	How well the product is differentiated from those of major competitors
Sustainability of competitive advantage	Our ability to sustain our competitive position (e.g. IPR, brand strength)
Technical challenge	How confident are we that the proposed product is technically feasible at all?
Market knowledge	Our understanding of size and requirements of the market
Technical capability	Do we have the required technical competences to complete the project?
Fit to sales and/or distribution	Fit to our sales competences and/or distribution chain
Fit to manufacturing and/or supply chain	Ability to manufacture or supply the product
Finance	Availability of finance for the project
Strategic fit	How well does the project fit our company strategy?
Organizational backing	Level of staff or management backing at an appropriate level

Table 8. The dimension feasibility and examples of specific criteria. Derived from Goffin and Mitchell (2017).

2.3.5 Holistic Evaluation

By conducting a holistic evaluation, early-stage innovation projects are subjected to an informal process, and decisions are made more intuitively (Magnusson et al., 2014). When decision-makers are using this way of evaluating, decision-makers think more rapidly (Evans, 2008), which consequently leads to a more rapid process when managing ideas (Magnusson et al., 2014).

By employing holistic criteria decisions, the decision-maker uses his intuition to judge, what aspects that are important and their relative importance in order to reach a decision (Magnusson et al., 2014). Holistic criteria distinguish from specific criteria. First, holistic criteria are broad, multi-dimensional and loosely articulated while specific criteria are narrow, one-dimensional and predefined. In the holistic evaluation, the decision-maker forms relevant criteria, which can be either holistic or specific. What's important to point out in a holistic evaluation is that a decision-maker can include both holistic and specific criteria in their evaluation. However, an emphasis is put on the exception that the specific criteria are not predefined in the holistic evaluation. Having determined relevant criteria, the decision-maker determines their relative importance in order to reach a decision. The holistic criteria decision can hence be argued to be more complex than the specific criteria decisions. (Ibid.). Magnusson et al. (2014) conclude that intuition and holistic criteria decisions can be used in an early stage, with the advantage of being less resource consuming compared to using more formal criteria. Moreover, Magnusson et al. (2014) state that it can be argued, based on Sadler-Smith and Sparrow's (2008) structure for decisions, that holistic criteria decisions are more in line with a loose decision structure which prefers intuition in front of analysis.

Eling et al.'s (2014) literature study reveals six capabilities of the unconscious processing in comparison to the conscious processing, that is capabilities of the holistic evaluation compared to the

rational evaluation. These capabilities are high information processing capacity (Evans, 2008; Dijksterhuis & Nordgren, 2006), access to implicit and tacit knowledge (Evans, 2008), openness to integrate new information (Dijksterhuis & Nordgren, 2006; Glöckner & Witteman, 2010), weigh information with precise relevance (Glöckner & Witteman, 2010), facilitates new combinations of new and stored knowledge (Dane & Pratt, 2009; Dane & Pratt, 2007) and, recognize complex patterns (Dane & Pratt, 2009; Glöckner & Witteman, 2010, Sadler-Smith & Shefy, 2004).

In the FEI, the holistic evaluation can be applied both on an individual and a team level and, making use of one individual's or several individuals' intuitions (Eling et al., 2014). One of the main challenges of using the holistic evaluation is when one or more decision-maker make a decision or choose a course of action without having adequate understanding of the conditions (Hodgkinson et al., 2009). Magnusson et al. (2014) recognize that the person relying on intuition to assess ideas, hence conducting a holistic evaluation, need to have both expertise and instructions to whether the assessment should have an incremental or radical twist or not. The importance of expertise in intuitive decision making, is also recognized by Sadler-Smith and Shefy (2004). Sadler-Smith and Shefy (2004) argue that intuition can be both effective and efficient when the decision-makers are experts. These researchers consider "intuition as expertise", where expert intuition is prior knowledge to the decision-maker which he or she has attained over time (Ibid.).

Goffin & Mitchell (2017) further recognize that evaluation of early-stage innovation projects is frequently based on the intuition of experienced managers in an organization. However, grounding this kind of decision on intuition has shortcomings, such as that our intuition is easily misled since aspects of the innovation projects often are unfamiliar to the decision-maker (Ibid.). Nevertheless, Dane and Pratt (2007) recognize that intuition potentially can be beneficial, but also that decision-makers using it in the wrong way results in decisions made being incorrect. A literature study conducted by Eling et al. (2014) revealed three drawbacks of the unconscious processing, hence including holistic evaluation, in the decision-making in the FEI phase. The first drawback is that the holistic evaluation is not universally applicable, hence it does not follow rules. The second drawback is that the unconscious processing carries no process for awareness. The holistic evaluation therefore carries, the already mentioned risk of decisions being made even though the decision-maker do not possess relevant knowledge. The third and last drawback considers that different decision-makers might experience different intuitions towards a decision or course of action. (Ibid.). Hence, there are challenges when applying the holistic evaluation for evaluating early-stage innovation projects.

Eling et al. (2015) recognize that an organization can provide both education and training which would facilitate and support the use of intuition when decision-makers evaluate ideas in the FEI. Hence, an organization can act in order to foster the holistic evaluation. Hodgkinson et al. (2009) also recognize that a person, in this thesis a decision-maker, can obtain intuitive expertise by practice, critical self-appraisal and feedback. Attaining such intuitive expertise facilitates that a decision-maker quickly can identify a problem and its suitable course of action before reasoning why it is suitable (Ibid.). Hodgkinson et al. (2009) hence argue that a decision-maker can improve his or her skills in applying the holistic evaluation.

2.3.6 Hybrid Evaluation

Sadler-Smith and Sparrow (2009) argue that the rational- and the holistic evaluation should not be treated as mutually exclusive. Instead, these two ways of evaluating can be viewed as different types of human information processing which may be possible to run in parallel (Ibid.). Traditionally, as already mentioned, the rational evaluation has been the response from decision-makers when operating in a highly ambiguous, complex and unpredictable business environment. However, the development of organizational systems and technological advancement has resulted in an overwhelming amount of data available, which decision-makers need to deal with. Requirements of fast decision-making and the human's limited ability of processing data makes an exclusively rational evaluation less efficient, hence, making it necessary to consider the rational- and the holistic evaluation as complementary and mutually reinforcing. (Sadler-Smith & Shefy, 2004). A further circumstance that has been argued to make it necessary to combine these two ways of evaluating is when there is a lack of consensus regarding key variables among decision-makers. Key variables can regard factors such as uncertainty, organizational goals, cause- and effect relationships. Hence, if key variables are not possible to properly predict due to an uncertain environment, intuitive judgement is needed to complement rational analysis. (Sadler-Smith & Sparrow 2009).

Senior management often neither trust nor accept the sole use of intuition, i.e. the holistic evaluation, for evaluating ideas in the FEI (Eling et al., 2014). Reasons why is suggested to be that they do not understand the benefits realized from using intuitive decision-making (Eling et al., 2015). Decision-making scholars suggest that the quality of idea evaluation in the FEI will be enhanced if intuitive and rational decision-making are jointly applied (Eling et al., 2015; Sadler-Smith & Shefy, 2004). Hence, if combined, complementary advantages of both rational analysis and intuitive decision-making can be utilized. Further, complementary benefits can also increase the speed of the idea evaluation process. For example, if the decision-makers have applied a combination of the rational- and the intuitive decision-making, and hesitate between two possible options, the usage of intuition and the complementary advantages it brings, will allow the decision-makers to make a faster final decision. If the rational- and the intuitive decision-making are used separately, it may enhance the hesitancy in making decisions. If solely using the rational evaluation, an "opinion" wouldn't be available to back up decisions with. The other way around, if solely using the intuitive decision making, there wouldn't be possible to have additional support in terms of information or data to backup decisions with. (Eling et al., 2015).

Eling et al. (2015) suggest that empirical research is lacking regarding whether to combine the holistic- and the rational evaluation, and if so, how the two ways of evaluating should be combined and in what sequence. Thus, Eling et al. (2015) have made an empirical study to examine how these should be combined in order to enhance speed and quality of idea evaluation decision-making in the FEI. The result from the study reveals that making an initial evaluation of ideas based on intuition before rationally analyzing the intuition is what causes the highest speed and quality of idea evaluation. (Eling et al., 2015). Sadler-Smith & Shefy (2004) suggest that the rational- and the holistic evaluation can be combined in several ways. One possible combination is to validate intuition is by rationally analyzing the intuition and try to back it up with data (Ibid.).

Hodgkinson et al. (2009) argue that it is necessary to develop balanced teams in terms on information processing. Preferably, the team should be a mix of of analytical and intuitive inclined individuals. However, such diversity of teams is not easily put together and managed. In order to utilize the diversity, individuals with different information processing styles need to develop deep understanding of the relative strengths and limitations of the two different ways of evaluating. (Ibid.)

2.4 Literature Review Summary

2.4.1 Understanding the Context

The first sections of this chapter have the aim of providing the reader with a contextual understanding. This was done by outlining the innovation process, close into the FEI, its characteristics, the idea screening process and introducing the complexity and challenges that decision-makers experience in the FEI. A summarization of these sections will follow below.

The opening of this chapter defines the innovation process as a three staged process. The innovation process starts with FEI, continues with NPD process and finishes off with commercialization. (Achiche, Appio, McAloone & Minin, 2013; Koen, Bertels & Kleinschmidt, 2014). As this thesis is concerned with early-stage innovation projects, the focus of the thesis it put in the FEI. Activities in the FEI are suggested to impact the remaining stages of the innovation process, for example by enhance value, probability of success (Koen et al., 2002), performance, speed and innovativeness of ideas (Jetter, 2003). FEI is characterized by factors such as high uncertainty, complexity, lack of information (Florén & Frishammar, 2012; Goffin & Mitchell, 2017; Mitchell et al., 2014) as well as high market and/or technological uncertainties (Achiche et al., 2013; Jetter, 2003). Even though Koen et al. (2001) agrees to that the FEI is subject to high uncertainty and lack of innovation, they argue that it still possible to actively work to manage it. However, due to the characteristics of the FEI, it is challenging to decide which ideas to develop further and which ones to reject (Barczak, Griffin & Kahn, 2009). The chapter moves forward by introducing idea screening; a process where decision-makers evaluate and select ideas and, thereby decide whether ideas will be further developed or not (Koen et al., 2002; Kahn et al., 2013). The idea selection process and innovation project selection process are iterative in its nature (Koen et al., 2002; Archer & Ghasemzadeh, 1999) and, in the beginning of such processes the level of information is low and increases by time (Koen et al., 2002). The idea screening process vary; however, decision-makers face the challenge of choosing whether to accept or reject an idea, hence further developing it or not (Barczak et al., 2009). Further decision-makers face challenges such as lack of available information (Kornish & Ulrich, 2014) and, unclear described or underdeveloped ideas (Frishammar et al., 2011). Decisions for evaluating early-stage innovation projects can be based on valid evidence when it comes to innovation projects in stable environments. However, when circumstances are uncertain, as in the FEI, evidence becomes less valuable. (Huff, 2016). Hence, it is of interest to further investigate how decision-makers at large enterprises in Sweden can employ criteria to evaluate early-stage innovation projects.

2.4.2 Foundation of Analysis

Building upon the conducted literature review, the authors of this thesis have distinguished three ways of evaluating early-stage innovation projects. Furthermore, the literature review has distinguished the differences between specific and holistic criteria as well as their connection to the three ways of evaluating which can be employed when evaluating early-stage innovation projects. The difference lies in that the rational evaluation employs solely predefined specific criteria, whereas the holistic evaluation employs both non-predefined specific criteria and holistic criteria. Lastly, the hybrid evaluation can employ both predefined and non-predefined criteria. The authors of this thesis consider that this literature review will serve as the foundation for their analysis and conclusion, which will further examine what criteria that can be employed to evaluate early-stage innovation projects as well as different ways of evaluating early-stage innovation projects. Below, the authors of this thesis provides a summary of the three ways of evaluating as well as different criteria that can be employed. With a starting point in dual-processing theories, the evaluation of early-stage innovation projects can be divided into two separate ways of evaluating for decision-making, namely the rational evaluation and the holistic evaluation. Further, the two ways of evaluating can be combined into one, which represents the third way of evaluation, the hybrid evaluation. Below Table 2 was provided initially in section 2.3.3 to give the reader an introduction which would ease the reading by giving a clear structure. Here, Table 2 serves as an overview for the summarization of the foundation for analysis and conclusion.

Ways of Evaluation	**Rational Evaluation 2.3.4**	**Holistic Evaluation 2.3.5**	**Hybrid Evaluation 2.3.6**
Description	**Prefer analysis, before intuition** • Based on specific criteria • Formal selection process **Specific criteria** • Employed in a set of criteria • Predefined • One-dimensional • Narrow	**Prefer intuition, before analysis** • Based on holistic criteria and/or specific criteria • Informal selection process **Holistic criteria** • Loosely articulated • Not predefined • Broad • Multi-dimensional **and/or Specific criteria** • Same as in rational evaluation, but <u>not</u> predefined	**Jointly applied** The rational- and the intuitive evaluation are combined. Can be combined in different ways and sequences. Can be complementary and mutually reinforcing to combine.

Table 2. An overview of the three ways of evaluating early-stage innovation projects. Compiled by the authors.

The rational evaluation has traditionally been the response from executives in order to deal with high uncertainty in a complex business environment (Sadler-Smith & Shefy, 2004). Consequently, rational evaluation has been the most prominent way of screening ideas. This is done by applying a set of formal and predefined criteria, referred to as specific criteria. Specific criteria are narrow in their nature and individuals with relevant expertise uses such criteria in order to evaluate given characteristics of an idea. (Magnusson et al., 2014). Specific criteria suggested by relevant existing literature is summarized and presented in Table 9 in section 2.4.3. Regarding the structure of the idea selection process, there are authors who recognize the importance of a formal process, such as the rational evaluation, since it will prevent organizations from missing out on opportunities (Soukhoroukova et al., 2012; Koen et al., 2002). However, there are also researchers who argue that too much formality in the assessment and selection process can lead to promising opportunities being missed (Gutiérrez & Magnusson, 2014; Vacík & Špaček 2007). Due to today's' rapid pace of innovation, organizations are forced to be agile and fast even when employing formal processes for idea screening (Cooper, 2009). Furthermore, a fast-paced, ambiguous and uncertain business environment in combination with an overload of available data, is suggested to decrease the efficiency of rational analysis (Sadler-Smith & Shefy, 2004). One way to achieve flexibility is to deploy different criteria for different projects (Cooper, 2009; Hart et al., 2003).

In the holistic evaluation, ideas are subjected to an informal process, and decisions are made more intuitively (Magnusson et al., 2014). Intuition is defined by the authors of this thesis as "an unsubstantiated attitude toward a decision alternative or course of action without yielding a reason why". Further, intuition is a way for a decision-maker to get an understanding without thinking rationally or logically (Hodgkinson et al., 2009). The holistic evaluation can be applied on both individual and team level (Eling et al., 2014) and, requires adequate understanding of conditions (Hodgkinson et al., 2009). The holistic evaluation has both capabilities and drawbacks, and organizations and individuals can use education and training to facilitate and support intuitions when evaluating ideas in the FEI (Eling et al., 2015). In the holistic evaluation, the decision-maker forms relevant criteria, which can be either holistic or specific. Since the decision-maker forms relevant criteria, the criteria are not predefined. (Magnusson et al., 2014). By using holistic criterion decisions, the decision-maker uses his intuition to judge, what aspects that are important and their relative importance in order to reach a decision (Ibid.). The authors of this thesis have not found any holistic criteria in the literature review, which is why holistic criteria were not possible to summarize in the same manner specific criteria will be in below section 2.4.3.

In the hybrid evaluation, decision-makers consider the rational- and the holistic evaluation as complementary and mutually reinforcing (Sadler-Smith & Shefy, 2004). The hybrid evaluation evolved because requirements such as fast decision-making, the human's ability to process data (Sadler-Smith & Shefy, 2004) and lack of consensus among decision-makers of for example uncertainty and organizational goals (Sadler-Smith & Sparrow, 2009). A further explanation is that senior management is often neither trusting nor accepting the sole use of the holistic evaluation for evaluating ideas in the FEI (Eling et al., 2014). Decision-making scholars suggest that the quality of idea evaluation in the FEI will be enhanced if intuitive and rational decision-making are jointly applied (Eling et al., 2015; Sadler-Smith & Shefy, 2004). However, research is lacking in terms of how the two ways of evaluating should be combined and in what sequence (Eling et al., 2015).

2.4.3 Summarization of Specific Criteria

By studying and compiling existing literature regarding specific criteria for evaluation of early-stage innovation projects, it can be derived that different specific criteria can be employed. All specific criteria which the authors of this thesis have identified have been compiled in below Table 9, which depicts a summarization of the specific criteria. In order to compile Table 9, the authors of this thesis first grouped all specific criteria under overarching criteria. In order to understand how the authors of this thesis grouped the different specific criteria, see Appendix 1.

Overarching Specific Criteria	Specific Criteria
Competitiveness	**Industry rivalry** (Goffin & Mitchell, 2017; Paulson et al., 2004; Koen et al., 2002; Rochford, 1991) **Product differentiation** (Goffin & Mitchell, 2017; Paulson et al., 2004; Koen et al., 2002; Rochford, 1991) **Competitive advantage** (Goffin & Mitchell, 2017; Paulson et al., 2004; Koen et al., 2002) **Patentability** (Rochford, 1991) **Positioning** (Paulson et al., 2004; Koen et al., 2002)
Customer	**Industry/market readiness** (Goffin & Mitchell, 2017; Paulson et al., 2004) **Customer benefit** (Goffin & Mitchell, 2017; Paulson et al., 2004) **Customer relations** (Goffin & Mitchell, 2017; Paulson et al., 2004; Koen et al., 2002)
Feasibility	**Financial feasibility** (Goffin & Mitchell, 2017; Rochford, 1991) **Technical feasibility** (Goffin & Mitchell, 2017; Koen et al., 2002; Rochford, 1991) **Team and internal network** (Paulson et al., 2004; Rochford, 1991) **Organizational infrastructure** (Goffin & Mitchell, 2017; Paulson et al., 2004; Koen et al., 2002; Rochford, 1991) **Learning potential** (Goffin & Mitchell, 2017; Paulson et al., 2004) **Is the project "do-able"?** (Rochford, 1991)
Financial	**Expected sales volume** (Goffin & Mitchell, 2017) **Expected profitability** (Goffin & Mitchell, 2017; Paulson et al., 2004; Koen et al., 2002; Rochford, 1991) **Investment required** (Paulson et al., 2004; Rochford, 1991)
Market	**Market size and growth** (Goffin & Mitchell, 2017; Paulson et al., 2004; Koen et al., 2002; Rochford, 1991) **Potential market share** (Paulson et al., 2004; Koen et al., 2002) **Access adjacent markets** (Paulson et al., 2004) **Market access** (Koen et al., 2002) **Role of the company** (Paulson et al., 2004; Rochford, 1991) **Market drivers** (Koen et al., 2002)
Portfolio	**Potential synergies** (Goffin & Mitchell, 2017; Paulson et al., 2004) **Contributes to portfolio balance** (Paulson et al., 2004)
Strategy	**Strategic fit** (Goffin & Mitchell, 2017; Paulson et al., 2004; Rochford, 1991) **Positive impact on brand image** (Goffin & Mitchell, 2017) **Impact on strategy** (Paulson et al., 2004) **Enhance growth of business** (Paulson et al., 2004)
Technology	**Technical capability** (Goffin & Mitchell, 2017; Paulson et al., 2004; Koen et al., 2002; Rochford, 1991) **Cost of technical progress needed** (Goffin & Mitchell, 2017; Paulson et al., 2004)
Time	**Appropriate time to invest** (Paulson et al., 2004) **Time to commercialization** (Koen et al., 2002; Rochford, 1991) **Time to break-even** (Koen et al., 2002) **Time to develop idea** (Rochford, 1991) **Competitive time advantage** (Koen et al., 2002)
Other	**Organizational backing** (Goffin & Mitchell, 2017) **Executive support** (Paulson et al., 2004) **Possibility to leverage on partnerships** (Paulson et al., 2004) **Regulatory barriers** (Paulson et al., 2004) **Gut feel** (Rochford, 1991) **Probability of success** (Rochford, 1991)

Table 9. Summarization of specific criteria. Compiled by the authors.

3. Methodology

This chapter will present the methodology used for this study. First, methodological choices for research strategy and research design will be presented. This will be followed by a presentation of choices made for the selection of experts, case companies and representatives from case companies as well as a presentation of each. Then, the method used for data collection will be described. Following this, methodology used for analyzing the data will be outlined. The chapter will be finalized by discussing the quality of the study and ethical considerations.

3.1 Qualitative Research Strategy

The aim of this thesis is to investigate how decision-makers at large enterprises in Sweden can employ criteria to evaluate early-stage innovation projects. The purpose of the thesis is further to contribute with insights regarding what criteria that can be employed and how decision-makers at large enterprises in Sweden can determine the valuation of criteria. In order to fulfill the purpose, a qualitative research strategy has been deployed. According to Bryman and Bell (2011), the choice of research strategy should be based on the nature of the data the authors of a paper or thesis aim to collect in order to answer the research question(s). Since the aim of the research questions is to investigate "how" things are by in depth data and analysis, rather than to prove a certain system of how things are, a qualitative method can be argued to be appropriate. This is in line with Bryman and Bell (2011) and Yin (2007), who argue that research questions containing "how", must be answered through words rather than explained by numbers, which implies qualitative research strategy to be suitable. With qualitative research strategy, in-depth answer of the research question enables a deeper contextual understanding of the subject (Bryman & Bell, 2011). Moreover, since this study has been conducted based on the viewpoint of the participants, rather than the point of view of the authors of this thesis, qualitative methods can be argued to be suitable. (Bryman & Bell, 2011; Yin, 2007).

According to Bryman and Bell (2011), inductive and iterative research strategy is typically executed when a qualitative research approach is applied. In this thesis, an inductive approach between theory and research has been applied. Induction implies that theoretical contributions is achieved by research. When theory is created rather than tested, research is considered as explorative, rather than confirmative. (Ibid.). Hence, this thesis is explorative in its nature. Furthermore, the research strategy was iterative. An iterative strategy allows the authors to go back and forth between theory and data (Ibid.).

Even though the authors of this thesis considered the strategy as appropriate, they recognized that the strategy has weaknesses. Flyvbjerg (2006) recognizes that persuasiveness of argument is given strength by giving attention to alternative explanations and why these have not been chosen. Therefore, the authors of this thesis will continue to introduce alternative approaches or methods and explain why these are not chosen. Quantitative strategy is an alternative to qualitative strategy; however, the quantitative strategy focuses on breadth (Flyvbjerg, 2006; Bryman & Bell, 2011) and numbers (Bryman & Bell, 2011), which is not connected to the purpose of this study.

