UNIVERSITY OF GOTHENBURG

SCHOOL OF BUSINESS, ECONOMICS AND LAW

Evaluating and selecting innovative ideas in the Front-End of Innovation

Oskar Kivilo

Hugo Ekman

Graduate school

Master's Degree Project Spring 2021

Innovation and Industrial Management

Supervisor: Linus Brunnström

Abstract

Background & Purpose

The inability to recognize and identify new upcoming innovations cause a great amount of large established firms to get outcompeted within their market. The challenge to identify new innovations in combination with companies' finite resources makes it crucial for companies to make the right decisions regarding what ideas to select in the Front-End of Innovation. Ideas in the front end of innovation are characterized by an uncertain nature with limited amount of information. An adaptable innovation process is vital to help companies evaluate and select the right ideas. The high amount of uncertainty regarding innovation ideas leads to companies using inconsistent approaches to evaluate innovation ideas. Wrong decisions within the front end of innovation tend to lead to time-consuming and expensive deviations in later phases. Consequently, the aim of this study is to investigate how large established Swedish firms maneuver this challenge. The purpose of this study is to contribute insights regarding how established Swedish firms evaluate and select innovation ideas in the front end of innovation.

Theory & Methodology

An extensive literature review of scholars highlighting the front end of innovation and different methods to evaluate and select between innovation ideas are included in the study. The research design of the study is based upon an inductive approach. The research design takes the form of a multiple-case study. Furthermore, twelve qualitative semi-structured interviews with respondents from established Swedish firms regarding how the companies evaluate and select between innovation ideas were conducted.

Findings & Conclusion

Established Swedish firms are employing a front-end innovation process that is divided into different stages. Clustered together, these could be divided into a first, second, and last stage where they throughout the process screened ideas that they could ensure wouldn't fulfill the firm's predetermined requirements. Apart from the screening within these stages, the firms aimed at throughout the process receive further information regarding the innovation ideas value in different areas.

Both the process of gathering information as well as the screening was performed through either intuition or more analytical and often through a mixture of these two called a hybrid approach. As innovation ideas are characterized by an uncertain nature with limited amount of information, the firms commonly performed a lean start-up methodology. This methodology favoured utilizing intuition initially to set up hypotheses which then are analyzed throughout the process with more analytical methods. In other words, the overall trend was that the usage of intuition was mainly performed within the first stage, which then diminished along the process. In contrast, the usage of analytical methods increased along the process and was the main basis of the final last stage evaluation and selection.

Acknowledgment

Before presenting this thesis we would like to express our appreciation and gratitude towards every person who has contributed to this thesis. First of all, we would like to warmly thank the twelve respondents who have allocated their effort and time by participating in this thesis. We would also want to thank Martin Högenberg and Cecilia Ekman at CGI for making this thesis possible through fruitful and inspiring cooperation.

Furthermore, we would like to thank the students that have throughout the thesis engaged in discussions with us in seminars and provided supportive guidance.

Our gratitude also goes to our supervisor Linus Brunnström, who has helped us along the process with valuable insights and feedback. Thank you for the support for this master thesis.

Gothenburg, May 2021-06-03

Oskar Kivilo *Hugo Ekman*

Abbreviations

FFE = *Fuzzy Front-End of Innovation*

FEI = *Front-End of Innovation*

NPPD = *New Product and Process Development*

NPV = *Net present value*

ROI = *Return on investment*

Table of contents

1. Introduction

This chapter aims to provide the background setting and problem discussion of the topic, which aims to explain why the chosen research topic is relevant to study. The purpose of the study will be followed by a research question. Lastly, the limitations of the thesis are described.

1.1 Background

The meaning of innovation has changed over the years. One early modern explanation is that innovations are novel combinations of society and the world (Schumpeter, 1934). Innovation needs to have a potential area of application and be seen as valuable by the user. According to Hakkarainen & Talonen (2014), this is what distinguishes innovation from the term invention. The authors make the distinction that innovations must have a commercial purpose compared to inventions that can occur anywhere without any commercial purposes. Other interpretations of innovation are that it is an idea, a practice, or an object that is perceived as something new by a unit of adoption, such as an organization or an individual. In other words, one determining factor, whether it is an innovation is the user's perceived newness of the idea (Rogers, 2003). A highly competitive and dynamic company environment encourages firms to broaden their approach and perspective towards innovation and thereby questions which platforms to work with. This, combined with increased interest from firms regarding the subject, leads to an increased demand for structured approaches and methods to manage innovation (Anzola-Román et al., 2018). For firms to facilitate and embrace the innovation process, it is necessary to utilize innovation management, which is the practices the firms can implement to manage the innovation performance (Eling & Griffin, 2016).