Qualitative findings have received critique for being difficult to be replicated by other researchers. The reason why is because few standard procedures are applied while conducting a qualitative study. (Bryman & Bell, 2011). To enhance the quality and transparency of this thesis, the authors have provided the reader with detailed explanations of procedures followed to execute the study. Qualitative research is often criticized for being subjective and impressionistic. Subjectivism and impressionism are a result of when findings of the qualitative research methods rely too heavily on what researchers themselves defines as important. (Ibid). In order to minimize issues related to subjectivism, both authors of this thesis have participated during all collection of empirical material. Moreover, the authors jointly conducted the analysis of the data by having an ongoing discussion regarding how to interpret findings. A further issue with qualitative findings is that researchers can be argued to lack confidence in how generalizable results are. This is a consequence of qualitative data collection methods being unable to generate representative data for a known population, thus findings cannot be considered as generalizable. (Ibid.). However, the aim of this thesis is not to gather examples that can be considered as generalizable for a known population. Limitation of qualitative strategy and actions taken by the authors to enhance the quality of the study is further outlined and discussion in section 3.5 Research Quality.

3.2 Multiple Case Study Design

As outlined in the previous section, the authors of this thesis have chosen an inductive approach. Eisenhardt and Graebner (2007) consider case studies to be the foundation for theory to be generated inductively. For the research questions of this study to be answered, the authors of this thesis have chosen to conduct a multiple case study design. A case study can be defined as an in-depth study of case, whereas a case can be exemplified as a single event, a specific person or a specific organization (Bryman & Bell, 2011). The choice of research design is supported by Baxter & Jack (2008) who recognize that the case study design both allows researchers to answer “how” and “why” questions and, at the same time examine the influence on a phenomenon by its setting which can yield the researcher great insight. Further, Bryman and Bell (2011) also emphasize the advantage of the thorough examination of the chosen setting, which enables a deep understanding of a specific subject. In this study, six specific large enterprises in Sweden have been studied, where each of these have been treated as its own case. A description of the selection of the case companies are outlined in section 3.3.1. The choice of large enterprises in Sweden as units of the multiple case study design is in line with what Bryman and Bell (2011) have stated, namely that “a case” can constitute of a single organization. The multiple case study design is widely applied in business research and facilitates a comparison of two or more organizations (Ibid.).

The multiple case study design is seen as an appropriate research design to answer the research question since it is advantageous in terms of grounding insights in several empirical evidence (Eisenhardt & Graebner, 2007). By conducting a multiple case study design, the authors of this thesis acknowledge, supported by Eisenhardt and Graebner (2007), that this facilitates the investigation of the same phenomenon in several case companies. Hence, by examining multiple cases, a wider exploration of the research questions is reached (Ibid.) The authors of this thesis recognize that a

single case study could have yielded more depth by for example interviewing more objects in one organization. Even so, the authors of this thesis argue that, with regards to the purpose of this thesis, it is more advantageous to examine multiple cases and reach a wider exploration of the research questions. Eisenhardt (1991), further points out that a multiple case study design facilitates comparisons which determines in a clear way whether an empirical finding is peculiar to one single case or replicated in numerous cases. Moreover, Baxter & Jack (2008) recognize that the multiple case study design allows researchers to analyze both within each setting and across settings, hence in this study within and between the six case companies. Nevertheless, this offers researchers the opportunity to gain understanding of similarities and differences between cases (Ibid.). Yin (2003) recognize that the multiple case study design has benefits such as that the evidence created is considered robust and reliable. However, Yin (2003) also recognize that conducting a multiple case study design has its own drawbacks, more specifically that the research design is extremely time consuming and expensive. However, which will be further described in section 3.3.2.2, interviews were conducted via audio and video telephone, which made the multiple case study less demanding of resources.

3.3 Research Method and Data Collection

3.3.1. Selection of Experts and Case Companies

In order to choose case companies and interview objects, a non-probability sampling, more specifically a purposive sampling, was applied. Further, the same type of sampling method, purposive sampling, was employed to choose potential experts for interviews. According to Bryman and Bell (2011), the goal with conducting a purposive sampling is to reach a sample of cases or participants strategically, meaning that the sample is relevant for the study's research questions. With relevance, Bryman and Bell (2011) consider that the objects within the sample are chosen based on their relevance in terms of their understanding of a phenomenon.

The authors of this thesis had the intention of writing the thesis in a collaboration with a company whom the authors can contribute with insights to. In order to find an organization to work together with, the authors of this thesis reached out to several companies by email and ended up in a collaboration with an innovation consultancy firm. The scope of the thesis as well as appropriate potential interview objects, were decided upon based on a discussion of inclusion criteria between the authors of the thesis and the innovation consultancy firm. The scope of the thesis, hence the purpose, originated from a problem that the innovation consultancy firm experienced that their customers, i.e. large enterprises in Sweden, are facing today. Afterwards, this was anchored with the supervisor of this thesis. This is in line with what Bryman and Bell (2011) describe, namely that when conducting research with a purposive sample, the researchers need to have clear criteria of cases to ensure the relevance. Supported by Bryman and Bell (2011), the authors of this thesis set clear criteria of inclusion. See Table 10 below for the two different sets of inclusion criteria for representatives at case companies and experts. The inclusion criteria will be further described later in this section.

Experts	Case Companies & Representatives
The purpose is: To complement the theoretical framework of this thesis	**The purpose is:** To generate an understanding of how decision-makers at large enterprises in Sweden can employ criteria to evaluate early-stage innovation projects
Inclusion criteria for experts: 1) Having extensive relevant knowledge within the field of idea management and innovation management	**Inclusion criteria for case companies:** 1) Swedish origin, 2) Large enterprise as defined by Skatteverket 3) Actively work with innovation in the front end **Inclusion criteria for representatives at case companies:** 1) Deep knowledge about the innovation processes in the front end of the case companies, more specific knowledge regarding the evaluation of early-stage innovation projects 2) Decision-making role related to the innovation process at the company

Table 10. Purpose and inclusion criteria for interviews. Compiled by the authors.

The employees at the innovation consultancy firm provided the authors of the thesis with contact details for relevant interview objects, both contacts of potential representatives at case companies and potential experts. Regarding relevance of interview objects, this was determined based on whether the inclusion criteria were met or not. As mentioned above, purposive sampling was applied, and this was facilitated by taking advantage of the network of the consultancy firm. All potential interviewees were contacted by the authors of the thesis by email. The email contained the purpose and research question of this thesis, an interview-guide and a question of participation in an interview. All contacted individuals did not have the possibility to participate, in those cases, the authors of this thesis were provided by contact details to other persons who were asked for an interview. In line with recommendations from Bryman and Bell (2011), the authors of this thesis further applied purposive sampling within case companies to find relevant interview objects that met the inclusion criteria of the study. When individuals within case companies provided contact details to colleagues which they found to be suitable, the authors of this thesis ensured that those fulfilled the inclusion criteria. Solely one potential interviewee did not respond, even though the authors of this thesis sent out an email to remind of their invitation to participate in this study. Due to the scope and the resources available for the thesis, it was decided to conduct one interview at no more than six case companies. Regarding the number of expert interviews, six interviewees were considered by the authors of this thesis to be appropriate. The reason why, was since the authors of this thesis experienced that findings form expert interviews became repetitive. This can be argued to indicate what Francis et al. (2010) refer to as data saturation, namely when no additional data can be found in interviews to further develop aspects of a concept. Data saturation can be used by researchers to justify the sample size when conducting qualitative research by interviews (Ibid.). Supported by Francis et al. (2010), the authors of this thesis concluded that the number of expert interviewees were appropriate for this study. In order to decide on what experts, case companies and representatives of case companies to contact, criteria for selection were defined by the authors of this thesis in collaboration with the innovation consultancy firm. All choices of criteria were rooted in the purpose of this study.

The purpose of the expert interviews was to complement the theoretical framework of this thesis, hence, to combine empirical findings of expert interviews with literature when analyzing empirical findings derived from case companies. Thus, the sole selection criterion employed to choose experts was that the individual should have extensive relevant knowledge within the field of idea management and innovation management. All six experts who participated are presented in Table 11 below.

The purpose of conducting interviews with case companies was to generate an understanding of how decision-makers at large enterprises in Sweden can employ criteria to evaluate early-stage innovation projects. To select case companies, three criteria was considered. First, the company needed to have a Swedish origin. Secondly, the company needed to be defined as large, whereas large is determined based on the definition provided by Skatteverket, i.e. the organization which organizes all various taxes in Sweden. The following three aspects defines a large enterprise; the company's average number of employees should have exceeded 50 during the previous two years (1), the assets of the company should have exceeded 40 million Swedish crowns during the previous two years (2) and, net sales of the company should have exceeded 80 million Swedish crowns during the previous two years. (Skatteverket, 2020). Thirdly, the company needed to actively work with innovation within the front end. These three inclusion criteria were set to ensure that the case companies could contribute to the purpose and research question of this study.

Regarding representatives at case companies, employees with relevant knowledge about the case company were asked to participate. Representatives needed to have deep knowledge about the innovation processes in the front end of the case companies, more specific knowledge regarding the evaluation of early-stage innovation projects. As the aim of this thesis is to examine how decision-makers at large Swedish enterprises evaluate early-stage innovation projects, the representatives from case companies were required to have a decision-making role related to the innovation process at the company. Consequently, all representatives had a position where they could affect decisions in the early stages of the innovation process. One representative from each case company was considered enough based on the aim of interviews, which was to get an overview of how decision-makers employs criteria and determined the valuation of these in the early-stages of an innovation process, rather than to gather extensive data around a single case. The authors of this thesis chose to focus on interviewing several companies rather than conducting several interviews at one single company to reach a wider exploration of the research question. All six case companies as well as the representatives are presented in Table 12 below.

It can be argued that purposive sampling is a better fit with qualitative research rather than quantitative research. The reason why is since the sampling approach frequently receives critique for being unlikely to represent a known population. Since qualitative research is concerned with less requirements regarding generalizability the critique can to some extent be defeated. (Bryman & Bell, 2011).

Expert number	Position of interviewee	Date	Interview Approach
[E1] Expert	Head of Development at a Swedish Science Park	19 March 2020	Audio telephone
[E2] Expert	Researcher at the Department of Machine Design at a Swedish University	23 March 2020	Video telephone
[E3] Expert	Researcher in Business Administration with an orientation in Industrial Engineering and Management at a Swedish University	23 March 2020	Audio telephone
[E4] Expert	Professor in Business Administration with an orientation in Industrial Engineering and Management at a Swedish University	24 March 2020	Video telephone
[E5] Expert	Assistant Professor in Business Administration with an orientation in Industrial Engineering and Management at a Swedish University	25 March 2020	Video telephone
[E6] Expert	PhD student at the Institute of Innovation and Entrepreneurship at a Swedish University	25 March 2020	Video telephone

Table 11. List of experts. Compiled by the authors.

Case company	Position of interviewee	Date	Interview Approach
[C1] Nordic Telecommunications Company	Innovation Catalyst	20 March 2020	Audio telephone
[C2] Infrastructure, Building and Urban Planning Consultant Company	Head of Innovation	23 March 2020	Video telephone
[C3] Real Estate Company	Head of Innovation	25 March 2020	Video telephone
[C4] Defence and Security Company	Software Innovation Specialist	30 March 2020	Video telephone
[C5] Industry Tools and Machine Company	Senior Portfolio Manager & Global Product Manager	31 March 2020	Video telephone
[C6] Project Development and Construction Company	Innovation Leader	1 April 2020	Video telephone

Table 12. List of case companies and representatives of case companies. Compiled by the authors.

3.3.1.1 Background of Experts

Expert [E1]: Head of Development at a Swedish Science Park

The expert has performed research and worked within the field of the early phases of innovation since 2009. Before the expert started to conduct research at the Science Park, the expert worked in positions such as Innovation Manager and Open Innovation Manager at different Swedish large enterprises. During the last one and a half year, this expert is performing research around innovation ecosystems, related to open innovation.

Expert [E2]: Researcher at the Department of Machine Design at a Swedish University
The expert is part of a unit called Integrated Product Development and Design. Researchers at this unit are performing research and teaching within design, innovation and product development. The expert focus on the academic field of Innovation Management, with a focus on how innovation can be organized and managed for in and between private and public organizations.

Expert [E3]: Researcher in Business Administration with an orientation in Industrial Engineering and Management at a Swedish University
The expert has extensive knowledge within the field of idea management and holds a PhD in Business Administration. During the expert's PhD, the expert has conducted research within the field of Innovation Management, with a focus on Front End Innovation and Idea Evaluation. At the same time, the expert has worked closely together with industrial firms and helped them to develop processes for how to manage ideas. Further, the expert has been a teacher at a Swedish University within Idea Management.

Expert [E4]: Professor in Business Administration with an orientation in Industrial Engineering and Management at a Swedish University
This expert is a full Professor at a Swedish university with a research focus on the early phases of innovation management, the so-called fuzzy front end. The expert is an author and co-author of several articles in high-end journals within the area. Before joining the academy, the expert worked as a "practitioner" for almost 20 years doing research and development within the computer and telecommunication industry.

Expert [E5]: Assistant Professor in Business Administration with an orientation in Industrial Engineering and Management at a Swedish University
The expert conduct research focusing on idea selection in the Front-End Innovation phases.

Expert [E6]: PhD student at the Institute of Innovation and Entrepreneurship at a Swedish University
The expert has previously graduated from an MSc Program in Innovation at a Swedish University. Conference papers which the expert has published consider academic engagement with industry and how these relationships influence innovation.

3.3.1.2 Background of Case Companies

[C1] Nordic Telecommunications Company
The interviewee has worked with innovation at the [C1] Nordic Telecommunications Company for four years and is currently employed at the Global Business Innovation department. The main responsibilities of the interviewee have been to drive engagement, establish and manage an innovative culture as well as to manage innovation projects in early phases. The interviewee is currently employed as Innovation Catalyst at the [C1] Nordic Telecommunications Company.

[C2] Infrastructure, Building and Urban Planning Consultant Company
The interviewee has been employed at the [C2] Infrastructure, Building and Urban Planning Consultant Company for approximately 16 years and is currently employed as Head of Innovation. The overall responsibility of the interviewee is to coordinate the Research and Innovation Program of the group and ensure business value output.

[C3] Real Estate Company
The interviewee is currently Head of Innovation at the [C3] Real Estate Company. Responsibilities of the interviewee includes to establish a framework and a platform for innovation, which is going to be nationally applied in the organization. Before Head of Innovation, the interviewee was employed as Business Developer at the same company.

[C4] Defence and Security Company
The interviewee has worked at the [C4] Defence and Security Company since 2006. The interviewee has worked as a Software Architect and is currently employed as Software Innovation Specialist. In the current role, the interviewee has developed an innovation lab for the [C4] Defence and Security Company and is today leading the work within it.

[C5] Industry Tools and Machine Company
Two interviewees were interviewed at the [C5] Industry Tools and Machine Company. The first interviewee has worked within the [C5] Industry Tools and Machine Company for many years within areas such as product management, R&D and project management. The interviewee's current role is Portfolio Manager where the interviewee updates product strategies and product plans. The second interviewee has been working at the [C5] Industry Tools and Machine Company for 15 years. Today the interviewee is employed as Global Product Manager and is responsible for performance management at [C5] Industry Tools and Machine Company. The two interviewees work closely together in selecting ideas.

[C6] Project Development and Construction Company
The interviewee is Innovation Leader at the [C6] Project Development and Construction Company. During the last two years, the interviewee has developed the way of working with and systems for how the [C6] Project Development and Construction Company is going to work more strategically with innovation and development projects.

3.3.2. Semi-Structured Interviews

Qualitative interviewing, more specific semi-structured interviewing, was chosen as an appropriate data collection method since it contributed to the purpose of this thesis. Since the authors of this study aim to reach an understanding of a phenomenon from the interviewees' perspective within the chosen sample, semi-structured interviewing was considered suitable since it enabled the study to be examined from the perspective of the interviewee.

The data collection method is supported by Bryman and Bell (2011) who recommend multiple case studies to employ semi-structured interviews when the topic is specific and when researchers wish to be able to compare empirical findings between case companies. As a clear purpose of this study was set, and due to the choice of research design, semi-structured interviews were considered as appropriate by the authors of this thesis. Further, there are advantages of conducting semi-structured interviewing such as allowing interviewees to generate rich answers by letting them speak freely (Ibid.). Semi-structured interviews contributed to the thesis by generating a deep understanding of the interviewees' views. According to Bryman and Bell (2011) a deep understanding can be reached by asking the interviewees questions which encourages them to reflect on the process. Moreover, semi-structured interviewing offered the advantage of flexibility which the authors of this thesis could take advantage of, for example by following-up on leads and clearing inconsistencies during the interviews. Furthermore, by employing this data collection method the authors of this thesis could take advantage of a detailed interview guide. The interview guide, which will be further described in the next section, offered the advantage of certain structure which eased the analysis of the content and enhanced the comparability of the interviewees.

Compared to other data collection methods such as participant observation, qualitative interviewing offered this study advantages which the other methods didn't offer. For example, advantages such as that the authors of this thesis could find out things which are not observable and that interviewees could reconstruct events. (Bryman & Bell, 2011). Notably, the data collection method also carries drawbacks. One drawback consists of the risk that the flexibility of the semi-structured interviewing can results in interviews deviating from the interview guide, consequently reducing the data collection methods advantage of comparability of interviews (Ibid.). The authors of this thesis took actions to mitigate this risk both by constructing the interview guide with a quite few numbers of questions and by being attentive when conducting the interviews in order to make sure that all questions were answered.

3.3.2.1 Interview Guide

In order to construct the interview guide, the authors of this thesis started to ask themselves "What kind of information do we need to know in order to answer our research questions?". With this starting point, the authors of this thesis started to construct the interview guide based on the structure of the research questions. Two separate interview guides were constructed, one for the representatives of case companies and one for experts. The reason why there are two separated constructed interview guides is because the purpose for interviewing representatives from case companies differs from the purpose of interviewing experts (See Table 10). Furthermore, the full interview guide for representatives at case companies can be found in Appendix 2, and for experts the interview guide in full can be found in Appendix 3.

The interview guides intended to give the potential interviewees enough knowledge and information about the thesis and the choices which the individual could make. The initial section, "information to respondents", constitutes of background information to the study along with the presentation of the purpose of the thesis. Further the section informs of the duration of the interview, respondent validation and choice of language. Kvale (1996) support the choice of structuring in terms of

presenting the purposes for the interview. “Information to respondents” is followed by “definitions and examples”. By presenting definitions and examples to the interviewees, the authors of this thesis aim to ensure simplicity of the questions and to create a common understanding of the definitions and concepts employed.

The structure of the interview questions begins with assessing the background of the interviewee. This choice is supported by Bryman and Bell (2011) who recognize that this type of general information plays an important role in the contextualization of the interviewee’s answers. Following, the interview questions are then structured in accordance with the research questions, making sure that the interview questions are contributing to answering the research questions. The constructed questions of the interview are characterized by openness. The authors of this thesis constructed the questions in such way to ensure that the questions allowed for open answers, which consequently would allow the interviewees to speak freely and hence not hinder differentiated answers and other ideas to be expressed. This is in line with what Bryman and Bell (2011) recommend, that the interview guide facilitates the acquirement of the interviewees’ perceptions of their social reality as well as allowing flexibility.

When the authors of this thesis formulated the interview guide and its interview questions, discussions with the innovation consultancy firm were held. Afterwards, the authors of this thesis were in contact with the supervisor of this thesis and presented the interview guide along with its questions. The discussion with the innovation consultancy firm and the contact with the supervisor supported the choice of questions and ensured that the questions were considered relevant in answering the research questions and hence fulfilling the purpose of the thesis.

In order to ensure that the interviewees felt comfortable with answering the questions in the interview guide, the authors of this thesis sent the interview guide by e-mail to the interviewees at least one week ahead the appointed time for the interview. Further, the authors of this thesis explained to the interviewees that they should only answer the interview questions they felt comfortable in answering.

3.3.2.2 Conducting Interviews

As mentioned above, twelve semi-structured interviews were conducted with six experts and one representative each from six case companies. Before the interviews, all interviewees were provided with an email including an introduction of the authors of the thesis, the purpose and research questions of this thesis, an interview-guide including further information and a question of participation in an interview. This was done in order to give the interviewees the possibility to prepare answers and presentation material. By doing this, the authors of this thesis aimed to get as detailed answers as possible. Two of the interviews were conducted through audio telephone and the remaining ten interviews were conducted through video telephone. This enabled the interviewees and the interviewers themselves to decide on an appropriate place for the interview. According to Bryman and Bell (2011), the importance of finding the right place for the interview should not be underestimated. A private and calm place will prevent interruption and ensure the possibility to

properly audio record the interview. Privacy from surroundings will further make it easier for the respondent to express answers and thoughts. (Ibid.).

Due to external factors, the authors of this thesis did not have the possibility to conduct physical face-to-face interviews. Performing interviews via audio and video telephone is beneficial as it is less resource demanding. Further, some interviewees may feel less distress while performing interviews per telephone in comparison to face-to-face interviews. A further reason why to conduct telephone interviews can be if the interviewer lacks the possibility to physically meet the interviewee. (Bryman & Bell, 2011). Telephone interviewing is according to Bryman and Bell (2011) not recommended for very long interviews. Further, it is not possible to observe body language and the risk of technical complications should be considered (Ibid.). However, in this study, most of the interviews were performed via video telephone which made it possible to include body language to a high extent. To minimize the risk of technical issues, platforms used for performing interviews were tested in advance by the authors of this thesis.

Before starting the interview, the authors of this thesis briefly introduced the purpose of the study. Further, the interviewees were asked both if they had any questions, and if they gave their permission to record the interview. As the identity of the interviewees do not contribute to fulfill the purpose of this thesis, it was decided to keep all interviewees anonymous due to confidentiality. The authors further explained that audio recording of interviews only would be used to transcribe the material. Both authors of this thesis were present during all twelve interviews. During each interview, one of them had main responsibility for leading the interview and asking questions and both asked follow-up questions.

All the interviewees gave their approval to record interviews. On one hand, recording qualitative interviews is advantageous since it allows the interviewer to fully concentrate at what is being said, instead of being busy by taking notes. On the other hand, a drawback with audio recording is that some interviewees may become self-conscious and overthink what they say and how they say it. (Ibid.). The recorded interviews were later fully transcribed. According to Bryman and Bell (2011), the procedure of transcribing is highly time-consuming. Nevertheless, transcribed material facilitates analysis of the data as it allows for repeating examine the answers (Ibid.), which is why the authors of this thesis decided to fully transcribe the material. Transcriptions were sent out to all interviewees for respondent validation. Interviewees were asked to control and confirm the material as well as to make revisions if needed. Examples of revisions that needed to be done after respondent validation were to correct minor misunderstandings as well as to erase confidential material. Confidential material could be exemplified as specific details about case companies and research material that was not yet published. In accordance with Bryman and Bell (2011), this was done to ensure a correct interpretation of the data and thereby decrease the influence of the authors' own perspective.

3.3.2.3 Language

In this study, the authors of this thesis held and transcribed all interviews in Swedish. After transcribing the interviews in Swedish, they were translated into English. The reason why interviews were conducted in Swedish is because all the interviewees were Swedish natives and used Swedish

in their working life. Even so, the interviewees were offered the choice of being interviewed in Swedish or English. By offering the choice of language, the authors of this thesis aimed to make the interviewees feel as comfortable as possible and to reduce the potential obstacles the interviewees might experience when expressing themselves in a language, they are not comfortable in. This choice is supported by Bryman and Bell (2011) who recognize that researchers need to consider potential restraints of language barriers while conducting interviews.

Critics around translating transcribed material, as has been done in this study, concerns problems that might arise when translating material which is not in the translator's native language as well as having a different setting in terms of culture. (Bryman and Bell, 2011). However, the authors of this thesis recognize that these types problems do not arise in this study due to the facts that the authors native language is Swedish and that the authors have the same national cultural setting as the interviewees. Bryman and Bell (2011), further recognize two limitations. First, in linguistic terms, there are words in Swedish which have no equivalent in English and there is a potential challenge of translating grammatical structures. Secondly, in socio-cultural terms, to facilitate understanding of some phrases or sayings a person needs to have a certain cultural background. (Ibid.) In order to tackle these issues, the authors of this thesis were transcribing and translating the collected material carefully with these limitations in mind. As already mentioned, the transcribed material was sent out for validation to the interviewees to ensure the right understanding. Having translated, the authors of this thesis both agreed on a final translation which they found appropriate and accurate.

3.4 Thematic Analysis

The aim of the analysis, connected to the purpose of this study, is to generate insights of how decision-makers at large enterprises in Sweden can employ criteria to evaluate early-stage innovation projects. The purpose of the thesis is further to contribute with insights regarding what criteria that can be employed and how decision-makers at large enterprises in Sweden can determine the valuation of criteria. In order to contribute to the purpose, the authors of this thesis recognize that a proper data analysis method needs to be used.

According to Bell, Bryman and Harley (2018), the most common way to analyze qualitative data is by analyzing through a thematic analysis. The thematic analysis involves both seeking and identifying themes as well as discovering hidden meanings. As described by Bell et al. (2018), for some researchers a theme can be the same as a code, and for others it transcends it. Regarding the latter, a theme is built up by a group of codes (Ibid.). The thematic analysis often involves transcribing, which facilitates the use of citations and thereby enables the reader to do an evaluation of analysis. In this study, the authors transcribed all the twelve interviews which eased the process of coding and as mentioned, enabled the use of citations.

The interviewees answers were coded by using different colors. The authors of this thesis categorized the codes into groups which yielded broader themes of the findings. In the color-coding process, the authors of this thesis searched for similarities and differences for each theme. Bell et al. (2018) describes that the process of coding is a way to break down the collected data into parts which

then can be given different labels. The iterative approach of this study made the authors of this thesis start to color-code the interviews before all the interviews had been conducted. By color-coding the interviews before all of them were conducted, the authors of this thesis took the opportunity to further build on their literature review. This is in line with what Bell et al. (2018) emphasize, that it is important to start the coding process early, since it contributes to the researchers understanding and, hence can constitute a contribution to the literature review. The basis for the coding process was the interview guide along with the answers from the conducted interviews, but also the literature review because it was the foundation for the questions asked. Two separate coding processes of the empirical material were conducted, one for data collected from expert interviews, and one for data collected from case company interviews. Different codes and themes emerged from the two sources of empirical material which can be explained by the differences in the purpose of conducting expert interviews and case company interviews. An overview of the codes and the broader themes can be found in Appendix 4. Nowell, Norris, White and Moules (2017) view these broader themes to capture themes in relation to the purpose of the research.

The authors of this thesis wanted to ensure that nothing relevant from the transcribed materials was missed. Consequently, the authors of this thesis started the coding of the transcribed materials separately. Afterwards, the authors compared their results with each other and went through a couple of differences. Following thus, the authors went through the constructed color-codes once again before agreeing on the final ones. This processing of data was performed by the authors of this thesis in order to reduce the risk of their own personal views affecting the results of the conducted study. This choice is supported by Bell. et al (2018), who suggest that researchers should go through transcribed materials several times and re-examine the codes before setting the final ones as well as categorize them into themes.

The themes identified in the coding process served as headings for the presentation of the empirical findings (chapter 4). The findings from the experts have been compiled and the findings from the case companies have been presented one by one. The reason why the case companies are presented one by one is to not lose the context. After having presented the empirical findings (chapter 4), the empirical findings were analyzed in the following chapter (chapter 5). The themes derived from the two coding processes naturally connected to the two sub-questions (see Appendix 4). This facilitated the analysis (chapter 5) to be structured according to the two sub-questions, that is having the sub-questions as the main headings. The empirical findings from the case companies were compared between companies, with the findings from experts and with the literature review.

The strength of the method thematic analysis lays in the flexibility, which enables the method to analyze a wide variety of qualitative data (Bell et al., 2018). With flexibility in its nature, the authors of this thesis recognize that the thematic analysis also offers a structured approach when analyzing by involving the interview guide constructed by the research questions. Even though there are strengths with conducting a thematic analysis, there are also weaknesses related to the method. Weaknesses with applying a coding approach and thematic analysis are the risks of decontextualizing as well as the fragmentation of data (Ibid.). These risks involve that the study might lose the context of the interviewees answers and solely presents fragments of it. The authors of

this thesis mitigated these risks by being well-aware of the mentioned risks and carefully reviewing the research questions while conducting their color-coding process. Another weakness to be mentioned is the lack of objectivity which might occur when only one researcher is coding the data. (Ibid.). However, this weakness of the analysis method is minimized since the study is conducted by two authors. As described above, both authors of this thesis went through the coding several times, in order to ensure the objectivity.

Even though the thematic analysis has weaknesses, it can still be argued as an appropriate way of making a qualitative analysis. The thematic analysis with its flexible approach is easy to grasp as well as a suitable way of analyzing interviews (Bell et al., 2018). Nevertheless, it contributes to fulfilling the purpose of this research by capturing themes related to it as Nowell et al. (2017) suggest.

3.5 Research Quality

3.5.1 Internal Validity

Internal validity of qualitative research regards whether there is a fit between the empirical results of the study and the theoretical ideas developed by the researchers or not. This kind of validity can be argued to be a strength of qualitative research since the researchers can reach a high level of congruence between what they observe and the concepts they develop. A corresponding term to internal validity is credibility. Credibility concerns if the researchers have understood the social world in a correct way. As there can be several feasible ways of interpreting the social reality, the credibility of the study is important to consider since it will determine if the findings are going to be accepted by others or not. (Bryman & Bell, 2011). A detailed description of how this study is performed will allow the reader to assess validity and credibility of the work (Baxter & Jack, 2008). The authors of this thesis have put emphasis on explaining how and why methodological choices have been made in order to enhance validity and credibility of this study. Moreover, to ensure internal validity and credible results of this study, some of the actions suggested by Bryman and Bell (2011) has been taken by the authors of this thesis. As mentioned above, all interviews were recorded and fully transcribed. Transcriptions were later sent to the interviewees for validation. According to Baxter and Jack (2008), this kind of validation will enhance credibility since the interviewees are provided with the opportunity to clarify interpretation as well as give additional comments.

3.5.2 External Validity

External validity regards the degree of generalizability of empirical results. Since qualitative researchers tend to apply small samples and case studies, it can be argued to be difficult to reach a high level of generalizability of the findings. (Bryman & Bell, 2011). In this study, a multiple case study was performed by qualitative interviewing. These methods are unlikely to generate highly generalizable results. However, the purpose was not to gather information that can be considered as representative for a known population, rather to contribute with examples. Since only six case companies are going to be investigated, results and conclusions made based on gathered data should be viewed solely in the settings of this study.

3.5.3 Internal Reliability

Internal reliability is dependent on if there is more than one researcher who investigates a research question and if the researchers agree on what they find. Internal reliability can also be referred to as inter-observability consistency. (Bryman & Bell, 2011). To enhance internal reliability, actions have been taken in accordance with recommendations provided by Bryman and Bell (2011). Both authors of this thesis have been present during all the interviews and all interviews were recorded and fully transcribed. This processing of data made it possible for the authors to easily go back and examine the data if they would lack coherence. Further, when the empirical data was analyzed, both authors were involved to ensure a high level of inter-observability. For example, the authors of this thesis started by coding the material separately before comparing and agreeing on the final codes and themes. By having an ongoing discussion regarding how to interpret the empirical findings when analyzing, the internal reliability could be enhanced.

3.5.4 External Reliability

External reliability regards the degree of replicability of the study. A high degree of replicability is difficult to reach in qualitative research, since it involves social settings and circumstances that will be different at the next measure. Due to the nature of qualitative research, the aspect of dependability is often discussed as a corresponding term to external reliability. Dependability concerns the accessibility of information about all phases of the research process. This kind of information will enhance transparency and allow readers to judge whether proper procedures has been applied or not. (Bryman & Bell, 2011). In accordance with recommendations from Bryman and Bell (2011), dependability was addressed by the authors of this thesis by making sure that details concerning each phase of the research process are available for review, for example the process of selecting case companies and interview objects and decisions taken regarding data analysis.

3.6 Research Ethics

According to Kvale (1996) it is important for researchers to be ethically sensitive. By being ethically sensitive, researchers consider the ethical dimension in interviewing and at the same time making sure that the interviewee appreciate the study and is informed about the purpose. Further, researchers need to ensure that the interviewee knows that their contribution will be treated with confidentiality. First, the authors of this thesis invited the interviewees to take part of this study, hence the interviewees participated on a voluntary basis. In the invitation the authors of this thesis both introduced themselves and the purpose of the study. Further, the interview guide was attached. The attachment ensured that the potential interviewees could go through both the purpose, further included information and the interview questions to see if they had interest in the study and think about if they were willing to contribute.

Bryman and Bell (2011) describe four ethical aspects by Diener and Crandall (1978), namely harm to participants, lack of informed consent, invasion of privacy and deception. Regarding the first ethical aspect, harm to participants, conducting research should not cause any harm for the participants, in this study the interviewees (Bryman & Bell, 2011). Within this aspect, the authors of this thesis

recognized that the identity of the interviewees did not contribute to the purpose of this thesis and hence decided to keep all interviewees anonymous due to confidentiality. The second ethical aspect, lack of informed consent involves that the potential interviewees are given adequate information enabling a well-informed decision of whether to participate or not (Ibid.). When asking interviewees if they were willing to participate, an introductory email was sent out including introduction of the authors of this thesis, the purpose and the attached interview guide. Hence, the authors of this thesis included enough information in the first mail which was sent to the potential interviewees and thereby facilitated an informed decision to be taken by the potential interviewees. The third ethical aspect, invasion of privacy, concerns that interviewees should have the right to not answer questions, even though they have well-informed given their consent to be interviewed (Ibid.). During the interviews, the authors of this thesis informed the interviewees to solely answer the questions in which they felt comfortable. The fourth and last ethical aspect, deception, considers the fact that the presentation of the researcher's study can be misleading (Ibid.). In order to tackle this ethical aspect, the authors of this thesis chose to include enough information about their study in the first point of contact with the potential interviewees and continued to inform the interviewees if necessary, as the study proceeded.

4. Empirical Findings

In this chapter the data collection from the qualitative interviews are presented. Initially, the chapter presents a compilation of the empirical findings derived from the experts. This is followed by a presentation of the empirical findings from the representatives of the case companies. The findings from the case companies are presented one by one.

4.1 Empirical Findings from Expert Interviews

4.1.1 Criteria Discussed and Problematized in the FEI

Different potential criteria are recognized by different experts. Some criteria are discussed and problematized more than others. The expert perspective highlights and discuss the criteria: *Understand the idea, strategy, user value, financial, technical readiness, producibility, originality, cost and, informed enough*. What's important to address in relation to literature is that the experts do not distinguish between predefined and not predefined criteria. The criteria will be further outlined in the following section.

The first criterion which the expert perspective highlights is understand the idea. The starting point of determining the valuation of criteria is according to the [E5] expert to ensure that the idea is fully understood. The [E5] expert explains *"Do you understand the idea? If the answer is yes, then you can go ahead and evaluate the idea. If the answer is no, then you need to think about why the answer is no. Are you not understanding the idea or the context? Then you need to make the idea clearer."*. Both the [E3] expert and [E4] expert also emphasize the importance of understanding the idea. The [E3] expert recognizes that ideas can be undervalued if the evaluator does not fully understand the idea. The [E3] expert argues that people perceive ideas differently, which is why the aspect of clarity or maturity of the idea becomes important. Moreover, the [E6] expert highlights the challenge of information asymmetry when determining the valuation of criteria in early stages. The [E6] expert explains, *"It is much about information asymmetry. Even if the knowledge is placed right in front of you, it will depend on the reader's ability to understand and make sense of it."*. When ideas are mature and concrete enough, hence understandable, organizations can determine what resources, people and processes that needs to be applied in order to do a valuation. ([E3] expert).

Secondly, the expert perspective highlights strategy. The [E1] expert argues that criteria which examine how well an innovation-project relates to the current business of the firm to be of interest. According to the [E2] expert, criteria related to strategy can be challenging for organizations to deal with. Reasons why can for example be how the strategy is formulated and interpreted by the decision-maker. Hence, a large enterprise needs to work with its innovation strategy and compile it to criteria, for example by having different areas where the enterprise should dare to take bigger risks. ([E2] expert). The [E3] expert also acknowledges that ideas need to be aligned with the company strategy and highlights the importance of decision-makers to correctly understand the strategy. On the other hand, the idea tends to receive an overall lower valuation if the evaluator considers the idea to be beyond the current scope of the firm ([E4] expert). The [E4] expert

highlights strategic fit to be appropriate for the short-term innovations, but maybe harmful for long term innovations as it may limit the organization from making strategic change, even if it is needed. Further, the [E5] expert discusses challenges related to how to deal with ideas outside the current scope of the company, "*Then you can discuss if the company has specific strategies to deal with ideas that may not fit with their core business."* This quote reveals that the [E5] expert argues that large enterprises should have specific strategies for early-stage innovation projects which are not aligned with the company's core business.

The third criterion which the experts highlight is user value. According to the [E1] expert, a large enterprise should apply a user value perspective, where the perceived value of the new idea should be investigated, i.e. the willingness to pay. User value is further mentioned by the [E3] expert, [E4] expert, [E5] expert and [E6] expert. The [E6] expert describes, *"Spontaneous, I think that if you can show what customer problem you solve, you are one step ahead"*. According to the [E4] expert, a good idea is an appropriate solution to a relevant problem. Hence, criteria that examine how well an idea solves a relevant problem are needed which can be viewed as a measure of user value. User value mainly concerns the "problem-side" of an idea, that is whether the problem is of interest to solve or not ([E4] expert). The [E4] expert emphasizes the importance of making sure that a relevant problem is addressed by the idea in order to prevent evaluators to overestimate the potential of the technologies. The [E4] expert explains, *"The potential of much of the new technology is high, but the potential won't be released until there is someone that realizes that, yes this is actually meeting a need of mine"*.

The fourth criterion which the expert perspective discusses is financial. The [E6] expert has the impression of, *"Large enterprises often aim to use financial criteria, to evaluate early-stage innovation projects, but they do not always understand that it may not be possible."* Reasons why large enterprises aim to employ financial criteria can for example be that is easier to communicate numbers to the rest of the organization and achieve buy-in ([E6] expert). The [E4] expert argues that financial criteria, such as profitability, often are unconsciously considered even though innovation literature suggest it as inappropriate in early stages of the innovation process. Further, the [E5] expert explains that if a company starts employing financial criteria too early, then there is a risk to kill ideas since evaluators do not properly understand. However, financial criteria may be appropriate if the idea is of incremental nature since information from previous, similar cases is available ([E1] expert; [E2] expert; [E5] expert). The [E1] expert concludes, "*Go financially in the parts where you have repetitive innovation projects, but as soon you comes to a new area, where a component of the innovation mix is unknown, then you should stay out of the financial criteria"*.

Furthermore, the fifth criterion is technical readiness, which addresses how much technical advances or additional technical knowledge that is needed by the organization in order to realize an idea ([E1] expert; [E2] expert). Moreover, the sixth criterion, the expert perspective calls producibility. This criterion is addressed in terms of deciding how difficult or easy it is to realize the idea ([E3] expert; [E4] expert; [E5] expert). The seventh criterion highlighted by experts is originality. The expert perspective recognize that some companies work with determining how novel an idea is ([E1] expert; [E3] expert; [E4] expert; [E5] expert). In comparison to user value and producibility, the [E4] expert argues originality to be of lower importance for firms when they are evaluating ideas. Originality

further describes whether an idea is incremental in its nature or not ([E5] expert). Further, the eighth criterion, the cost of realizing the project can be assessed ([E2] expert). According to the [E2] expert, the cost of the project is mainly assessed by organization more of a traditional product development process. The ninth and last criteria highlighted by expert is informed enough. The [E2] expert suggests employing criteria to judge whether enough information around the project is accessible or not. Further, the [E2] expert believes that a large enterprise should have high requirements on information early in the project.

4.1.2 Factors Affecting the Choice of Criteria in the FEI

4.1.2.1 Process and Structure

"I don't believe you will find the same criteria for that many companies.", the [E1] expert explains regarding what criteria large enterprises employ in early-stage innovation projects today. In line with the [E1] expert, the [E3] expert neither believes that large enterprises employ a fixed number of criteria, nor that it is generalizable. The [E2] expert and the [E6] expert acknowledge that what criteria that is used is dependent upon the nature of company. If the company is technology based, the [E2] expert believes that criteria from a more traditional product development process are employed. Further, the [E6] expert argues that the innovation culture as well as the innovation strategy of the firm to have implications on what criteria that are used. Moreover, the [E1] expert acknowledges that there are many criteria which can be employed and, that many of these can potentially be of value. Further, the [E1] expert emphasizes that organizations need to have a battery of different criteria and be aware of which ones to use when.

The [E6] expert suggests that the innovation process of a company will have implications on what criteria that are being employed. The [E6] expert exemplifies with if a company sets up an "innovation jam", ideas may be evaluated on the basis of a set of criteria that probably differs from the set of criteria employed if an idea is initiated by an external innovation group of the same company. Further, criteria can be dependent on structure, the [E6] expert describes the following regarding innovation processes at large enterprises, *"It is not that structured at large enterprises, even if you would like to imagine it like that, since the literature frames it like that".* However, the [E3] expert acknowledges that very structured approaches exist where criteria change in connection with the idea maturing. The [E3] expert recognizes that some large enterprises work more analytical by employing several criteria. Having very structured criteria can result in large enterprise searching for ideas which fit the criteria. Thus, if the large enterprise wants truly innovative ideas, fixed criteria may not be appropriate. ([E3] expert). The [E1] expert agrees to the danger of applying limiting criteria in early stages, "*If we are too limited in the beginning, it is truly difficult to buy back the opportunity later".* According to the [E3] expert, the first phase should concern a holistic evaluation as well as screening and categorizing of ideas, in order to make them comparable. When this is done, a suitable evaluator should start including criteria which fits. ([E3] expert).

4.1.2.2 The Aim and the Degree of Innovativeness

As already mentioned, the [E3] expert neither believe that large enterprises use a fixed number of criteria nor that it is generalizable. Both the [E3] expert and the [E5] expert think that organizations

are guided from where they are and where they want to go. The [E5] expert has experienced that companies often struggles to decide on what criteria to employ. Hence, the initial question that the [E5] expert asks managers when they are confused about what criteria to employ is; "*Wait a minute, what is it that you are looking for?"*. Hence, the [E5] expert argues that what criteria to employ is dependent of what kind of idea that is subjected to evaluation, which is confirmed by the [E2] expert.

Further, the [E2] expert suggests that what criteria to employ, in this case specifically financial and non-financial, depends on how innovative the projects are. The [E4] expert agrees on different criteria to be appropriate for different ideas. What kind of innovation project it is can guide the organization regarding how to manage the project ([E2] expert). The [E2] expert believes that truly radical innovative projects need to be evaluated based on other criteria than just the financial ones, since the uncertainty is high. The matter of newness is further discussed by the [E1] expert who suggests criteria to be determined based upon "innovation three horizons". The innovation three horizons consider both novelty for the company in technical means and, novelty for the company in terms of whether the target group is known for the company or not ([E1] expert). Even though the [E2] expert agrees on different criteria to appropriate in different situations, the [E2] expert perceives that large enterprises do not distinguish criteria between different projects, hence using the same criteria for projects such as product development projects and business development projects. The [E3] expert argues that it is important for large enterprises to have some form of categorization which facilitates that ideas can be evaluated in groups or clusters, rather than individually, based on how innovative the ideas are and how mature they are. For example, if the ideas concern more of a specified and incremental product, more concrete and clear criteria can be employed. ([E3] expert). The [E5] expert describes that the task of grouping and clustering is challenging, since there is an enormous amount of ideas within an organization. In terms of how innovative a project is, the [E4] expert highlights different time aspects of projects to have implication on what criteria to deploy, "*One is the short-term, what we need to make today. The other one is more long-term; we also need to get ideas that somehow develop out organization in the long-term"*.

4.1.3 Determining the Valuation of Criteria in the FEI

4.1.3.1 Co-Developing the Idea and Determining the Valuation of Criteria

As already mentioned, the starting point of determining the valuation of criteria is according to the [E5] expert to ensure that the idea is fully understood. However, if the idea is perceived as unconcrete and underdeveloped, the [E3] expert recognizes that this is an opportunity for the decision-makers to further develop the idea when determining the valuation of criteria. The [E3] expert explains the following regarding what happens during an evaluation process, *"Then the ideas act like triggers and here I believe you should try to catch this, otherwise it will be a loss, loss of competence"* Hence, the decision-makers can have a co-creating role whereby the decision-makers develop and clarify the idea further, rather than solely evaluate it. ([E3] expert). This is in line with the [E5] expert, who describes the valuation process as a "new-idea-generation-process", where the evaluators try to understand ideas and where some evaluators are doing this by developing the idea further or even generate new ideas. The [E5] expert describes the following regarding the evaluation

process, *"Maybe you should view this as a generative process, and that it happens things in the evaluation that you can take advantage of".* A challenge related to this process is to ensure that valuable insights are taken care of instead of lost ([E5] expert).

4.1.3.2 Determining the Valuation of Criteria by Intuition

In terms of how to handle lack of information when determining the valuation of criteria, the [E3] expert recognizes that the quickest way is to let people with relevant knowledge fill up with information. Furthermore, the [E1] expert argues that decision-makers should bring in expertise in order to make assumptions. The [E3] expert points out that having a good match between the idea and the person with knowledge is a way of gathering information. The [E1] expert concludes that if the idea regards the core business of the company, knowledge should be internally available. However, if the company moves into a new area, the company need to get help by institutes or innovation bridges, such as consultancy firms who work with many different industries and offers knowledge ([E1] expert).