From a study performed on CEOs by IBM (2012), the conclusion can be made that innovation is among the highest prioritized topics for top management. According to Gassmann and Schweitzer (2014), top managers tend to mainly focus on the later stages of the innovation process that are characterized by clear procedures and defined processes. The same focus is not put on the early phases of the innovation process, which are often called "the Front-End of Innovation", even though this is where most of the leverage exists regarding innovation projects (Gassmann & Schweitzer, 2014). According to Achiche et al. (2013), and Koen et al. (2014), three phases together make up the innovation process. These phases are the Front-End of Innovation (FEI), New Product Development (NPD), and Commercialization (ibid). Figure 1 below illustrates these three phases.

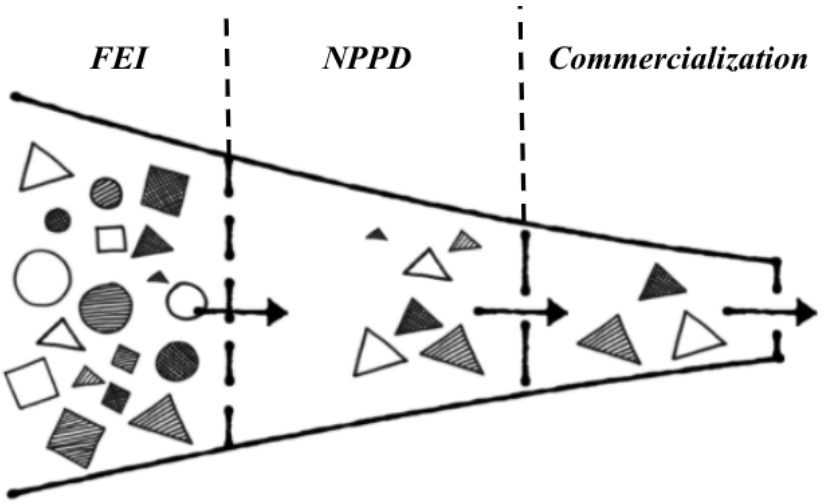

Figure 1: The three phases of innovation described as a process (Koen et al., 2002, p.6).

Hereafter, the Front-End of Innovation will be referred to as FEI. FEI or the often-used synonym Fuzzy Front End is the initial phase of the innovation process and is illustrated as the left part of Figure 1. Within the FEI, opportunities of different kinds turn into ideas, which are later evaluated to make these go/cancel decisions (Kohn & Husig 2003). In practice, these go/cancel decisions are connected to financial investments, which means that these decisions determine which ideas the firm perceived as good enough to receive financial support (Florén & Frishammar, 2012). Those selected ideas are then moved into the more formal New Product Development process, which is illustrated as the middle part of Figure 1. Within this stage, the firms initiate a project, and the ideas are further investigated before moving into the commercialization stage, illustrated as the right part in Figure 1. The commercialization stage is where the innovation ideas are launched into the market (Koen et al., 2002).

1.2 Problem Discussion

According to Chandy & Tellis, (2000), an inability to recognize and identify new upcoming innovations could lead to large incumbent firms getting outcompeted from their market. The next crucial step after the identification of ideas is to possess the capabilities to evaluate the identified ideas in order to allocate resources to the most promising ideas. This is often

challenging for firms since most often firms have several different innovation projects active at the same time and have a finite amount of resources (Goffin & Mitchell, 2017).

This step of being able to manage and choose which ideas to allocate resources to is according to Nicholas et al. (2015), crucial for the firms' overall success with innovations. Wrong decisions within the FEI tend to lead to time-consuming and expensive deviations in later phases. However, even though the importance of focusing and handling the FEI carefully it is also important for firms nowadays to keep this process as short as possible as well (Verworn et al., 2008).

One approach for making this process more manageable could be to employ predetermined criteria for decisions within the FEI process. By doing so the firm will, according to Martinsuo & Poskela (2011), increase its chances of selecting ideas that are aligned with the firm's overall goals and strategy. At the same time, there are discussions within the literature on how predetermined the selection criteria should be and the risk that it can lead to decreased flexibility and missed opportunities (Gutiérrez & Magnusson, 2014). The fact that innovations projects compared to other projects are characterized by higher uncertainty means that otherwise common criteria such as financial criteria are more difficult to apply when evaluating ideas and projects (Cooper et al., 2001). One common approach firms take is, therefore, an inconsistent approach that is not connected to their strategy or goals when selecting innovative ideas in the FEI due to the achieved flexibility (Eling & Griffin, 2016).