The [E3] expert implies that assumptions are useful when organizations are dealing with something totally new. This is confirmed by the [E4] expert, who suggests assumptions to be useful when evaluating long-term innovation that is pioneering. The reason why, is for example that this kind innovation tends to have higher risks as well as higher potential revenue which require organizations to make assumptions and to some extent to rely on gut feel ([E4] expert). According to the [E1] expert, assumptions are advantageous since you can make them quickly during the first probing activities. According to the [E5] expert, an issue related to assumptions is that people tend to lack arguments for why an assumption is correct, rather these assumptions are often backed with intuition. Accordingly, the [E2] expert and the [E5] expert point out the importance of the experience of individuals making assumptions, in order to make their intuition trustworthy. This is in line with the [E6] expert who suggests that assumptions will be influenced by the knowledge and perspective of the individual making assumptions. The [E4] expert further highlights the importance of the expertise and experience of the individual using intuition to make decisions, "*The gut feel requires that you really have experience and some kind of expertise".* Relevant experience is also emphasized by the [E5] expert in order to make intuition reliable. According to the [E3] expert, knowledgeable experts can sometimes almost intuitively assume estimations of criteria based on their experience of evaluating innovation projects, and perhaps similar projects as the one subjected to evaluation. In contrast, according to the [E5] expert, intuition can become problematic when it regards early-stage innovation projects since it is impossible to have experience of e.g. truly novel technologies.

The [E4] expert and the [E5] expert discuss intuition to determine the valuation of criteria. The [E4] expert suggests that the more complex a decision is, the less dependent it should be on individual criteria. The [E4] expert refers to prior studies that have concluded intuitive decision making to be appropriate when the complexity of the decision is very high. When the complexity is too high, or when there are too many parameters for a human consider, rational valuations are not possible to achieve. Instead, the overall impression of the idea should be considered, which is related to intuition. ([E4] expert). This is in line, with the [E3] expert who considers that a large enterprise should start with a holistic evaluation when evaluating ideas in the first phase.

4.1.3.3 Determining the Valuation of Criteria by Data

A fast learning-process can be achieved by testing minimum viable products in order to conclude whether assumptions are correct or not ([E1] expert). Moreover, the [E2] expert recommends organization to make assumptions based on conducting experiments to test hypotheses, since it guides the organization in its gathering of information. This is in line with the [E5] expert who suggests data to be created when assumptions are formulated and tested. Furthermore, the [E4] expert highlights the importance of making the idea concrete for the intended user in order to ensure that a real problem is being addressed, the [E4] expert explains, *"I think that you need to somehow visualize the possibilities of the technology. We have great possibilities to do this today. Look at the gaming industry, they are great at visualizing and make up virtual worlds"*. This approach may also make it possible for the user to estimate the willingness to pay for the innovation ([E4] expert). In situations with lack of information in determining the valuation of criteria, the [E1] expert emphasizes the need of having people who dare to go out and create the data. The [E1] further describes "go out" and show the user a mock-up as an efficient way of gathering information around willingness to pay as well as perceived user value. Other ways to gather information is through prototypes and demonstrations, which also are ways to enhance customers' understanding of technological potential ([E4] expert; [E5] expert).

Even if the large enterprise creates data, valuation of criteria will to some extent be based on assumptions ([E1] expert). Thus, the [E1] expert further emphasizes the importance of transparency and awareness of how the assumptions affects the results. *It's not a one-shot, it's a process with assumptions and data collection, and valuation. It constantly ongoing"*, the [E2] expert concluded about the iterative process around assumptions and data in terms of determining the valuation of criteria. According to the [E6] expert, more and more information will become available as the innovation matures, hence assumptions made in the early stages of the project will by the time be replaced by data.

Speaking in general terms, the [E1] expert argues that the less opinions organizations involve and the more facts they involve, the better. The [E2] expert further highlights the importance to use data to the highest possible extent and that the technology of today should be used to collect data. In terms of creating data in comparison to solely making assumptions, the expert [E1] paints a scale. To the left of the scale, assumptions are made by the organization which is considered as weak evidence. In the middle of the scale, the large enterprise reaches out to an external source to make the investigation, which is stronger evidence than the first situation. To the right of the scale, the large enterprise goes out and creates data on its own by testing ideas and by listening to users, which is viewed as the strongest evidence. In the middle of the scale, the [E1] expert acknowledges that the large enterprise per say are dependent on external part's interpretation of the information, whereas to the right of the scale, the large enterprise make their own interpretation.

4.2 Empirical Findings from Case Companies

4.2.1 [C1] Nordic Telecommunications Company

4.2.1.1 The Setting in the FEI

The [C1] company has a joint function for innovation which works for a joint innovation agenda for the whole organization, is responsible to drive the development of innovation and creating commitment for innovation and, to make innovation happen in the organization. Furthermore, the [C1] company perceives that they have a lot of opportunities, which they rather talk about than ideas. The reason why is because the [C1] company aims to have a starting point in a clear opportunity, profoundly anchored in either insights, trends, problem formulations or strategic orientations. However, the authors of this thesis have chosen the term idea, instead of opportunity, to not confuse the reader. The [C1] company has three input channels of ideas, namely the internal channel, the innovation portfolio and, the strategic dimension. These constitute of the [C1] company's decision gate 1. An idea from these three channels can move into an initiative. An idea moves to an initiative if it fulfills the criteria of respective channel of input. The initiative constitutes of the [C1] company's decision gate 2. See below Figure 5 for a visual overview of the process, and later below Table 13 for a summarization of the criteria decision gate 1 and decision gate 2.

The [C1] company do not differentiate decision-makers nor criteria for innovation projects to other projects, such as regular business cases. Decision-makers at the [C1] company makes at least hundred decisions per month, since they develop products and services or invests in grids continuously (i.e. regular business cases). During the same period, the [C1] company have a couple of innovation projects. The interviewee describes the situation as, "*In an ideal world you would hope that the decision-makers in one moment wear one hat and, in the other moment another hat. But, in reality it's not like that, they wear the same hat*".

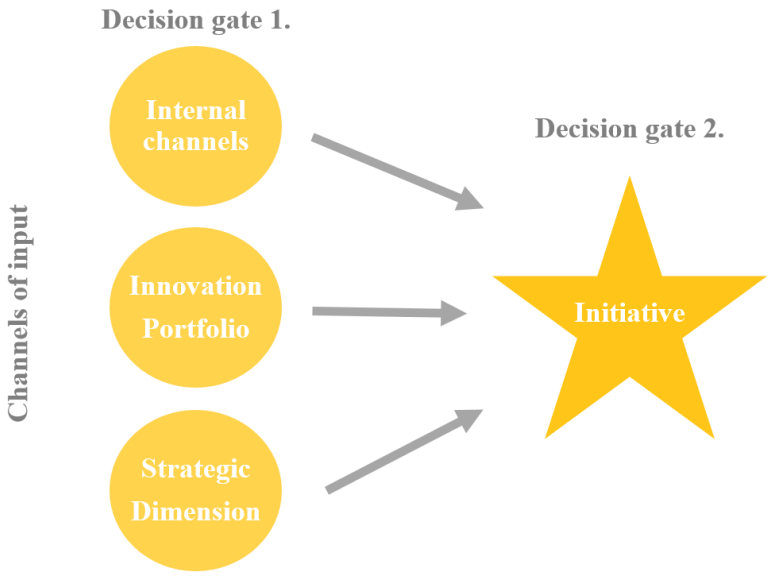

Figure 5. An overview of the [C1] company's innovation process in the FEI. Compiled by the authors.

4.2.1.2 Criteria Employed in the FEI

Through internal channels, the function makes use of digital platforms by engaging the organization in different forms of challenges and campaigns. The ideas received from the first starting point, internal channels, are seldom transformative in nature, but characterized by being something new and, hence innovative. The innovation function evaluates the ideas by examining three criteria, namely identifying something which is new, something which is feasible and something which is scalable.

The second starting point, the innovation portfolio, consists of ideas originated from different markets identified by an individual or a team. The innovation function works in order to replicate these ideas at several markets to facilitate synergies. Here, the replicability becomes an important criterion to examine. High replicability means that a solution can be replicated in several markets which creates high value to the organization. The interviewee says, "*if we have done it once, let's do it seven more times instead*", which illustrates the importance of replicability for the [C1] company. Low replicability means that the solution might only be applicable in a specific market or segment and is therefore of lower value to the organization. As a large enterprise, there is a risk for the [C1] company to solely attain a "inside-out" perspective and thereby lose focus of what value an idea creates for the customer. The interviewee explains "*You can put an indefinitely amount of time to develop products, services, platforms or technologies and, then when it comes out to the customer, there is no value of it*". Therefore, another criterion is value. If the idea is considered valuable, the next criterion to examine is scalability. Scalability is a criterion which measure "*How can we scale it up fast?*" the interviewee describes.

In the third starting point, the strategic orientation, the [C1] company has a company strategist who determines what the company should do in order to win in the market during the next three years. Four focus areas of innovation have been determined. The interviewee reasons around these focus areas of innovation, "*In these two areas we see that a lot is happening […] but within these two areas of focus we do not have any investments, should we or should we not?*". In order to determine whether the [C1] company should invest or not in the focus areas with no current investments, they investigate the market and where the [C1] company is heading. When these two criteria coincide, that is there is a market value and a strategic value, then the function should make a proper investment since these ideas originates from a strategic orientation.

Having started an initiative based on the idea, the [C1] company evaluate the initiative based on certain criteria. See below Table 12 for a summarization of the criteria. In the first phase of the initiative, "*it's all about that with as little means as possible, evaluate and explore value offers and problem formulations*", the interviewee describes. Having started in a rooted pictured of the market or trend, the function develops several hypotheses and, then asks for resources in order to test these. "*In the early initiatives, we speak rarely about financial criteria. The fact is that we try to ignore them to as far as possible*", the interviewee states. The function rather examines the attractiveness in a service. There are different ways to evaluate the attractiveness, for example the number of customers possible to onboard and, the number of deliveries possible to achieve. However, there can be a pressure for financial criteria when it is time for decision-meetings. For example, decision-

makers can demand the ROI. The interviewee explains "*During decision-meetings it always emerge discussions around what the future potential revenue would look like, but we do not have it as a significant criterion for decision. It's rather about that "we want to try this" and "we want to learn from this"*". For an idea to qualify for a first decision-meeting, the idea needs to have the potential to address a market. The interviewee states "*Is the potential too small, then there is no reason for us to go into it*". It is a measure which have created some form of interest and understanding about why the function should act.

Decision-gate 1. **Channels of input**	**Criteria**
Internal channels	Novelty Feasibility Scalability
Innovation portfolio	Replicability Value Scalability
Strategic orientation	Market value Strategic value
Decision-gate 2.	**Criteria**
Initiative	Attractiveness (Pressure for financial criteria, e.g. ROI) Potential to address a market

Table 13. Summarization of the [C1] company's criteria for decision gate 1 and decision gate 2. Compiled by the authors.

4.2.1.3 Determining the Valuation of Criteria in the FEI

The interviewee portrays the situation in terms of determining the valuation of criteria and what to ground decisions on in early-stage innovation projects, *"If you have done a business case of any kind of project, then it's a bit of guessing. There are several conditions and several assumptions. The more mature, the more facts and evidence you have for your assumptions. However, when it comes to innovation, we do not have any facts or data. It's the fact that you need to go out and create it"*. Hence, in the [C1] company, determining the valuation of criteria for innovation projects is more guessing than a regular business case, unless you go out and gather data. To summarize, the [C1] company go out and create their data for innovation projects.

The [C1] company is using assumptions when determining the valuation of criteria. However, there is a will to anchor assumptions in data or market input but in the end, it boils down to how much resources and time that exist to execute in such time-consuming work. The quicker and the less resources the [C1] company put in, the better. "*It's a game of the numbers. The more innovation projects you have, the greater probability that some moves on and succeeds",* the interview explains about the ability to have more active innovation projects when investing less resources. The function know that half of the initiatives will be shut down by themselves while 30% of the initiatives the decision-makers will turn down.

When determining the valuation of criteria, the [C1] company make use assumptions backed by both knowledge from internal sources and external sources, to complement the existing data. When it comes to something totally new, as early-stage innovation projects, then the data you currently possess might not be truly representative, hence can become a source of error. To minimize the error, the function makes use of several sources of data. Even though it is hard and time-consuming to anchor criteria with data, the interviewee explains "*You can guess how much you want, but it doesn't matter. I am more of a school where its first when you have clear evidence from the market […] such as a clear attractiveness or a clear willingness to pay, then it is relevant to sit down and put numbers on something"*. The citation illustrates the importance of having clear evidence, rather than solely making assumptions in the early stage.

4.2.2 [C2] Infrastructure, Building and Urban Planning Consultant Company

4.2.2.1 The Setting in the FEI

The [C2] company has a structured approach to evaluate early-stage innovation projects (see Figure 6 below). First, an employee fills out a form around their idea. The form covers the problem the idea addresses, a brief description of how the idea solves the problem, the employees involved and, if it addresses the market or internal development. Every week, two innovation leaders go through all new ideas to examine the relevance of ideas. Then, the idea generator(s) is connected to an innovation coach. The task for the innovation coach is to allocate the idea to 3-5 experts within the company in order to get their perspective of the customer need, the solution of the problem, the people behind the idea and other general comments. The innovation coaches then summarize gathered knowledge which the idea generator(s) can make use of later, in their pitch to decision-makers. The interviewee explains, "*It's a very fast process to ensure that we are not way off track. […] We want to give the ideas the benefit of doubt in this stage, check if the idea is understandable enough and see if there is any kind of problem behind"*. If the idea passes the first decision-stage, the idea moves into a program in a suitable track. In such a track, the employee(s) gets 50 hours of work to pull through the program and to substantiate the idea. "*You need to dare to invest some money to substantiate the ideas to get more and more substance in them, before you say no in any case*", the interviewee describes.

The [C2] company has four different tracks connected to their research and innovation (R&I) development, out of these, this thesis will consider two of them, since they are relevant to the purpose of the thesis. These two tracks are new business (1) and optimization (2). By making use of these tracks, a second rough evaluation in the early stage is done. The tracks have twelve criteria each. The criteria are fairly the same, but in the optimization track has more of an internal perspective. In an early stage decision-makers should try to have a sense of the criteria. All this is then compiled to a pitch, in which the decision gate involves higher management within the company. Based on the characteristics of the idea, business managers are chosen to participate.

The first track, new business, concerns ideas that will result in a new or changed service or product. With new business, the goal is to generate new revenue streams. The second track, optimization, concerns ideas which will result in a new or changed internal process, methods or tool that has an

external potential. With optimization, the [C2] company aims to reach an increased efficiency and hence generate competitive advantage.

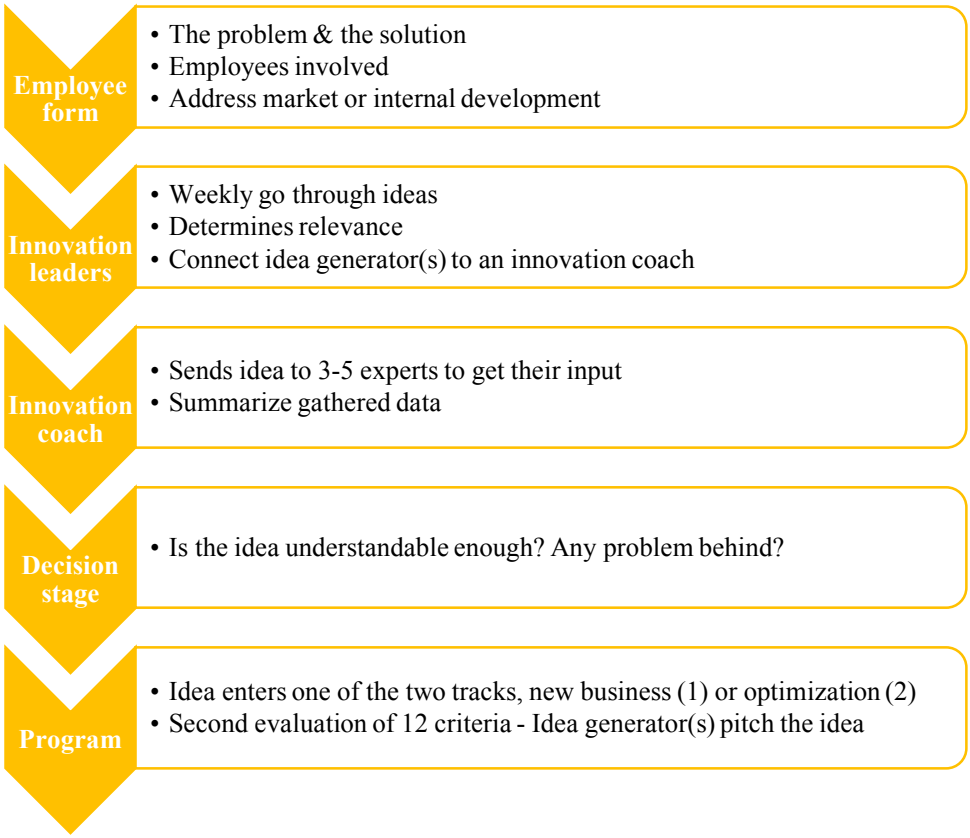

Figure 6. An overview of the [C2] company's innovations process in the FEI. Compiled by the authors.

4.2.2.2 Criteria Employed in the FEI

As already mentioned, each of the tracks have 12 criteria. Find Table 14 below constituting of a summarization of the 12 criteria to respectively track. Following section will describe the criteria, one by one, but jointly between the two tracks since the criteria have similarities.

The [C2] company's first criterion is R&I strategy. The criterion occurs in the two tracks and outlines six focus areas for innovation. These areas of focus are connected to creating sustainable solutions for the future and are in line with the UN's sustainable development goals (SDG). In the second criterion, namely customer need (track 1) and user need (track 2), the [C2] company investigates the need of the customer or user. "*Here we have contact with the market, it's a must here. We need to interview a number of potential customers around this new business idea to see their reaction"*, the interviewer explains. The third criterion, that is value proposition in terms of solution (track 1) and of efficiency factor (track 2). Here the [C2] company examines the value offer the idea yields to either the customer in the market (track 1) or to the internal system or user within the company (track 2).

The fourth criterion differs between the two tracks. For new business (track 1), the criterion is business model. The decision-makers evaluate roughly if the business model is realistic. "*We examine the business model, what will break even, and ROI be, is there a plausibility in this business model, in this business assumption?",* the interviewee describes. When it comes to optimization (track 2), the criterion is the solution. Here, decision-makers evaluate if they believe in the solution which the idea is built upon, more specifically if it is realistic. The fifth criterion is common for both tracks, that is the team. Within this criterion, decision-makers evaluate the team behind the idea, whether they have the drive to implement the idea and take it to market or not. Testability, the sixth criterion, is also common for the tracks. The criterion concerns the amount of resources needed to try out a first minimum viable product (MVP).

The seventh criterion, scalability concerns if the idea is a solution which is fully scalable or is limited by people or market. The eighth criterion, market size, is a shared criterion for decision-making in the two tracks. The criterion considers the size of the market, which is often linked with if it is for the public- or private market. The [C2] company's capacity, the ninth criterion is common for the two tracks and relates to the company's ability to pull through the idea on their own or if they need partners to realize it.

The tenth criterion aims to evaluate of the time schedule and budget is realistic. In the eleventh criterion, the wow factor, decision-makers evaluate whether if the idea will gain internal and external support or not. Further, decision-makers also determine if the idea will contribute to increase the brand value. Finally, the twelfth criterion differs for the two tracks. For new business (track 1) the criterion is competitive situation. This criterion involves how many players there are in the market and if there are similar products in the market. For optimization (track 2) the criterion is implementation plan. Here, decision-makers evaluate how many in the organization that will be able to use the idea the ideas.

Program	**Track 1. New Business**	**Track 2. Optimization**
Criteria	1. R&I strategy alignment 2. Customer need 3. Value proposition / solution 4. Business model 5. The team 6. Testability 7. Scalability 8. Market size 9. The [C2] company's capacity 10. Time schedule & budget 11. Wow factor 12. Competitive situation	1. R&I strategy alignment 2. User need 3. Value proposition / efficiency factor 4. The solution 5. The team 6. Testability 7. Scalability 8. Market size 9. The [C2] company's capacity 10. Time schedule & budget 11. Wow factor 12. Implementation plan

Table 14. Summarization of the [C2] company's criteria in track 1 and track 2. Compiled by the authors.

4.2.2.3 Determining the Valuation of Criteria in the FEI

When it comes to innovation, the [C2] company recognizes that a decision-maker always needs to handle risk and the situation where not all the facts are on the table. The [C2] company recognizes that there are limitations in resources when evaluating early-stage innovation projects, which results in difficulties to, for example, make financial calculations and to fully anchor valuation of criteria in the reality. When discussing determining the valuation of criteria the interviewee states that, "*There is an evaluation in realistic terms. Sometimes it's harder, especially when it comes to more radical innovation, which is fairly difficult to assess"*. With the citation, the interviewee explains that when determining the valuation of criteria, it's a question of determining whether it is realistic or not. When it comes to radical innovation, the [C2] company make use of gut feel. Gut feel can be used to determine whether a problem is a true pain for the customers or not, and to estimate whether the solution meets the problem. The interviewee explains, "*If you truly have a problem which you solve, then you have come pretty far"*. The [C2] company believes that, if they have that approach, then there is often money behind the idea.

Furthermore, when decision-makers determine the valuation of criteria, it is a question of determining if the pitch (second evaluation) is trustworthy or not. The idea generator(s) assess the criteria and, the decision-makers determine whether they are credible or not. When pitching, the idea generator(s) needs to sell the idea internally. "*Can you sell it to decision-makers internally here, then you might be able to sell it externally later"*, the interviewee explains. The determining of valuation of criteria is done subjectively and, is then judged by the decision-makers in the second decision-gate who reaches a final valuation of criteria.

Further, in the two tracks, you want to anchor the idea with customers all the time, so you have a connection to the reality. The [C2] company wants to ensure that they meet a need on the market, not just make developments within technology without having the link to the customers. When discussing around assumptions and anchoring them with data, the interviewee argues, "*Do we have a number of customers who believe in an idea, who speak greatly about the idea and even can commit to the idea and be part of the development, then it becomes a stronger argumentation"*. The valuation of criteria is determined by a mix of facts and judgements. Furthermore, assumptions should be anchored as much as possible in the market. "*Show a clear upside by showing that it is a problem today",* the interviewee describes. The longer the idea travels in one of the tracks, the more the [C2] company turns to results from tests they have done with customers.

4.2.3 [C3] Real Estate Company

4.2.3.1 The Setting in the FEI

Currently, the [C3] company is creating a foundation and a platform for innovation. The foundation aims to shape a common perspective on innovation from top management. There is an ongoing work at the [C3] company to gather digital initiatives, since most of the developments are of digital character. Hence, the [C3] company is undergoing a digital transformation. The [C3] company has left a previous top-down model where the top identifies what will be prioritized during the next business plan period. Instead, the [C3] company tries to shift to a mindset where they operate

iteratively and with more short-term innovation projects. The shift involves moving down the decision-making to those working with the development, however this is in a developing stage.

The [C3] company differentiates between regular investment projects where they can calculate the investment and innovation projects where such calculation is not possible. Moreover, the [C3] company do not have a standard framework for every kind of innovation project. Furthermore, the [C3] company do not have a matrix for how to evaluate the criteria against each other and the [C3] company do not have any formal weighting for the criteria. Rather they have more of a prioritization of what resources the [C3] company have in order to meet challenges.

4.2.3.2 Criteria Employed in the FEI

The [C3] company defines innovation by saying that it should create new value for people, for example by creating a new product, service or system. Hence, the [C3] company examines if value is truly delivered and to whom. Different kind of innovation projects are treated differently depending on type of project, but it is always based on the mindset of value creation. The interviewee exemplifies, "*Either you have a more disruptive agenda where you might push out a new technical solution and test it iteratively and do your sprints. But there is also another type of innovation which is more long-term, for example it can be changes in systems, then it's more about lobbying and that we are in the long-term innovation project by trying to put forward changes in law or try to give input to municipalities when they create their detail plans".*

The [C3] company's scope for all innovation projects is sustainability, more specifically social, environmental and economical sustainability. The interviewee explains, "*It is also the long-term idea that if we truly focus on sustainability, then this will also be positive for our business"*. The scope, namely the three different types of sustainability, operates as overarching criteria. See Figure 7 for an overview of the [C3] company's overarching criteria and examples of criteria. An example of a criteria for the environmental sustainability can be energy consumption. Examples of criteria for social sustainability are results in schools in the area, how pleased the tenants are in terms of safety, cleanliness and, if they feel that they are listened to.

One criterion is increased usage, which can involve both existing services and newly developed ones. Another possible criterion is a better user experience. Then the [C3] company can evaluate the customer journey and investigate what parts of this they want to improve. More specific improvements or criteria which the [C3] company can examine within the user experience is criteria such as that the user barely notice the process (seamless), how safe the user feels in the process (safety), how well informed the user feels (degree of information), whether the user is happy or not (mood) or, more in general if the experience is good (general experience). A further criterion partly concerns how complex the value will be in terms of delivering the project (complexity in delivering). The interviewee further explains, "*If it's a lot of actors involved, for example in system changes, we are a small part, however it can have large impact on our business in the long-term. While if it's just us, our tenants and our development department, then it's a totally different complexity".* The citation offers another type of explanation to complexity in delivering, namely when there are larger projects and more actors are involved.

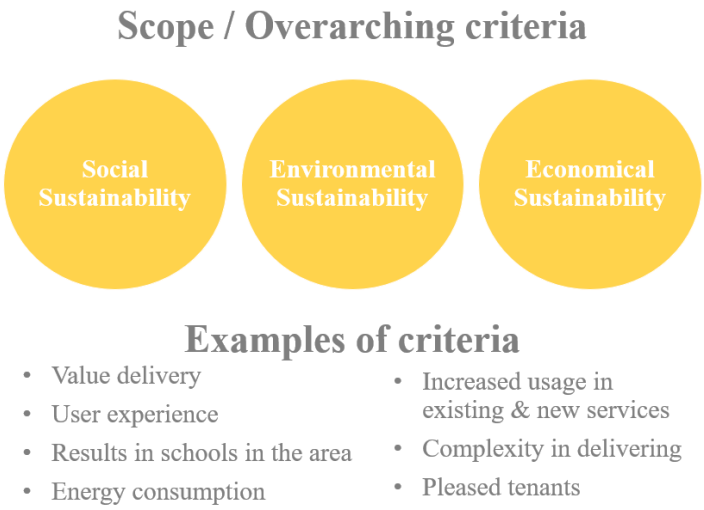

Figure 7. An overview of the [C3] company's scope and examples of criteria. Compiled by the authors.

4.2.3.3 Determining the Valuation of Criteria in the FEI

As mentioned above, the [C3] company differentiates between regular investment projects where they can calculate the investment and innovation projects where such calculation is not possible. Moreover, the [C3] company recognize that they can either make use of qualitative or quantitative data men determining the valuation of criteria which will be further discussed below.

Starting with the qualitative data, there are several methods which the [C3] company can use to gather such data. These methods are for example in depth interviews and observations and, from these interviews the [C3] company can make assumptions. The [C3] company believes that if they can deliver value in criteria, they are able to ask the user the question if they have a willingness to pay for a service. By examining the willingness to pay, the [C3] company aims to investigate what an idea can yield in terms of revenue. In that case, the [C3] company has anchored their criteria by creating data. When determining the evaluation for how happy the tenants are in terms of safety and if they are listened to, then the [C3] company evaluate by using subjective data, hence creates their own data by for example in depth interviews. Qualitative interviews can contribute with insights that the [C3] company can turn into for example a product. "*Then you evaluate from a deeper understanding about human behavior and after you use the insight, turn it over and choose whether we will continue or not"*, the interviewee explains about making use of their own qualitative data.

In terms of using quantitative data to determine the valuation of criteria, the [C3] company acknowledge that they do not always have that type of quantitative data available today due to lack of users to extract the data from. Further, when measuring quantitative data, the [C3] company believe in combining it with qualitative data when evaluating. The interviewee explains, "*Let's say that we see an increase in usage in something, then we want to know why there is an increase in usage. […] Then we need to understand if it is something that we have done or if it is something external, so it is always best to combine the two"*. However, combining the two approaches requires resources that the [C3] company not always are able to allocate all projects.

4.2.4 [C4] Defence and Security Company

4.2.4.1 The Setting in the FEI

The [C4] company has an external innovation lab where all emerging ideas are taken care of. The mission is for example to try new technologies and ways of working, work as an enabler for employees with ideas, spread knowledge and to be the place where innovation at the [C4] company happens. The innovation lab aims to discover one or two ideas per year. To succeed, the [C4] company needs to receive a relatively high amount of ideas, the interviewee explains, "*We think that, if we get 100 – 200 ideas to the lab, we will get one or two brilliant ideas*".

The [C4] company describes their innovation process as a funnel constituting of six steps. The external innovation lab manages the first four steps, then the idea moves into the central organization. This thesis will include the first four steps of the funnel, since they contribute to the purpose of the thesis. For an overview of the funnel see Figure 8. The first step of the funnel is to find ideas. Ideas are found somewhere in the organization by the innovation lab when individuals working at the lab are networking with other functions. The [C4] company also has a webpage where employees can submit ideas. No ideas are rejected at this stage of the innovation funnel.

Step two of the innovation funnel is to understand the idea. When the innovation lab of the [C4] company receives an idea, they start by developing deep understanding for what the person with the idea has in her or his mind. In order to understand ideas, a process with the purpose of clarifying certain aspects is deployed in the innovation lab. This process will be further described in the next section. A part of this step is also to clarify what expectations the person with the idea has on the innovation lab. Expectations can range between making an initial study within the field of the idea to come up with a prototype.

The third step of the innovation funnel is to test the idea. After the idea is fully understood, the innovation lab team helps the person with the idea to test it in different aspects. The team testing the idea are diverse with different competencies. Experts throughout the [C4] company are contacted if their knowledge is needed in the testing phase. It is not possible to test all ideas that the innovation lab receives. The gut feel of the leader of the lab is mainly what determines which ideas that will be prioritized and tested. However, if the novelty of an idea is extremely high, gut feel will not be appropriate. In such cases, the [C4] company doesn't have any other method of determining how the idea will be prioritized and tested, even an idea may be tested anyway. In an idea are regarded as truly physically complex, the idea may end up with being abandoned.

Step four of the innovation funnel is to sell the idea. The interviewee describes this activity as following "*We help people to test their ideas, then we package the idea in a good way that makes it possible for us to sell the idea to the organization"*. The lab does not own the idea or the results of it, the person who came up with the idea is the owner. However, the lab will help the person with the idea to talk with potential product owners, project managers and so forth. Here, the idea is to some extent financially assessed by individuals with relevant expertise.

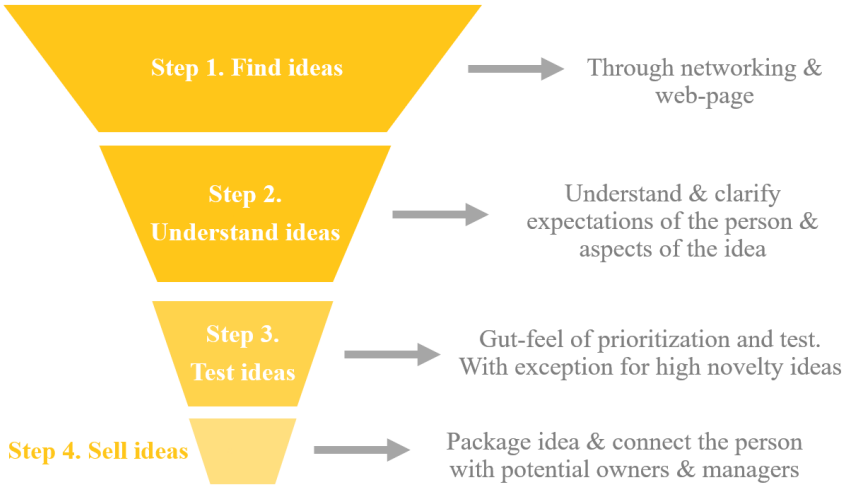

Figure 8. An overview of the [C4] company's innovation process in the FEI. Compiled by the authors.

4.2.4.2 Criteria Employed in the FEI

Step two of the innovation funnel is to understand the idea. In order to understand ideas, a certain process is deployed in the innovation lab. The process helps to examine several criteria of the idea. These criteria are summarized in below Table 15. The first criterion concerns customer value. Customer value aims to evaluate if the idea can impact a potential customer positive, hence, make the customer willing to buy outcome of the idea. In order to determine the customer value, advantages and disadvantages are reviewed.

Following criteria regards technology, business, process and function. In terms of these criteria, the person who owns the idea needs to choose and clarify if the idea concerns a technical innovation, business innovation, process innovation or functional innovation. Following criteria, namely people, performance and portfolio, are derived from the [C4] company's own values. Within these criteria there evolve a discussion around if the idea will make it easier for us to work, will make us more efficient or contribute to a better offer for the customer. These criteria, namely "technical innovation, business innovation, process innovation or functional innovation" as well as "people, performance or portfolio", are the ones which truly yields an understanding of what kind of idea the [C4] company have in front of them. The [C4] company acknowledge that they ask same question twice, but with a little difference, to yield an understanding of the idea. Lastly, the [C4] company explains, "*What's important here, is not where the dot end up, rather the discussion you have when you try to sort out this. When you are forced to choose corner, then you must analyze it in your head, in order to reach what you actually wants"*. This citation yields an understanding of the importance of the discussion rather than what score or dot the idea receives.

Next criterion to address is to clarify who benefits from the idea. Whom benefits can for example be if the idea will generate profit or make it easier for the [C4] company to for example collaborate. For the innovation lab to decide how to manage the idea and for the person with the idea to express expectations on the innovation lab, time, scope and quality is discussed. The criteria of time, scope and quality is discussed based on the complexity of the idea. Within this criterion, the external lab

exemplifies by delivering a prototype which is complex. In such a situation, the external lab needs to cut in either time, scope or the quality. Speed (time) is essential at the innovation lab, which is why the time criterion is considered as the most important one, relative to scope and quality. The decision depends upon who that will view the prototype. On one hand, if it is a prototype for internal use, then the external lab might cut on quality and go with time and scope.

Step 2	Criteria
Understand ideas	Customer value Technology, business, process & function People, performance & portfolio Whom benefits Time, scope & quality

Table 15. Summarization of the [C4] company's criteria in step 2. Compiled by the authors.

4.2.4.3 Determining the Valuation of Criteria in the FEI

In order to enhance the understanding for an idea, the person with the idea is asked questions by the innovation lab related to the criteria above. An initial evaluation of an idea happens when these questions are answered. The questions are often answered by a discussion and all criteria are investigated by the owner of the idea (the person who came up with the idea) together with employees at the innovation lab. Individuals employed at the innovation lab have different kinds of expertise, but it is also possible to reach out to the rest of the of [C4] company as well as to external contacts if additional expertise is needed. Hence, the aim of step two of the innovation funnel is both to understand the idea, but also to make an early evaluation of the idea.

Even though the process of understanding the idea at the [C4] company serves as a way of making an early valuation of the idea, ideas are never rejected by the innovation lab at this stage. The interviewee explains "*I have never told anyone that this is a bad idea, you better take it back. Those times it has happened, it is the persons with the idea themselves that realize, "guys let us not do this, I am not really sure what I want"*". Hence, if understanding of the idea is lacking after the second step of the innovation funnel, they may not proceed in the innovation funnel. The interviewee describes, "*The good ideas will survive these discussions. The discussion can be tough, so those to make it through them and still want to do it, they have something valuable*".

In the fourth step of the innovation funnel, sell the idea, the idea is to some extent financially assessed by individuals with relevant expertise. Hence, if information is lacking, internal expertise of the [C4] company or external expertise is used.

The interviewee describes the attitude of the [C4] company towards the usage of assumptions as positive. The major underlying reason for attitude against assumptions early in the innovation process may according to the interviewee be the fact that the early stage is managed by the external innovation lab of the [C4] company. Since the lab has its own budget and is decoupled from the rest

of the [C4] company, the choice of what ideas to bet on do not initially affect the rest of the organization.

The employees of the innovation lab are performing extensive research at search engines and platforms such as Google, if additional information is needed. In early phases of the innovation funnel, assumptions are frequently used to make evaluations. However, the objective is to generate data that can be used in order to make decisions in later steps of the innovation funnel. Hence, assumptions are successive replaced by data that is possible to generate as ideas are getting more concrete. As mentioned above, the attitude of the [C4] company towards the usage of assumptions for early-stage innovation projects is positive and the interviewee explains that data and financial estimation are not required until in later steps of the innovation funnel where data will be available.

4.2.5 [C5] Industry Tools and Machine Company

4.2.5.1 The Setting in the FEI

The [C5] company uses a selection model to compare early-stage innovation projects with each other in order to decide what suggestions and initiative to execute. For an overview of the idea selection process, see Figure 9 below. The [I1] respondent explains why a selection model is needed at the [C5] company with "*It has always been, and hopefully it will continue to be like that even in the future, that we have more ideas than what we can realize, so that's why we have to choose*". The [C5] company has a project system with a large amount of information regarding targeted segments, what current product to replace and so forth. Information from this platform is used as input in the selection model. The purpose of using the same selection model for all ideas is to harmonize the way of evaluating ideas and make ideas comparable. The [I2] explains, "*This is not a contest, but it will help us to allocate resources.*" If an idea gets prioritized in the selection model, it becomes subject to a pre-study, before it develops to a real project.

The purpose of innovation projects at the [C5] company is often to replace something else, which is why the [C5] company aims to establish an overall understanding for the effects of the project on the organization. The [C5] company has a formal set of overarching criteria for idea evaluation which is applied to all ideas. Further, the [C5] company is working with different weightings on criteria in order to make them relatively important. However, even though the criteria are allocated standard weights, these standard weights are possible to change fast if needed. Reasons for changing relative importance of criteria are rooted in changes in the external environment, such as when a financial crisis takes place. The [C5] company aims to be dynamic when reviewing and determining the value of criteria. Concerning criteria related to strategic fit, the [I1] interviewee means that strategic implications will change over time and emphasizes the importance of both recognizing and considering trends when evaluating ideas.

Criteria are allocated different standard weightings which can be subject to change if needed. Today, financial criteria are of relatively high importance, the [I2] interviewee explains, "*Somehow we need to make an estimation about what this is going to generate, even in an early-stage and even if it becomes more of a best guess*". Moreover, the [C5] company strives to be positioned as market

leader, rather than a fast follower. This aim has resulted in an indirect valuation of the possibilities to get the idea protected by intellectual property (IP)

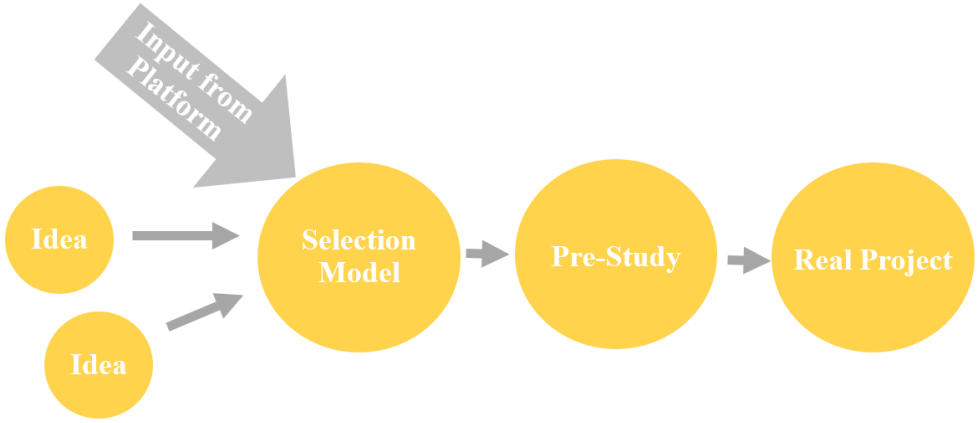

Figure 9. An overview of the [C5] company's innovation process in the FEI. Compiled by the authors.

4.2.5.2 Criteria Employed in the FEI

The four main criteria are financial return, strategic fit, commercial opportunity and project risk. These criteria and examples of sub-criteria to each are summarized and presented in below in Figure 10.

First, within the main criteria the financial return, the [C5] company examine four criteria. The [C5] company examine return on investment (ROI), time to market, total addressed market potential and, spin-off / adjacent areas. Time to market addresses how long time it will take for the early-stage innovation project to be launched in the market. Total addressed market potential is the market which the [C5] company potentially can address by the idea. Lastly, spin-off / adjacent market concerns whether the idea will access the [C5] company's adjacent market or create spin-offs which can be launched.

The second main criteria, strategic fit, concerns whether the idea relates to the [C5] company's innovation strategies. These criteria are namely, support digitalization, support prioritized industry sub-segments and, maximize sustainability.

In the third main criteria, commercial opportunity, the [C5] company involves criteria such as degree of competition, commercial readiness level and, estimated differentiation by customer impact. The degree of competition considers whether there are many or few actors who compete in the market. The commercial readiness level can be examined with two perspectives. First, with an external perspective the criterion can evolve in whether the customer is ready for the idea or not. Second, with an internal perspective the criterion can examine whether the [C5] company are ready to commercialize the idea today or not. Further, the [C5] company involves the criterion estimated differentiation by customer impact. By examining the differentiation in relation to the customer the [C5] company examine how unique a product or service is to the customer.

The fourth main criteria, project risk, concerns the two criteria technical complexity knowledge and technical complexity production. These two criteria examine whether the [C5] company have the knowledge of the technology and if the [C5] company can produce the technology.

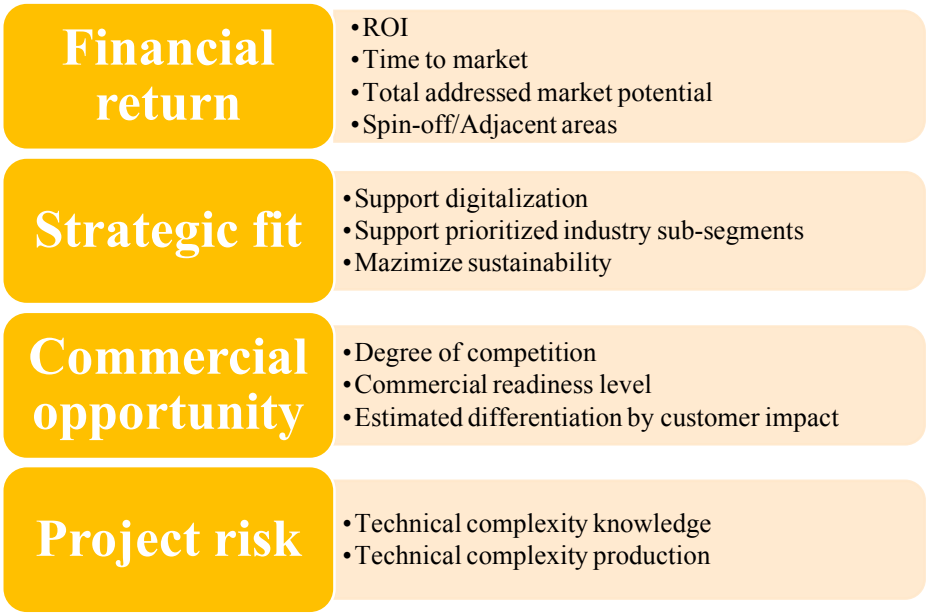

Figure 10. A summarization of the [C5] company's criteria. Compiled by the authors.

4.2.5.3 Determining the Valuation of Criteria in the FEI

In the [C5] company, both data and assumptions are used to make estimations of criteria in early phases of innovation projects. In order to be able to employ the selection model, a certain amount of information and knowledge around the idea is needed. The [I1] interviewee explains that this knowledge is something that individuals gather over years. To make an estimation of a criterion such as expected sales volume, the potential innovation project manager is working together with a product manager of a similar product. By analyzing the sales volume of the similar product as well as overall market trends, estimations are done. Further, the organization are quarterly provided with centrally administered reports of relevant market trends for each segment. When an idea becomes subject to a pre-study and are viewed as an actual project, forecasts and estimates need to be validated. However, assumptions in early stages are still backed up with data from similar projects as well as knowledge of experienced employees. The [C5] company is actively trying to make use of the internal competencies and knowledge to make estimations as well as verify them.

Today, so called "market insights" are generated from market representatives of the [C5] company. The market insights are today barely backed with data, which according to the [I1] interviewee would be desirable. However, both [I1] interviewee and [I2] interviewee recognize that it is not possible to be fully driven by data. The reasons why is since the [C5] company aim to be positioned as market leader in its industry, rather than a fast follower, which requires the [C5] company to take a certain amount of risk in terms of using assumptions as well as data to back up decisions with. The [I2] interviewee emphasizes the importance of a healthy balance between data and assumptions by

explaining, "*If you just would use data, no humans would be needed. On the contrary, then it would just be wild guesses. So, we need the balance between both, we need both.*".

4.2.6 [C6] Project Development and Construction Company

4.2.6.1 The Setting in the FEI

Different kinds of innovation projects are treated differently at the [C6] company. If the project regards how to make current business better in the future, it is called a development project. If the project aims to change the way the [C6] company doing business, the project is referred to as an innovation project and is subject to evaluation through certain criteria. The interviewee describes the innovation process of the [C6] company as a funnel which is broad in the beginning. The closer the project moves to implementation, the thinner the funnel and the more detailed description of the project is available. However, there is no detailed process for how to deal with innovation projects. The reason why, is described by the interviewee to be the high level of differentiation of projects. Early-stage innovation projects at the [C6] company are described by a one-pager. The description of the one-pager is written by the idea generator(s). The content of the document is based upon certain criteria that are stated in advanced, these criteria is outlined in below Table 16 and further described in next section. The one-pager is complemented by a sub-document where the idea generator(s) describes more in detail their own reasoning around why.

The decision-makers who are evaluating early-stage innovation projects are representing different functions of the [C6] company. These individuals embody an innovation-board which the individual or group with an idea brings the idea to. The purpose is to decide if the project can meet the criteria to the extent that is considered as expected in an early stage. The decision-makers of the innovation board are constituting of both internal functions at the [C6] company and external individuals. The external individuals represent for example a financial perspective and a sustainability perspective. The [C6] company make use of the decision-makers competence in the early stages. Before project teams bring ideas to the innovation-board, they are provided with information regarding what criteria the board will evaluate the idea on. Individuals with ideas often belong to one function of the [C6] company, hence, have competency within that function, but may lack competencies which other functions possess. The interviewee portrays it as, "*If you are from the technical side, you are great at it, but you may lack knowledge and focus of the business side or the customer. Then we will help and support so that the person gets the right conditions to think about all these aspects*".

4.2.6.2 Criteria Employed in the FEI

The [C6] company employs mainly non-financial criteria to evaluate innovation projects in early phases. The innovation project is subject to the same main criteria throughout the whole funnel described in the earlier section. The five main criteria are related to strategy, value for customer & partners, value for the [C6] company, uniqueness and producibility. Regarding strategy, the criterion examines if the project is connected to the overall strategy of the [C6] company, both in short-, medium- and long-term. Concerning the criterion value for customer & partners, the [C6] companies considers if the idea would yield value for its customer and partners. Next criterion, value for the [C6] company, includes the value for the [C6] company such as improved sustainability, but also the

monetary value. The value in monetary terms gets more prominent as the project matures. The reason why is described by the interviewee to be the complexity of quantifying and making financial assessment of early-stage innovation projects, hence the [C6] company has decided to avoid financial criteria for evaluation in the initial part of the innovation process. Uniqueness describes how unique the project is. The [C6] company explains, "*What kind of uniqueness is there within this initiative?"*. Lastly, producibility regards if the projects are considered as doable.

	Criteria
One-pager	Strategy Value for customers & partners Value for the [C6] company Uniqueness Producibility

Table 16. The [C6] company's criteria in the one-pager. Compiled by the authors.

4.2.6.3 Determining the Valuation of Criteria in the FEI

As already mentioned, different functions of the [C6] company are represented by the innovation-board when early-stage innovation projects are evaluated. The variety of competencies of the innovation-board is described by the interviewee as particularly important to make use of in early phases. The value of the project is determined by a joint discussion between the innovation-board and the individual or group with the idea. The discussion is based on the criteria of the one-pager. After all criteria are discussed, they are marked in green, yellow or red, depending on how well the project satisfies the expectations of each criteria. Green implies that the expectation of the criterion is entirely met, yellow indicates that the criterion is met at an acceptable level and red states that the project does not meet the expectations. When all criteria are evaluated, a joint valuation of the project is made in order to determine if the projects should proceed to the next phase of the innovation process or not.

The innovation-board is not determining the valuation of criteria in terms of numbers. Regarding putting numbers on criteria, the interviewee describes it as "*If you have a feeling for it, then it is good to highlight it, but we do not require it, at least not in a very early-stage*". The [C6] company is making a lot of assumptions in order to determine the valuation of criteria. For example, a project's positive impact on climate is difficult to put an actual number on, but it can still be highlighted and discussed. The individuals who are responsible to manage the project are the ones who are making assumptions; however, these assumptions are later judged by the innovation-board. The board does also support the team with their expertise and advice regarding what to focus on and what to investigate further. If external competence is needed, it is brought in to the [C6] company.

Further, the interviewee views assumptions as beneficial since it is possible to execute even in early phases. The interviewee declares, "*Should you make it with data, then you should have nothing to make the analysis on and base the decision on*". Hence, an advantage is that the [C6] company can

move forward in the innovation process if analysis and decisions can be based partly on assumptions. Regarding disadvantages and limitations with assumptions, the interviewee says, "*The disadvantage is that it gets a bit more subjective than objective. It gets more dependent on the competence of the ones that are making decisions*."

As mentioned above, criteria are marked with green, yellow or red when evaluated. Red implies that a criterion is not fully met, hence particularly important to focus on during the next phase of the innovation project. Sometimes, the individual or group with the idea need to go back and collect more information and then come back to the innovation-board.

5. Analysis

This chapter analyzes the empirical data derived from case companies against the literature review of this study as well as the empirical data derived from the expert interviews. Further, the chapter compare case companies with each other in order to contribute to fulfilling the purpose of this study. The first section of the chapter will analyze empirical data related to the first of the two sub-questions. Following this, empirical data that can be linked to the second sub-question will be analyzed.

5.1 What criteria can be employed when evaluating early-stage innovation projects in large enterprises in Sweden?

Five out of six case companies are employing predefined specific criteria when decision-makers evaluate early-stage innovation projects. See Table 17 for a list which depicts which case companies employ specific criteria and which one who does not. In the literature review it was found that decision-makers at large enterprises in Sweden can employ either specific or holistic criteria or both when evaluating early-stage innovation projects. The two criteria have their differences, however what clearly distinguished the two was the fact that the specific criteria were predefined, and the holistic criteria were not predefined (Magnusson et al., 2014). There is an exception to the rule, and that is when specific criteria are employed in the holistic evaluation, then the specific criteria are not predefined (Ibid). From here on, when using the term specific criteria this implies that these are predefined, unless other is stated. Following section will compare specific criteria highlighted by literature with the empirical findings of both case companies and experts. Afterwards, the case company not employing specific criteria will be analyzed against what criteria the expert perspective suggest that decision-makers at large enterprises can employ. The case company will not be analyzed against literature, since literature have solely contributed with criteria which are predefined specific criteria. The expert perspective outline criteria that will be compared with all the case companies, both those employing predefined criteria and the one not employing predefined criteria.

	Case Companies
Employ specific criteria	[C1] Nordic Telecommunications Company [C2] Infrastructure, Building and Urban Planning Consultant Company [C4] Defence and Security Company [C5] Industry Tools and Machine Company [C6] Project Development and Construction Company
Do <u>not</u> employ specific criteria	[C3] Real Estate Company

Table 17. A list separating case companies who employ specific criteria, to the one who does not employ specific criteria. Compiled by the authors.

5.1.1 Comparing Specific Criteria Highlighted by Literature with Empirical Findings

The literature review revealed that several specific criteria can be used when decision-makers at large enterprises in Sweden evaluate early-stage innovation projects. However, Goffin and Mitchell (2017) recognize that there is no best practice regarding what specific criteria to deploy. This creates relevance for the comparison of what specific criteria the literature review highlights with the specific criteria brought up in the empirical data from the case companies. Also, the expert perspective is included in the comparison since they contribute with a new perspective on the use of certain criteria. The comparison yields an understanding of what specific criteria the literature highlights to the specific criteria that are applied in practice by large enterprises in Sweden. The comparison further reveals what criteria that today's scholars discuss in relation to the specific criteria highlighted by literature and specific criteria applied in practice. Table 18 below demonstrates the overarching specific criteria that were highlighted in literature and how it connects to the empirical data (For the compilation of overarching specific criteria from literature, see Table 9 in section 2.4.3). The authors of this thesis have enclosed their detailed compilation of below Table 18 in Appendix 5.

Determining the Valuation of Criteria Comparing Literature with Empirical Data from Case Companies & Experts						
Overarching Specific Criteria	**[C1]**	**[C2]**	**[C4]**	**[C5]**	**[C6]**	**[E1-E6]**
Competitiveness		X		X		
Customer	X	X	X	X	X	X
Feasibility	X	X	X	X	X	X
Financial	X	X	X	X	X	X
Market	X	X		X		
Portfolio						
Strategy	X	X		X	X	X
Technology				X		X
Time		X	X	X		
Other	X	X	X	X	X	X

Table 18. A comparison of specific criteria highlighted by literature with specific criteria applied in practice and those discussed by experts. Compiled by the authors.

According to this study, the comparison of Table 18 reveals that some specific criteria highlighted by literature, are more applied in practice than others. What especially stands out is that none of the case companies employ specific criteria related to portfolio, meaning that none of the decision-makers at the case companies are employing criteria to evaluate the early-stage innovation projects in relation to the innovation portfolio. Further, neither the experts discuss the overarching criteria portfolio. Moreover, most of the case companies employ specific criteria connected with the overarching specific criteria customer, feasibility, financial, market, strategy, time and other. These will be further analyzed one by one in below sections.

5.1.1.1 Overarching Specific Criteria Customer

Five out of five case companies employ specific criteria which are connected to the overarching specific criteria customer. On one hand, the literature reveals specific criteria such as customer benefit (Goffin & Mitchell, 2017; Paulson et al., 2004) and customer relations (e.g. Paulson et al., 2004; Koen et al., 2002). On the other hand, the [E1] expert suggests that a large enterprise should apply a user value perspective. This is supported by other experts, whom also suggest user value to be an appropriate criterion to employ (e.g. [E5] expert; [E6] expert). Nevertheless, the [C2] company includes both customer and user. Both in terms of criteria such as customer and user need as well as value proposition / solution or efficiency factor. Hence, the [C2] company include both the customer which the literature highlights, as well as the user, which the expert perspective highlights. The [C6] company further includes partners, namely value for customers & partners in their set of specific criteria. The partner perspective differs from both what the literature and the experts highlight. The [C5] company consider the commercial readiness level, which with an external perspective can evolve in whether the customer is ready for the idea or not. Furthermore, the [C1] company recognize the risk of that large enterprises can lose focus of what value an idea creates for the customer, and hence emphasize the importance of their criterion value. Moreover, the [E4] expert emphasizes that a good idea is an appropriate solution to a relevant problem and that the criterion user value can be a measure of it. Further, the [E4] expert recognizes that such criterion is needed when evaluating early-stage innovation projects. Dean et al. (2006) describe that the quality of an idea is how well a proposed solution is solving a defined problem. Thus, the user value criterion can be viewed as supported by Dean et al. (2006) who recognize the importance of the solution to the defined problem.

5.1.1.2 Overarching Specific Criteria Feasibility

All case companies that are employing specific criteria are employing such specific criteria related to feasibility. The literature review uncovers a variety of specific criteria within feasibility. Such specific criteria are for example technical feasibility (e.g. Koen et al., 2002), team and internal network (e.g. Paulson et al., 2004) and, organizational infrastructure (Rochford, 1991). These are supported by the expert perspective, who recognize the importance of considering the criterion producibility (e.g. [E3] expert; [E5] expert). The [E3] expert and the [E5] expert describe producibility as how difficult or easy it is to realize the idea. Regarding the case companies, the label of their specific criteria differs and may also differ slightly in their meaning to the companies. To exemplify, the [C2] company employ the criterion the [C2] company’s capacity, which entails

whether the company can realize the idea in terms of capacity or not. Further, the [C1] company employ the criterion scalability and the [C6] company employ producibility. The [C6] company entail that their criterion producibility refers to if the project is doable or not, which is supported specifically by Rochford (1991) with the criterion is the project "do-able"?. Moreover, the [C5] company employ commercial readiness level, which with an internal perspective examine whether the [C5] company are ready to commercialize the idea today or not, hence if the idea is feasible. Further, Dean et al. (2006), suggest that the solution needs to be possible to implement for the idea to be of high quality. This supports that all case companies consider the overarching specific criteria feasibility, which involves whether an early-stage innovation project can be implemented or not.

5.1.1.3 Overarching Specific Criteria Financial

In the literature, financial specific criteria are mentioned such as expected sales volume (e.g. Goffin & Mitchell, 2017), expected profitability (e.g. Paulson et al., 2004) and investment required (Rochford, 1991). Regarding profitability, the [E4] expert argues that financial criteria such as profitability often are unconsciously considered even though innovation literature suggest it as inappropriate in early stages of the innovation process. However, as this section will present, all case companies employ specific criteria relating to profitability in some way.

The [C1] company recognize that they rarely speak about financial criteria. However, the [C1] company also acknowledge that there can be a pressure for financial criteria, such as ROI, when it is time for decision meetings and eventually such decision meeting need to be held. This is partly supported by the [E6] expert's impression that large enterprises can aim to employ financial criteria because it is easy to communicate to others in the organization and to achieve buy-in. However, emphasis is put on the fact that the [C1] company doesn't aim to employ financial criteria, but because of the advantages to achieve buy-in during decision-meetings it can't be ignored. Furthermore, the [C5] company has ROI as a specific criterion for evaluating early-stage innovation projects. Moreover, the [C2] company evaluates early-stage innovation projects based on the criterion business model. Within this criterion, the decision-makers evaluate roughly if the business model is realistic, including examining break-even, ROI and the plausibility. All three case companies, namely the [C1] company, the [C2] company and the [C5] company, seems to employ ROI, unwillingly or not.

The [C4] company employ the specific criterion whom benefits. The [C4] company explains that this criterion can involve whether the idea will generate profit or benefit the [C4] company in whole. The [C6] company employ a similar specific criterion, namely value for the [C6] company. This criterion could include value in terms of the monetary value or in terms of an improvement in sustainability. Potentially, one can view these criteria as that the decision-maker have a choice whether to evaluate the projects more broadly, thus if they yield value to the companies in whole, or specifically, if they will generate profit. In connection to this, the [E5] expert explains that if a large enterprise starts employing financial criteria too early there is a risk of decision-makers killing ideas which they do not properly understand. Moreover, several experts consider financial criteria to be more appropriate if the idea is of incremental nature ([E1] expert; [E2] expert; [E5] expert). Another take on the subject is that the [E1] expert concludes that decision-makers can use financial criteria where they

have repetitive innovation projects. By having such specific criteria which can be evaluated both in terms of general value to the company and specifically in terms of profit, a decision-maker can choose evaluation depending on the idea. Consequently, this would not yield a situation where financial criteria are the reasons why ideas are being killed for not being properly understood.

Lastly, the [E2] recognize that the cost of realizing a project can be assessed as a specific criterion by large enterprises. This type of criterion can be found in the [C2] company, with the label time schedule and budget. Within this criterion, the [C2] company assess whether the budget for an early-stage innovation project is realistic or not.

5.1.1.4 Overarching Specific Criteria Market

The literature reveals that several specific criteria within the market can be used. In comparison to specific criteria applied in practice, the literature contributes with more specific criteria. Thus, it can be argued that literature consider market as important in evaluating early-stage innovation projects. However, no expert highlights using criteria for market, suggesting that the experts of today might not think of it as significant to the same extent as literature.

Within this overarching criteria, three out of five companies are employing specific criteria. One specific criterion which the literature suggests is market size and growth (e.g. Goffin & Mitchell, 2017; Rochford, 1991). The [C1] company employ the criterion market value and the [C2] company the market size. Another type of specific criterion which can be related to market size but with an internal perspective is implementation plan, which is employed by the [C2] company. Within the criterion the implementation plan, decision-makers at the [C2] company evaluate how many in the organization that will be able to use the idea, thus the internal market size. Further, the literature highlights the use of the criterion potential market share (Paulson et al., 2004; Koen et al., 2002). The [C1] company employs two specific criteria relating to potential market share, specifically attractiveness and potential to address a market. Regarding the attractiveness, the [C1] company exemplifies by considering number of customers possible to onboard in a service. Further, the [C2] company evaluates the specific criterion scalability, which involves whether the idea is a solution which is fully scalable or limited by people or market. Thus, by examining how much the [C2] company can scale in terms of market, the [C2] company includes the potential market share as highlighted by literature. The [C5] company also addresses the potential market share by employing the specific criterion total addressed market potential. Lastly, the [C5] company employ another specific criterion within market, that is spin-off / adjacent areas which is also highlighted by literature as access adjacent markets (Paulson et al., 2004).

5.1.1.5 Overarching Specific Criteria Strategy

The literature uncovers four potential specific criteria to employ with regards to strategy. These are strategic fit (e.g. Goffin & Mitchell, 2017; Rochford, 1991), positive impact on brand image (Goffin & Mitchell, 2017), impact on strategy (Paulson et al., 2004) and, enhance growth of business (Paulson et al., 2004). On one hand, this is supported by the [E1] expert who argues that criteria which examine how well an innovation-project relates to the current business of the firm to be of interest. On the other hand, the [E4] expert consider the limitations with specific criteria for strategy.

The [E4] expert highlights that strategic fit might be appropriate for short-term innovation, but harmful for long-term innovations as it may limit the organization from making strategic change, even if it is needed.

Four out of five case companies are employing specific criteria related to strategy. In line with literature, the [E3] expert acknowledges that ideas need to be aligned with the company strategy and highlights the importance of decision-makers correctly understanding the strategy. Further, the [E2] expert acknowledges that criteria relating to strategy can be of importance, however, also recognizes that it can be challenging for organizations to deal with. The [E2] expert concludes that a large enterprise need to work with the innovation strategy and compile it to criteria, which for example define what area the enterprise should dare to take bigger risks in. The [C1] company, the [C2] company and the [C5] company can be viewed as having worked with their strategies and created areas of focus. However, these areas of focus do not entitle whether the companies should dare to take bigger risks or not, rather where the companies want innovation to happen. At the [C1] company, there is a strategist who determines what the company should do in market during the next three years which should be aligned with four areas of focus and where the company is heading. A horizon on three years can't be viewed as long-term, hence the criterion strategic value fits the strategist's horizon. However, the questions remain how and if the [C1] company includes a long-term perspective, as well as if the criterion strategic value is harmful for the organization by not fitting the long-term perspective as implied by the [E4] expert. Further, the [C2] company have within their R&I strategy alignment outlined six focus areas for innovation which are connected to UN's SDG's. Moreover, the [C5] company have outlined areas of focus being that the company should support digitalization and prioritized industry sub-segments, as well as maximize sustainability. However, the [E4] expert recognize that an idea tends to receive an overall lower valuation if the evaluator considers the idea to be beyond the current scope of the firm. A lower valuation can be a result of enterprises limiting themselves to established focus areas. The [E5] expert discusses challenges related to how to deal with ideas outside the current scope of the company. The [E5] expert suggests that companies should have specific strategies to deal with such ideas that are outside its areas of focus. The [C6] company concludes that they have such specific strategies. The [C6] company employ the specific criterion strategy, which entails whether the early-stage innovation project is connected to the overall strategy of the [C6] company, both in short-, medium- and, long-term. Lastly, the [C6] company employ the specific criterion value for the [C6] company. This criterion has already partly been mentioned under financial, as it concerns value in monetary terms to the company. However, it can also entail value in terms of improvements in sustainability which seems to be connected to the company's strategy.

5.1.1.6 Overarching Specific Criteria Time

Within the overarching specific criteria time, the criteria found in literature are appropriate time to invest (Paulson et al., 2004), time to commercialization (e.g. Koen et al., 2002), time to break-even (Koen et al., 2002), time to develop idea (Rochford, 1991) and, competitive time advantage (Koen et al., 2002). Three out of five case companies employ these types of specific criteria, whereas none of the expert highlights the time related criteria. The [C5] company employ the criterion time to market in their selection model for early-stage innovation projects. Further, the [C2] company employ the

criterion time schedule & budget to determine if the time schedule i realistic. Lastly, the [C4] company employ the criterion time, scope and quality. In relation to the mentioned criterion, the [C4] company discuss the complexity of the idea and consider speed, thus time, to be the most important for the external innovation lab. For the [C4] company, time in their sense might evolve around how fast they can generate a prototype of a complex idea, and consequently if they need to cut on quality or scope. This can relate to the specific criterion time to develop idea (Rochford, 1991). Making a prototype of the idea, might be necessary in order to for the idea to be further developed.

5.1.1.7 Overarching Specific Criteria Other

Within the overarching specific criteria other, the literature reveals criteria ranging from organizational backing (Goffin & Mitchell, 2017) to gut feel (Rochford, 1991). See below Table 19 for an overview of the overarching specific criteria other in comparison with the empirical data. The [C2] company employ the specific criterion the solution, which entails whether the decision-makers believe in the solution which the idea is built upon and if it is realistic. On one hand, this is supported by literature in terms of that Rochford (1991) suggests the use of the specific criterion gut feel. On the other hand, the [E2] expert suggests employing criteria to judge whether enough information around the project is accessible or not. Further, the [E2] expert believes that a large enterprise should have high requirements on information early in the project. Thus, since the [E2] expert argues for high requirements of information, it can be viewed that the [E2] expert may be against to employ a specific criterion relying on solely gut feel.

In order to assess the criterion wow-factor at the [C2] company, decision-makers evaluate whether the idea will gain internal and external support or not. Literature partially supports this by for example the criteria organizational backing (Goffin & Mitchell, 2017) and executive support (Paulson et al., 2004). However, the external support isn't highlighted in the same way by literature. The literature reveals the specific criterion possibility to leverage on partnership (Paulson et al., 2004). This criterion takes an external perspective and entails whether the large enterprise per say can make use of their partnerships or not. Somehow, this criterion may implicitly entail that the large enterprise receives external support since they can leverage their partnerships. However, the criterion doesn't explicitly involve that the idea has external support, just that there is a possibility for leveraging of external partners.

The [C1] company employ the specific criterion new, which involves whether the [C1] company views the early-stage innovation project as something new or not. The [C6] company employs a similar specific criterion, namely uniqueness. For the [C6] company, uniqueness describes how unique the early-stage innovation project is. Further, the [C5] company involves the criterion estimated differentiation by customer impact. By examining the differentiation in relation to the customer, that can entail how unique a product or service is to the customer. The three mentioned criteria, namely new, uniqueness and estimated differentiation by customer impact, can thus be argued to examine fairly the same characteristics of an early-stage innovation project. Accordingly, all three criteria are touching on the degree of newness of the project, either as a whole or in relation to the customer. This is supported by experts who acknowledge that some large enterprises employ criteria which determine how novel an idea is, namely the criterion originality (e.g. [E1] expert; [E3]

expert). However, the [E4] expert argues originality to be of lower importance, than for example user value and producibility, in terms of evaluating early-stage innovation projects. Moreover, the [E5] expert recognizes that employing the criterion originality facilitates a description of whether an idea is incremental in its nature or not.

The [C4] company employ criteria where the idea generator(s) needs to choose and clarify both if the idea concerns a technical innovation, business innovation, process innovation or functional innovation and, if the idea regards people, performance or portfolio. By employing these criteria, the [C4] company yields an understanding of what kind of idea that is in front of them. Several experts emphasize the importance of understanding the idea (e.g. [E3] expert; [E4] expert; [E5] expert). The [E5] expert acknowledges that ensuring that the idea is fully understood is the starting point of determining the valuation of criteria. When ideas are mature and concrete enough, hence understandable, organizations can determine what resources, people and processes that need to be applied in order to do a valuation ([E3] expert). Thus, the criterion understands the idea can serve as an initial criterion, before starting to determine the valuation of the set of the criteria. If this is not thought of, the [E3] expert recognizes that ideas can be undervalued if decision-makers do not fully understand them. Cooper et al. (2001) recognize that a formal selection process, e.g. constituting of predefined specific criteria, can ensure that all available information regarding the early-stage innovation project is properly analyzed and prevent important decision criteria from being overlooked. The initial specific criterion understands the idea can be viewed as quite important for the selection process, since it may affect whether important decision criteria are being overlooked or not.

Other – the Overarching Specific Criteria Comparing Literature with Empirical Data from Case Companies & Experts	
Other from literature	**Organizational backing** (Goffin & Mitchell, 2017) **Executive support** (Paulson et al., 2004) **Possibility to leverage on partnerships** (Paulson et al., 2004) **Regulatory barriers** (Paulson et al., 2004) **Gut feel** (Rochford, 1991) **Probability of success** (Rochford, 1991)
Other from case companies	**Novelty** [C1]
	Wow-factor; the Solution [C2]
	Technical innovation, business innovation, process innovation or function innovation; People, performance or portfolio [C4]
	Estimated differentiation by customer impact [C5]
	Uniqueness [C6]
Other from experts	**Understand the idea; Originality; Informed enough** [E1-E6]

Table 19. An overview of the overarching specific criteria other compared to the empirical findings. Compiled by the authors.

5.1.2 The [C3] Company - Not Employing Predefined Specific Criteria

The [C3] company evaluate early-stage innovation projects through a prioritization of what resources the [C3] company have in order to meet challenges. The [C3] company acknowledge that they do not employ predefined specific criteria by concluding that they neither have a framework for every innovation project nor a matrix for how to evaluate the criteria against each other. However, the [C3] acknowledge that they have a company scope for innovations and give example of potential criteria which they employ. The authors of this thesis acknowledge that the criteria can be either holistic or specific, however not predefined.

The [C3] company's scope for early-stage innovation projects is sustainability, more specifically social, environmental and economical sustainability. The scope can be compared with what the expert perspective calls strategy. As mentioned in the earlier section, the [E2] expert puts emphasis on that large enterprises need to work with its innovation strategy and compile it to criteria, which the [E2] expert exemplified by taking larger risks in certain areas. Otherwise the [E2] expert recognizes that strategy can be challenging to deal with. The [C3] company's scope is general in its nature; thus, it can be argued that it is a risk of the scope being challenging and not thoroughly worked with. However, it is hard to tell since the criteria are not predefined. Further, the [E4] expert highlights strategic fit to be appropriate for the short-term innovations, but maybe harmful for long term innovations as it may limit the organization from making strategic change, even if it is needed. However, the [C3] company have the long-term idea that if they truly focus on sustainability, then it will be positive for business. This can involve a partially reversed situation for the [C3] company's scope, namely that their strategy is appropriate for the long-term. However, whether it is harmful for the short-term strategy or not can't be derived.

Through prioritization, the [C3] company treat different kind of innovation projects differently depending on the type of project. However, the [C3] company always evaluate early-stage innovation projects with a basis of value creation. This is supported by experts through the criterion user value (e.g. [E3] expert; [E4] expert; [E6] expert). Further, the [C3] company can employ the criterion user experience, which can entail factors such as seamless, safety, degree of information, mood or general experience. In relation to value, the [C3] also exemplifies criterion by how complex the value will be in terms of delivering, namely complexity in delivering. The [C3] company exemplifies with more criteria which they potentially can make use of, however these are not supported by experts.

5.1.3 Factors Affecting the Choice of Criteria in the FEI

Having analyzed the criteria on their own, both literature and the expert perspective recognize that what criteria that decision-makers at large enterprises in Sweden can employ are dependent on some factors. Mitchell et al. (2014) state that criteria are dependent on type of organization. Type of organization is also supported by both Goffin and Mitchell (2017) and Magnusson et al. (2014), who recognize that what criteria to assess in evaluation are dependent on contexts or circumstances. This is further supported by the expert perspective. The [E6] expert acknowledges that other circumstances affect and argues that the innovation culture as well as the innovation strategy of the

firm have implications on what criteria that are employed. Furthermore, the [E2] expert and the [E6] expert acknowledge that what criteria that are employed are dependent upon the nature of company. The [C1] company first divide the early-stage innovation projects depending on origin and later has a common gate for all initiatives. Dividing the evaluation upon origin of idea can be argued to be supported by literature and experts since it is recognized that what criteria to employ is dependent on contexts and circumstances (e.g. Goffin & Mitchell, 2017; Magnusson et al., 2014; [E6] expert).

The [E5] expert and the [E4] expert argue that what criteria to employ is dependent on what kind of idea that is subjected to evaluation. On one hand, the empirical findings reveal that the [C4] company, the [C5] company and the [C6] company treat all early-stage innovation projects in the same way. Firstly, the [C4] company use their innovation funnel for all incoming ideas. Secondly, the [C5] company use one selection model to harmonize the way of evaluating ideas. Thirdly, the [C6] company subject the early-stage innovation project to the same certain criteria. On the other hand, the [C1] company, the [C2] company and the [C3] company treat early-stage innovation projects differently. As already mentioned, the [C1] company divide the early-stage innovation projects depending on origin of idea and later has a common gate for all initiatives. This can be argued to be further supported by the [E4] expert, who agrees on different criteria to be appropriate for different ideas. However, the question is whether the origin of the idea paves the way for ideas to be different. Second, the [C2] company start with a common evaluation, and then through their two tracks divide the early-stage innovation projects upon the nature of the project. More specifically, the [C2] company divide projects upon whether the project yields a changed service or product or, changed internal process, methods or tools. This is supported by Mitchell et al. (2014) stating that criteria are dependent upon nature of the project. The [C2] company's two set of criteria is also partially in line with what the [E1] expert emphasizes, that organizations need to have a battery of different criteria and be aware of which ones to use when. However, what can be questioned is that the [C2] company solely have two fixed set of criteria, not more which the [E1] expert implies by having a battery of different criteria. Third, the [C3] company treat different kind of innovation projects differently in their prioritization of resources. More specifically, the [C3] company distinguish between disruptive short-term innovation projects and long-term innovation projects. This is in line with what the [E5] expert and [E4] expert argue, that criteria are dependent on the idea subjected for evaluation. However, the experts do not recognize specifically that division of short- and long-term projects is the way to go.

The [E2] expert suggests that what criteria to employ, in this case specifically financial and non-financial, depends on how innovative the projects are. However, none of the case companies employ criteria dependent on how innovative the projects are.

Cooper (2009) and Hart et al. (2003) recognize that employing different evaluation criteria for different projects is one way of achieving flexibility while screening ideas. On the topic of flexibility, the [E3] expert argues that very structured criteria can result in that a large enterprise searching for ideas which fit the criteria. Hence, the [E3] expert emphasizes that if the large enterprise wants truly innovative ideas, fixed criteria may not be appropriate. Regarding what criteria to employ, the [E3] expert argues for a first phase constituting of a holistic evaluation as well as screening and categorizing of ideas, in order to make them comparable. Further, the [E3] expert

argues for that a suitable evaluator should start including criteria which fits. This implies that a large enterprise should be aware of flexibility with regards to what criteria to employ. However, not all experts suggest the same. One side argues that predefined criteria may not be the way to go, rather that a decision-maker determine relevant criteria for evaluation (E3] expert). The other side argues for a battery of different predefined criteria and the awareness of when to use which ([E1] expert]. To summarize, the literature and the experts are not implying that there is one way to go in terms of what criteria to employ. A large enterprise can either have a battery of predefined specific criteria, employing holistic criteria or both.

5.2 How can decision-makers at large enterprises in Sweden determine the valuation of criteria?

Table 20 below reveals a comparison of how the decision-makers at the six different case companies in Sweden determine the valuation of criteria in early-stage innovation projects. First, five of six companies aim to anchor the valuation of the criteria in data, regardless whether the criteria are predefined or not. In other words, these five case companies appear to strive to gather information and data to base their valuation of criteria on, rather than to solely make assumptions based on intuition. This relates to "rational evaluation" presented in the literature review, section 2.3.4. Magnusson et al. (2014) further states that it can be argued, based on Sadler-Smith and Sparrow's (2008) structure for decisions, that specific criteria decisions are more in line with a tight decision structure which prefers analysis in front of the sole use of intuition.

Out of the five case companies preferring data, i.e. anchor their valuation of criteria in data, four of these case companies recognize a situation characterized by lack of information and data to base their valuations of criteria on in the FEI. This is supported by Sadler-Smith and Sparrow (2009) who recognize that uncertainty makes it too difficult for organizations to anchor assumptions in data and information and, that intuitive judgement is needed to complement rational analysis. Consequently, these four case companies acknowledge that assumptions anchored with intuition are employed to reach a valuation of criteria. The literature review suggests a combination of rational- and intuitive decision-making to yield the highest quality of idea evaluation in the FEI (e.g. Eling et al., 2015; Sadler-Smith & Shefy, 2004). The pursuit of employing rational analysis, and at the same time including assumptions backed by intuition, can be found in four case companies, namely the [C1] company, the [C2] company, the [C4] company and the [C5] company. This can be linked to "hybrid evaluation" presented in the literature review, section 2.3.6.

The sixth case company, the [C6] company, distinguish from the other case companies since the company strive to anchor their assumptions in intuition. Hence, the [C6] company prefer intuition and anchor their assumptions by it. To prefer intuition when determining the valuation of criteria can be linked to "holistic evaluation" presented in the literature review, section 2.3.5. What doesn't link the [C6] company to the holistic evaluation is that the [C6] company employ predefined specific criteria. Hence, it can be argued to be like a "hybrid evaluation", however with another combination than the other case companies.

What has been found, is that the how decision-makers determine the valuation of criteria differs among the case companies. What is commonly stated by all case companies, is that data and information available for determining the valuation of criteria in innovation projects in the FEI is spares. Thus, to anchor assumptions case companies must either gather data or rely on intuition. Five out of six case companies gather data to anchor assumptions. Out of these, three case company acknowledge to gather data quantitatively and four case companies acknowledge to gather data qualitatively. Lastly, five out of six case companies make use of intuition to back their assumptions with. Below section will first analyze how decision-makers in large enterprises gather data to determine the valuation of criteria. This is followed by a section analyzing the use of assumptions and intuition to determine the valuation of criteria.

Determining the Valuation of Criteria						
	[C1]	**[C2]**	**[C3]**	**[C4]**	**[C5]**	**[C6]**
Prefer data	**X**	**X**	**X**	**X**	**X**	
Prefer intuition						**X**
Gather data Quantitatively			**X**	**X**	**X**	
Gather data Qualitatively	**X**	**X**	**X**	**X**		
Makes use of intuition	**X**	**X**		**X**	**X**	**X**

Table 20. A comparison of how the six case companies determine the valuation of criteria. Compiled by the authors.

5.2.1 Determining the Valuation of Criteria by Data

To determine the valuation of criteria by anchoring the assumptions with data, companies recognize that data needs to be gathered. The analysis reveals that gathering of data can be divided in two. First, data can be gathered quantitatively by making use of platforms and other information such as reports or information at search engines. Second, data can be gathered qualitatively by individuals actively going out to the market to generate data.

5.2.1.1 Quantitatively Gather Data to Determine the Valuation of Criteria

Three of the six case companies gather data quantitatively in order to determine the valuation of criteria. What needs to be pointed out is that these three case companies do not solely determine the valuation of criteria by grounding decisions on quantitative data. The [C5] company is anchoring their assumptions with quantitative data. As the aim of most innovation-projects executed by the [C5] company is to replace a current product by a new one, the [C5] company argue that it regularly is possible to source information from previous, similar business cases. Consequently, the [C5] company requires valuations of criteria in the FEI to be backed by data from earlier projects by making use of their internal platform. The [C3] company seem to aim to determine the valuation of

criteria in slightly the same way. The [C3] company distinguish between gathering qualitative and quantitative data and would wish to apply both when determining the valuation of criteria. Later section will analyze the gathering of qualitative data. In terms of quantitative data, the [C3] company strive to extract data from users by mapping how products or services are used by their current users. However, the [C3] explains that lack of users to source information from is a limitation of their quantitative methods of today. The [E2] expert support the use of internal platforms to collect data by arguing for high information requirements. Further, the [E2] expert highlighting the importance to use data to the highest possible extent, and that the technology of today should be used to collect data. In accordance with recommendation from the [E2] expert, the [C4] company make extensive research via external search engines and platforms if additional information is needed. In addition to gathering data on internal platforms, the [C5] also acknowledge that they work centrally to gather data around relevant market trends. However, this is the sole case company which acknowledge the use of such reports to gather quantitative data to determine valuation of criteria.

5.2.1.2 Qualitatively Create Data to Determine the Valuation of Criteria

The [E5] expert suggests making assumptions and test these at the market in order to create data. This is supported by the [E2] expert who suggests companies to formulate hypotheses and test these. Hence the hypotheses will guide companies regarding what information to be gathered. Further the [E1] expert points out the importance of having individuals in the organization who dares to go out and create data when needed.

Four out of six companies acknowledge that they create data by interacting with the market to determine the valuation of criteria. The [C1] company recognize that it is arguably important to gather data to ground their valuation of criteria on in the FEI. Further, the [C2] company also stress the importance of anchoring assumptions in the market as much as possible. Both of the [C1] company and the [C2] company go out and interact with the market to create data to back up assumptions with. The [C4] company includes a testing-phase in their evaluation of early-stage innovation project. In the testing-phase, the [C4] company aim to visualize ideas for intended users, either internally or externally, by making prototypes. Assumptions made by the [C4] company in order to make prototypes are hence tested in order to be confirmed or amended. By testing prototypes, the [C4] company adjust assumptions by creating data and hence determine the valuation of criteria. Moreover, the [C2] company recognize that by testing the innovation with customers, the [C2] company aim to ensure that an actual need of the market is being addresses. By testing the innovation with customers, the [C2] company can determine the valuation of criteria such as the market need. This is confirmed by all the six experts who emphasize the importance of making sure that organizations are attempting to solve a relevant problem experienced by the intended users.

Lastly, in addition to the already mentioned quantitatively gathering of data conducted by the [C3] company, the company also aim to have qualitatively gathered information. To gather such qualitatively information, the [C3] company go out and interact with users, for example by conducting in depth interviews and observations. However, what distinguishes the [C3] company is how they combine information gathering and assumptions. Instead of first making assumptions and

then test these in the market as suggested by the [E5] expert, the [C3] company starts with gathering information from which they derive insights to make assumptions on.

Comparing the [C3] company's way of working to how the [C1] company, the [C2] company and the [C4] company work, the latter three case companies are guided by their assumption in their collection of information. The way these three companies work, is supported by the [E2] expert who suggests companies to formulate hypotheses and test these. Hence the hypotheses, or in this case the assumptions which serves as hypotheses, help companies to decide what information to be gathered. Thus, the [C1] company, the [C2] company and the [C4] company are guided in what data to generate, by the already established assumptions. After having generated data, these three companies can adjust their assumptions, hence use the data to determine the valuation of criteria. The [C3] company on the other hand, seem to go out with an open mind and based on that derived data make their assumptions. Consequently, the [C3] company is not adjusting their assumptions in the same manner as the other three case companies.

Creating data by testing and interacting with the market is in line with the [E4] expert who emphasize the importance of visualizing the idea for the intended user. Furthermore, the [E1] suggests that assumptions can be confirmed or rejected when a minimum viable product is tested at the market, hence the speed of the learning-process of a company can be enhanced. Further, the [E1] expert and the [E4] supports the case companies who are determining the valuation of criteria through generating data by testing their assumptions in the market, namely the [C1] company, the [C2] company and the [C4] company.

5.2.2 Determining the Valuation of Criteria by Intuition

The importance of involving expertise in intuition when decision-makers evaluate early-stage innovation projects is highlighted both in the literature review (e.g. Sadler-Smith & Shefy, 2004; Magnusson et al., 2014) and by the experts (e.g. [E4] expert; [E5] expert). Sadler-Smith and Sparrow (2009) recognize that uncertainty makes it too difficult for organizations to anchor assumptions in data and information and, that intuitive judgement is needed to complement rational analysis. Several of the experts recommend organizations to allow individuals with relevant knowledge to fill the information gaps that emerge because of lack of data (e.g. [E1] expert; [E3] expert). In four of six case companies this is what seems to be happening, namely letting experienced and knowledgeable individuals use their intuition to determine the valuation of criteria when data is not available. In one additional company, the [C6] company, they seem to solely apply intuitive decision to determine the valuation of criteria in the early stages. The [C3] company is the sole case company which does not acknowledge to employ assumptions backed by intuition.

Goffin and Mitchell (2017) recognize that evaluation of early-stage innovation projects often is done based on the intuition of experienced managers in an organization. Further, Magnusson et al. (2014) suggest that the appropriate first step of evaluating innovation projects through specific criteria is to involve people with relevant expertise. According to the [E5] expert, people tend to lack arguments for why their assumptions are correct, hence, assumptions are often backed with intuition. Accordingly, several experts point out the importance to ensure that individuals with relevant

experience and expertise make assumptions, in order to make their intuition trustworthy (e.g. [E2] expert; [E6] expert).

5.2.2.1 The Role of Idea Generator(s), Group of Decision-Makers and the Emerging Discussion

At the [C6] company the idea generator(s) describes a one-pager, constituting of predefined specific criteria, and complements it with a sub-document with the reasoning of the idea generator(s). By describing the idea, the idea generator(s) can be viewed to make assumptions about the idea by employing his or her knowledge, hence intuition. The trustworthiness of the assumptions within the description are examined by a joint discussion between the idea generator(s) and the innovation board of the [C6] company. The discussion concerns each of the specific criteria and determines the valuation of criteria. At the [C6] company the innovation board use their competences to contribute to the discussion and determining the valuation of criteria.

Even though the [C2] company determine the valuation of criteria by generating data, the [C2] company also use intuition. The way the [C2] company work, have similarities with how the [C6] company work. At the [C2] company, it is the idea generator(s) themselves who determine the valuation of the criteria. Later, these valuations are judged by decision-makers at the [C2] company, who decide whether the valuations of criteria can be considered reliable or not. That the idea generator(s) makes initial valuations of criteria and that decision-makers later examine their credibility, have some similarities to how the [C6] company manage idea evaluation.

In line with the [C2] company and the [C6] company, the idea generator(s) at the [C4] company has an active role in the evaluation of his or her idea. At the [C4] company, ideas are subjected to determine an initial valuation of criteria by a discussion regarding predefined criteria. This is a joint discussion between the idea generator(s) and the individuals employed at the innovation lab of the [C4] company. The similarity between the [C4] company and the [C6] company, is the discussion between the idea generator(s) and the decision-makers when determining the valuation of criteria. Hence, the discussion between different knowledgeable individuals occurs both at the [C6] company and at the [C4] company.

The [E3] expert and the [E5] expert highlights a co-developing role of decision-makers. In the [C4] company, the decision-makers in the innovation lab takes an active role in the already mentioned discussion. By engaging in the discussion, the decision-maker at the [C4] company and the idea generator(s) together develop the idea further by determining what kind of innovation the idea is and for whom it is for. Thus, valuation of criteria is determined of the basis of the discussion. This is supported by the [E3] expert who argues that the decision-makers can have a co-creating role whereby the decision-makers develop and clarify the idea further, rather than solely evaluate it. Further, this is also in line with what the [E5] expert describes about evaluators, that they try to understand ideas by developing the idea further, or sometimes even by generating new ideas.

5.2.2.2 Employing both Internal and External Expertise

Three of the case companies, namely the [C1] company, the [C4] company and the [C6] company, are bringing in external expertise when an idea regards something novel to the organization. The [C1] company seem to always strive to anchor assumptions in data, however, the company is experiencing lack of information in the FEI which makes them partially base their valuation of criteria on assumptions backed by intuition. When determining the valuation of criteria, the [C1] company make use of assumptions backed by both knowledge from internal sources and external sources, to complement the existing data. At the [C6] company, the decision-makers of the innovation board are constituting of both internal functions at the [C6] company and external individuals. The external individuals represent for example a financial perspective and a sustainability perspective. Thus, the [C6] company make use of both competencies of internal decision-makers, as well as competencies from external individuals to determine the valuation of criteria. The [C4] company also involve both internal and external expertise when needed. Individuals employed at the innovation lab have different kinds of expertise, however the innovation lab reaches out to the rest of the of [C4] company as well as to external contacts if additional expertise is needed. To reach out to additional sources of knowledge is supported by the [E1] expert, who suggests organization to reach out to the rest of the organization and/or to external actors if additional expertise is needed or if information is lacking.

5.2.2.3 Employing Solely Internal Expertise

Both the [C5] company and the [C2] company seem to rely solely on internal expertise to determine the valuation of criteria. The [C5] company make use of internal expertise as a supplement to data. The internal expertise constitutes of internal individuals who fill up information gaps. These internal individuals have relevant and extensive knowledge within the field, which they have gathered over years. The [E3] expert agrees on that knowledgeable experts can sometimes almost intuitively assume estimations of criteria. Knowledgeable expert base the intuitive estimations of their experience of evaluating innovation projects in general, as well as similar projects as the one subjected to evaluation. For example, if expected sales volume is going to be assessed by the [C5] company, a product manager of a similar product at the [C5] company is involved in the assessment. This is in accordance with what the [E3] expert underlines regarding having a good match between the idea and the person with knowledge. Even at the [C2] company, the importance of internal knowledge is emphasized. Every early-stage innovation project is allocated to 3-5 experts within the [C2] company. The [C2] company reaches out to internal experts to get general comments on an idea. The innovation coaches summarize gathered knowledge from the experts, which the idea generator(s) can involve in the pitch. The pitch further includes the information gathered from the 50 hours that the idea generator(s) were allocated to substantiate the idea. The pitch should convince decision-makers to accept the idea for further development. The valuation of criteria is determined when the pitch is judged by the decision-makers. Hence, the pitch is partially based on internal competence and the judge of decision-makers use their internal competence to determine the valuation of criteria.

6. Conclusions

This chapter presents the conclusions of this study in order to answer the main research question. Firstly, the answers to the two sub-questions will be presented since conclusions from these two sub-questions will serve as the foundation for the answer of the main research question. This is followed by an answering of the main research question. The chapter will be finalized with suggestions for future research.

6.1 Answering the Research Questions

The purpose of the thesis is to investigate how decision-makers at large enterprises in Sweden can employ criteria to evaluate early-stage innovation projects. The purpose of the thesis is further to contribute with insights regarding what criteria that can be employed and how decision-makers at large enterprises in Sweden can determine the valuation of criteria. Accordingly, the main research question of the study was formulated as following: *"How can decision-makers at large enterprises in Sweden employ criteria to evaluate early-stage innovation projects?"*. In order to answer the main research question, the following two sub-questions were formulated: *"What criteria can be employed when evaluating early-stage innovation projects in large enterprises in Sweden?"* (1) and *"How can decision-makers at large enterprises in Sweden determine the valuation of criteria?"* (2). Conclusions derived from analysis of empirical data and literature for the two sub-questions will be presented below. Following this, the answer of the main research question will be presented based on the answers belonging to the two sub-questions.

6.1.1 Sub-question 1: What criteria can be employed when evaluating early-stage innovation projects in large enterprises in Sweden?

From the literature review, it could be concluded that decision-makers at a large enterprise can employ specific criteria or holistic criteria, or a combination, when evaluating an early-stage innovation project. The main difference between specific and holistic criteria was identified as being the fact that a specific criterion is predefined by the company which employs it, whereas a holistic criterion is not predefined by the company which deploys it. An exception was identified to be when specific criteria is employed in the holistic evaluation, then the specific criteria is not predefined. From the experts, it could be concluded that different criteria were discussed. However, it was concluded that the criteria discussed by the experts in this study did not distinguish the criteria as done in the literature. What can be concluded, is that five of six case companies are employing predefined criteria in order to evaluate early-stage innovation projects. The case company which do not employ specific criteria is still employing criteria to evaluate early-stage innovation projects, however not predefined criteria.

When the overarching specific criteria suggested by literature were compared to criteria discussed by experts and compared to the specific criteria used by the case companies, both differences and similarities were found. Even though the experts support the usage of some specific criteria suggested by literature, they are problematizing the usage of some of them by pointing out benefits and drawbacks. From the compilation of the comparison of specific criteria (Table 18), it was

possible to identify what overarching criteria that were most frequently mentioned by literature and experts, at the same time as commonly employed by the case companies. These criteria are *customer, feasibility, financial, market, strategy, time* and *other.* The overarching criteria *other,* showed that all case companies that are employing specific criteria had additional criteria that were not possible to fit to any overarching specific criteria highlighted in the literature.

From the literature review, it could be concluded that a lot of potential specific criteria for large enterprises to employ exist, however, that no best practice for what criteria to employ when exists. This conclusion was further confirmed by the experts who emphasized several factors to have implications on what criteria to employ when. Factors highlighted by literature and experts can be linked to the individual context of companies, these are: *culture, strategy, nature of company, degree of innovativeness of project* and *nature of project.* Three of the six case companies seemed to take factors such as the ones mentioned into consideration when deciding what criteria to employ for evaluating early-stage innovation projects and when. Hence, it was found that these three case companies treated different early-stage innovation projects differently by employing different criteria. Nevertheless, the remaining three case companies were found to use the same criteria for all early-stage innovation-project subjected to evaluation.

6.1.2 Sub-question 2: How can decision-makers at large enterprises in Sweden determine the valuation of criteria?

In providing the answer to the second sub-question, three different approaches towards idea evaluation were identified in the literature and in the expert interviews, namely rational evaluation, intuitive evaluation and a combination of these which in this study is referred to as hybrid evaluation. The second sub-question illustrated differences between how the literature and experts suggest that large enterprises can determine the valuation of criteria, and how valuation of criteria were determined at the case companies of this study in practice. As it was found that all case companies, except one, preferred to anchor their valuation of criteria in data, it could be concluded that none of these case companies applied a holistic evaluation. The remaining company was found to prefer intuition to base the valuation of criteria on. However, this company did still make use of predefined criteria. Consequently, it could be concluded that neither this company applied holistic evaluation. Rather, similarities with the rational evaluation and the hybrid evaluation was found in how the case companies were determining the valuation of criteria.

The second sub-question showcased differences regarding how different case companies are determining the valuation of criteria. As implied above, it was discovered that the case companies grounded the valuation of criteria either by making assumptions anchored with data, by making assumptions anchored with intuition or a combination of both. Most of the case companies preferred to determine the valuation by anchor assumptions in data. Solely one of the case companies preferred to anchor assumptions in intuition. In situations where the case companies aimed to anchor the valuation of criteria in data, they were actively working to gather data. Since the case companies either gathered quantitative or qualitative data, or a combination of both, the empirical data revealed that the gathering of data can be divided in twofold. Half of the case companies were found to work actively to gather quantitative data to include in their valuation of criteria. The sources used to gather

quantitative data found in the empirical material were internal platforms, market reports, external platforms and external search engines. Further, most of the case companies were found to work in order to create and generate qualitative data to use for valuation of criteria. Qualitative data was found to be gathered when case companies were interacting with the market, thus the intended users and testing ideas.

Even though most of the case companies worked actively to anchor their valuation of criteria in data, most case companies were found to struggle with this. The characteristic of the front end of the innovation process, such as high uncertainty and information shortages, were identified to limit the ability of case companies to ground the valuation of criteria. Accordingly, it was found that the majority of the case companies made assumptions anchored with intuition when determining valuation of criteria. Empirical data also showcased that case companies made use of intuition in different manner. How assumptions anchored in intuition were established differed between the case companies. In half of the case companies the idea generator(s) took an active role in determining the valuation of criteria. Some case companies seemed to validate the assumptions made by the idea generator(s), by having a group of decision-makers judging the credibility of assumptions. In some case companies, the valuation of criteria was determined through a discussion between the idea generator(s) and the decision-makers. In one case company the discussion between the idea generator(s) and the decision-maker seemed to determine the valuation of criteria by establishing a common understanding for the idea and by develop the idea further. In the empirical data from expert interviews, a similar approach to determine the valuation of criteria could be identified. This approach described the evaluation process as a co-developing process, where the evaluators tries to understand the idea by developing it further or by coming up with new ideas. Related to intuition, it was further discovered that both internal and external expertise were leveraged on in order to determine the valuation of criteria. Some of the case companies were identified to make use of both external and internal expertise, while some only relied on internal expertise.

6.1.3 Main Research Question: How can decision-makers at large enterprises in Sweden employ criteria to evaluate early-stage innovation projects?

This study has showcased differences between how literature and experts suggest decision-makers to employ criteria in order to evaluate early-stage innovation projects, and how criteria seem to be practically employed by decision-makers at large enterprises in Sweden. In providing answer to the main research question, literature and experts suggest companies either to decide on predefined criteria in advance and make a rational evaluation, or to allow the decision-maker to form relevant criteria during the evaluation in order to make a holistic evaluation. A combination of rational and intuitive decision-making was described by the literature as an alternative to the exclusive use of rational evaluation or holistic evaluation. The empirical data from case companies revealed that mostly predefined criteria anchored in data and intuition were used to evaluate early stage innovation projects.

In providing the answer to the main research question, a comparison between the overarching specific criteria suggested by literature, criteria suggested by experts, and criteria employed by case companies was done. The comparison illustrated differences and similarities among all three sources

of criteria, hence it was not possible to draw any conclusion regarding a potential best practice of what predefined criteria that large enterprises should employ. What could be concluded, was that literature and experts recommend companies to employ different criteria in different situations. Guidance of what criteria to employ when did also emerge from the literature review and the expert interviews. Factors highlighted by literature and experts as appropriate to consider when deciding what criteria to employ are: *culture, strategy, nature of company, degree of innovativeness of project* and *nature of project.* Nevertheless, half of the companies did appear to adapt and fit their use of criteria, however not to to the same extent as it was found that literature and experts suggested them to do. The remaining case companies did not customize criteria at all, hence they were found to use the same criteria for all early-stage innovation projects subjected to evaluation.

Even though the literature review revealed several potential criteria as well as guidance of when to use which criteria, previous research regarding how to determine the valuation of such criteria was found to be limited. From the empirical data collection, two primary approaches to determine the valuation of criteria emerged. In the first identified approach a company can evaluate early-stage innovation projects by gathering data to anchor assumptions with to determine the valuation of criteria. In the second identified approach a company can evaluate early-stage innovation projects by making assumptions anchored in intuition to determine the valuation of criteria. Literature and experts were unified regarding the fact that data should be taken into consideration to as high extent as possible when companies use criteria to evaluate early-stage innovation projects. However, the characteristics of the front end of the innovation process could be concluded to explain why companies in practice did not seem able to be fully driven by data when evaluating early-stage innovation projects. Empirical data showcased that companies had different requirements of how much intuition in relation to data that was considered as adequate to anchor assumptions with when evaluating projects in early stages. Even though the relation between data and intuition differed among companies, an identified common goal of companies was to successively replace intuition with data. What relation between assumptions anchored in data and assumptions anchored in intuition that is appropriate for companies to apply, is however not possible to conclude from this study. The knowledge of the individual whose intuition were relied on, could be identified to have a crucial role according to previous research and experts of this study. Empirical data showcased different approaches used by companies to take expertise into account when employing criteria to evaluate early-stage innovation projects. In practice, both internal and external knowledge seemed to be taken advantage of by companies. This could be concluded to be in accordance with recommendations found in literature and in expert interviews.

Different ways of structuring the process, in which criteria could be employed, emerged from the literature review and the empirical data of this study. From the empirical data collected from case companies, it was possible to conclude that companies which use criteria to evaluate early-stage innovation projects seemed to have a formal process in place. Literature suggest the use of a formal process with flexibility in terms of criteria what criteria to employ. Moreover, a co-developing process could be identified in empirical data collected form experts and one case company. In a co-developing process, criteria were recognized to serve as underlying discussion areas by which the

decision-maker aimed to understand the early-stage innovation project and to develop it further, in order to make an evaluation.

The question whether predefined specific criteria should be employed at all, emerged from the literature review and the expert interviews. While some scholars argue for the usage of specific criteria when evaluating early-stage innovation projects, others suggest a holistic evaluation to be more appropriate. However, none of the six case companies in this study could be concluded to apply a purely holistic evaluation, rather a hybrid evaluation, meaning a combination between rational and intuitive decision making. Some literature and experts implied that holistic evaluation which prefer intuition could be as efficient as data under certain circumstances when evaluating early-stage innovation projects. Whether companies should be employing holistic evaluation to evaluate early-stage innovation projects or not is not possible to concluded from this study.

6.2 Future Research

To finalize this thesis, three suggestions of potential angels for future research that have emerged from the study will be presented.

Firstly, in this study attention was given to the knowledge of the individuals whose intuition were relied on when evaluating early-stage innovation projects. Expertise and experience were pointed out as crucial factors in order to enhance the trustworthiness of the intuition. It would be of interest to further examine the individual behind the intuition. For example, it would be interesting for future studies to compare the intuition of individuals with expertise with, the intuition of individuals without expertise. By doing this, it would be possible to explore whether the intuition of "non-experts" is appropriate to consider or not when evaluating early-stage innovation projects.

Secondly, it would be of interest to further explore how companies in practice can use holistic evaluation. In the literature review of this study, rational evaluation, holistic evaluation and hybrid evaluation were identified as potential approaches to use for evaluating early-stage innovation projects. However, none of the case companies in the study was found to employ holistic evaluation. Hence, it would be of interest to perform a case study with companies that applies holistic evaluation. It would further be valuable to investigate if, and in that case how, companies that are employing holistic evaluation are working with non-predefined criteria.

Lastly, this study aimed to explore both what criteria that large enterprises in Sweden potentially should employ, as well as how the valuation of the criteria was determined. Since previous research regarding how to determine the valuation of criteria could be considered as limited, it would be interesting to further investigate this. Hence, a suggestion for further research is to perform a case study that aim to in depth investigate how companies are working with determining the valuation of criteria. A recommendation could be to investigate this by observations, and by think-aloud methods in order to gain as deep understanding for the valuation of criteria as possible.

7. References

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8. Appendix

Appendix 1. Groupings of Specific Criteria

	Goffin & Mitchell (2017)	Paulson et al. (2004)	Koen et al. (2002)	Rochford (1991)
Competitiveness	Competitive intensity Product differentiation Sustainability of competitive advantage	Well positioned to capture market share Ahead of competitors Sense of competitive landscape No competing approaches to solve problem	Proprietary position Leadership position Cost position Key competitive advantage Sustainability of position	Uniqueness Exclusivity – in terms of patentability
Customer	Industry/market readiness Customer benefit Customer relations	Enthusiastic customers of potential applications Offer market benefits not possible before No negative social or political implications from customers	Customer familiarity	
Feasibility	Fit to sales and/or distribution Fit to manufacturing and/or supply chain Learning potential Availability of finance for project Technical capability	Require team to develop/leverage internal network Efficient team with experimental orientation, future perspective & experience of innovation Leverage & extend competencies Capable leader Build new technical and market competences	Business infrastructure Core competency Technology availability, readiness and skill base (people & time)	Production Personnel Organizational infrastructure Personnel & managerial experience and expertise Financial feasibility "Is the project "do-able"?" Technology
Financial	Increased margin/benefit per unit Sales potential Business unit cost reduction or simplification	Revenue streams positive impacted Higher margin of VC Partially funded by external resources Enough resources	After-tax operating income Max. cash hole Revenue stream Business potential	Investment required Costs Profitability
Market	Market size Market growth Future potential, e.g. open new markets Market knowledge	Growth customers & adjacent business Potential applications Growth portion, develop new VC Market potential for applications Potential to set new industry standards Comfortable with path to market	Market size Market growth Market drivers Market access Potential market share	Size, current & potential Growth, current & potential Appeal Role for the company
Portfolio	Synergy opportunities	Synergistic effects with portfolio Unique, not cannibalize on portfolio If killed, portfolio would suffer Provide balance		
Strategy	Strategic fit Brand image	Impact on company strategy Match company's strategic intent Address threats to maintenance and growth of business		"Is idea consistent with company objectives?"
Technology	Technical capability Technical challenge	Achieve next technical milestone is high Cost of gain technical progress is appropriate	Technology availability, readiness and skill base (people & time)	Product development
Time		Investment date is appropriate Timing of expected first revenue is reasonable	Time to sales Full commercialization Competitive time advantage Operating at break-even	To develop idea Commercialization
Other	Organizational backing	Executive support Have partnerships to be leveraged Committed to ensure appropriate organizational home VC members are enthusiastic of potential applications No regulatory barriers Solution to regulatory threat		Gut feel "Is it realistic?" Probability of success

Appendix 2. Interview Guide to Case Companies

Information to respondents

The empirical data derived from this interview will be used in as a part of a master thesis in Innovation and Industrial Management at the School of Business, Economics and Law. The purpose of the thesis is to investigate how decision-makers at large enterprises in Sweden can employ criteria to evaluate early-stage innovation projects. The purpose of the thesis is further to contribute with insights regarding what criteria that can be employed and how decision-makers at large enterprises in Sweden can determine the valuation of criteria. The duration of this interview will be approximately 45 minutes. After having summarized the empirical data, you as a respondent of this interview will be offered the possibility to check and confirm findings, in order to avoid any misunderstandings. The respondent of this interview can choose whether to be anonymous or not. The interview will be conducted in Swedish or English, depending on what the respondent of the interview prefers.

We thank you for investing time and participating in our master thesis study. If you have any questions you are most welcome to contact us. Best Regards, Ebba Hällin Olsson & Kristina Landström (gusolssoeb@student.gu.se / guslankr@student.gu.se)

Definitions & examples

- Early-stage innovation projects: Projects in the first part of the innovation process, namely the front end. In the front end, the early-stage innovation project moves from being an idea to a more defined concept. The front end is characterized by uncertainty, experimental and unpredictable.
- Financial criteria: E.g. *Net Present Value (NPV)* and *Return on Investment (ROI)*.
- Non-financial criteria: E.g. *Strategic Fit* and *Customer Benefit.*
- Criterion based on data: A valuation of a criterion is based on facts and statistics collected together for reference.
- Criterion based on assumptions: A valuation of a criterion is accepted and reached without proof.
- Valuation: When a criterion is assessed and receives a value. The value of the criterion can be communicated differently, e.g. by number or words.

Background

- Please tell us briefly about you and what position you have at your company.

What criteria can be employed when evaluating early-stage innovation projects in large enterprises in Sweden?

- When evaluating an early-stage innovation project, what criteria are you employing? Please exemplify.
- Are you employing both financial and non-financial criteria when evaluating early-stage innovation projects? If yes, does any of these types weigh more heavily than the other, and why?

- Are you employing the same criteria for evaluation of all early-stage innovation projects? If no, what determines what criteria you employ for each project?
- Beyond the already discussed criteria for evaluation of an early-stage innovation project, are there any other criteria which you are employing? Please exemplify.
- If you think beyond the criteria you are employing for evaluating an early-stage innovation project today, would you like to employ any other criteria for evaluation? If yes, which ones and why?

How can decision-makers at large enterprises in Sweden determine the valuation of criteria?

- When determining the valuations of criteria in an early-stage innovation project, what do you usually examine?
- If you are employing financial criteria, how are you determining the valuation of these? Please exemplify.
- If you are employing non-financial criteria, how are you determining the valuation of these? Please exemplify.
- Are there criteria which are more difficult determine the valuation of in an early-stage innovation project? If yes, why and how do you handle this?
- Are there formal aspects to adhere to when determining the valuation of a criterion? If not, how do you proceed?
- How are you determining the valuation of a criterion when you perceive that there is a lack of information?
- Are your organization employing assumptions when determining the valuation of a criterion? If yes, how are you making such an assumption?
- What is your organization's attitude against determining valuations of criteria based on assumptions versus data?
- How you like to employ assumptions and/or data to determine the valuation of a criterion?
- In your point of view, what are the advantages and disadvantages with employing assumptions versus data in terms of valuation of criteria?

Other

- Are there subjects or aspects which you feel that we have missed when asking you about how early-stage innovation projects are being evaluated in large enterprises?
- Lastly, is there anything else you would like to add before finishing this interview?

Appendix 3. Interview Guide to Experts

Information to respondents

The empirical data derived from this interview will be used in as a part of a master thesis in Innovation and Industrial Management at the School of Business, Economics and Law. The purpose of the thesis is to investigate how decision-makers at large enterprises in Sweden can employ criteria to evaluate early-stage innovation projects. The purpose of the thesis is further to contribute with insights regarding what criteria that can be employed and how decision-makers at large enterprises in Sweden can determine the valuation of criteria. The duration of this interview will be approximately 45 minutes. After having summarized the empirical data, you as a respondent of this interview will be offered the possibility to check and confirm findings, in order to avoid any misunderstandings. The respondent of this interview can choose whether to be anonymous or not. The interview will be conducted in Swedish or English, depending on what the respondent of the interview prefers.

We thank you for investing time and participating in our master thesis study. If you have any questions you are most welcome to contact us. Best Regards, Ebba Hällin Olsson & Kristina Landström (gusolssoeb@student.gu.se / guslankr@student.gu.se)

Definitions & examples

- Early-stage innovation projects: Projects in the first part of the innovation process, namely the front end. In the front end, the early-stage innovation project moves from being an idea to a more defined concept. The front end is characterized by uncertainty, experimental and unpredictable.
- Financial criteria: E.g. *Net Present Value (NPV)* and *Return on Investment (ROI)*.
- Non-financial criteria: E.g. *Strategic Fit* and *Customer Benefit.*
- Criterion based on data: A valuation of a criterion is based on facts and statistics collected together for reference.
- Criterion based on assumptions: A valuation of a criterion is accepted and reached without proof.
- Valuation: When a criterion is assessed and receives a value. The value of the criterion can be communicated differently, e.g. by number or words.

Background

- Can you please tell us briefly about your background and what you are doing today?

What criteria can be employed when evaluating early-stage innovation projects in large enterprises in Sweden?

- What criteria are you experiencing that large enterprises currently are employing when evaluating early-stage innovation projects?
- When large enterprises are evaluating an early-stage innovation project, what criteria would you suggest them to employ? Please exemplify.

- In your opinion, should large enterprises employ both financial and non-financial criteria when evaluating early-stage innovation projects?
    - If yes, does any of these types weigh more heavily than the other, and why?
    - If no, why shouldn't both be employed?
- Do you think large enterprises should employ the same criteria for evaluation of all early-stage innovation projects?
    - If not, what determines what criteria you employ for each project?

How can decision-makers at large enterprises in Sweden determine the valuation of criteria?

- When decision-makers determine the valuation of criteria in an early-stage innovation project, what should they examine?
- If large enterprises employ financial criteria, how should decision-makers determine the valuation of these? Please exemplify.
- If large enterprises employ non-financial criteria, how should decision-makers determine the valuation of these? Please exemplify.
- Are there criteria which are more difficult determine the valuation of in an early-stage innovation project?
    - If yes, why and how should decision-makers handle this?
- Should decision-makers adhere to formal aspects when determining the valuation of a criterion?
    - If not, how should decision-makers proceed?
    - If yes, what kind of formalities should exist?
- How should decision-makers determine the valuation of a criterion when the decision-makers perceive that there is a lack of information?
- Given that large enterprises employ assumptions when determining the valuation of criteria, how should decision-makers make assumptions?
- In your point of view, what are the advantages and disadvantages with employing assumptions versus data in terms of valuation of criteria?

Other

- Are there subjects or aspects which you feel that we have missed when asking you about how early-stage innovation projects should be evaluated in large enterprises?
- Lastly, is there anything else you would like to add before finishing this interview?

Appendix 4. Overview of the Coding Process, divided by Experts and Case Companies

	Presentation of Coding Process for Experts
Codes	**Themes**
Understand the idea	**Criteria Discussed and Problematized in the FEI** *Connected to sub-question 1.*
Strategy	
User value	
Financial	
Technical readiness	
Producibility	
Originality	
Cost	
Informed enough	
Process and structure	**Factors Affecting the Choice of Criteria in the FEI** *Connected to sub-question 1.*
The aim and the degree of innovativeness	
Co-developing the idea and determining the valuation of criteria	**Determining the Valuation of Criteria in the FEI** *Connected to sub-question 2.*
Determining the valuation of criteria by intuition	
Determining the valuation of criteria by data	

	Presentation of Coding Process for Case Companies
Codes	**Themes**
Context	**The Setting in the FEI** *Connected to sub-question 1.*
The innovation process in the FEI	
Predefined criteria	**Criteria Employed in the FEI** *Connected to sub-question 1.*
Not predefined criteria	
Prefer data	**Determining the Valuation of Criteria in the FEI** *Connected to sub-question 2.*
Prefer intuition	
Gather data quantitatively	
Gather data qualitatively	
Use intuition	

Appendix 5. Detailed Compilation of the Comparison of Specific Criteria

Specific Criteria Comparing Literature with Empirical Data from Case Companies & Experts						
Overarching Specific Criteria	**[C1]**	**[C2]**	**[C4]**	**[C5]**	**[C6]**	**[E1-E6]**
Competitiveness		Competitive situation		Degree of competition		
Customer	Value	Customer need / User need Value proposition / solution or efficiency factor	Customer value		Value for customers & partners	User value
Feasibility	Feasibility Scalability Replicability	The team Testability Scalability The [C2] company's capacity	Whom benefits	Technical complexity knowledge Technical complexity production	Producibility	Producibility
Financial	(Pressure for financial criteria, e.g. ROI)	Business model Time schedule & budget	Whom benefits	ROI	Value for the [C6] company	Financial Cost
Market	Replicability Market value Attractiveness Potential to address a market	Scalability Market size Implementation plan		Total addressed market potential Spin-off / adjacent areas Commercial readiness level		
Portfolio						
Strategy	Strategic value	R&I Strategy Alignment		Strategic fit (Support digitalization, support prioritized sub-segments, maximize sustainability)	Strategy	Strategic fit
Technology				Technical complexity knowledge Technical complexity production		Technical readiness Cost
Time		Time schedule & budget	Time, scope and quality	Time to market		
Other	Novelty	Wow-factor The solution	Tech. innovation, bus. innovation, proc. innovation & funct. innovation People, performance or portfolio	Estimated differentiation by customer impact	Uniqueness	Understand the idea Originality Informed enough