1.3 Purpose and Research Question

Even though FEI is considered as a crucial part of a firm's overall innovation success, there are fewer studies conducted on this stage compared to the new product development stage (Koen et al., 2014). Furthermore, there is close to non-existing academic literature regarding how Swedish firms approach the front end of innovation. Thus, there exists a theory gap which is why this thesis aims to contribute with both theoretical and practical knowledge about how established Swedish firms evaluate and select innovation ideas in the front end of their innovation process.

As stressed under the problem discussion, one reason that large established firms get outcompeted within their market is their inability to recognize and identify new upcoming innovations (Chandy & Tellis, 2000). Therefore, it would be of interest to investigate how

large established firms maneuver this challenge. By conducting a literature review and interviews with 12 respondents from different case companies, the authors of this thesis aims to contribute with insights regarding how established Swedish firms evaluate and select between innovation ideas in the FEI to fulfill the purpose of the study. The study will thereby both investigate what activities the firms are performing as well as what the basis is behind their decisions. These insights will be grounded on findings from the analysis done on the study's empirical data as well as findings from the theory. To be able to fulfill the purpose the study will, therefore, aim to answer the following research question:

- *How do established Swedish firms evaluate and select innovative ideas in the Front-End of Innovation?*

1.4 Limitations

The study's limitations regarding its scope are that the main focus has been to collect and analyze data of respondents from Sweden. This limitation is done due to easier access to data and also the time constraints of the study. This limitation could have an effect on the study's generalizability in a geographical sense.

Respondents that are chosen for the study are limited to people who work within the specifically established firms that are studied. Therefore, the recommendations will not aim to be generalized in order to be applicable to all kinds of firms. Finally, as the research question states the scope of the study is limited towards innovation ideas and thereby excluded from study business ideas in general.

2. Literature Review

This chapter presents the literature review of this thesis including both the Front-End of Innovation as well as different methods for evaluating innovation ideas.

2.1 Front-End of Innovation

According to Ho & Tsai (2011), the Front-End of Innovation (FEI) phase is problematic to manage since it is characterized by low levels of standardization, lack of reliable information, and involves both uncontrollable factors and high uncertainty. Even though there exist several difficulties in managing the FEI, scholars have since the late 1980s stressed the importance of managing the phase proficiently (Cooper & Kleinschmidt, 1987). By managing the FEI proficiently, managers will be able to make early informed decisions about which of the firms' ideas to pursue further, which will allow for long-term resource effectiveness and efficiency. In other words, this prioritization and filtering process of ideas will improve the managers' ability to allocate the firms' finite resources among the several innovation ideas (Florén & Frishammar 2012).

There are different views among scholars on how formal the processes should be within FEI. Khurana & Rosenthal (1998) and Koen et al. (2001) argues that there is no benefit of having a process at all for some cases due to the fact that it will decrease the productivity and creativity of the FEI. However, according to Kohn & Husig (2003) and Goodale et al., (2011), a formal process within the FEI is beneficial since it increases the success rate and decreases uncertainty around the innovation projects. These different viewpoints and the importance of creating a balance between letting the innovation flow freely without any constraints and managing innovation is something that Gassman et al. (2006) highlight. Another difference is that activities within the FEI vary depending on the context (Florén & Frishamar, 2012). A literature review was conducted in order to understand how existing research has studied activities and phases performed in the FEI. The result of this literature review is illustrated in Table 1 below.

Authors(s)	Study type	Phases	Explanation of activities
Khurana & Rosenthal (1998)	Multiple case study	Pre-phase zero	Preliminary opportunity identification, market and technology analysis, idea generation
		Phase zero	Identify market segment, customer needs, understand current requirements and capabilities, align with business strategy
		Phase one	Product and project definition and specify the need of support
Cooper (1998)	Case study	Idea generation	Make the idea conceptualized
		Preliminary assessment	Define the position of the product and its benefits that it will deliver
		Concept definition	Analyze the probability of development and success in the market
Montoya- Weiss & O'Driscoli (2000)	Case study	Concept development	Make the idea into concepts to get a better understanding of their opportunities
		Concept rating	Perform a rating of the conceptualized ideas in order to make a selection
		Concept assessment	Make a concept to identify market success factors
Koen et al. (2001)	Literature review	Opportunity identification	The organization identifies the opportunities they want to further look into
		Opportunity analysis	Make these identified opportunities into specific technology and business opportunities and perform market and technology assessment
		Idea genesis	Combine, reshape, modify, upgrade, torn down the opportunities into concrete ideas
		Idea selection	Select which of the concrete ideas that will bring the most value
		Concept and technology development	Develop a business case that illustrates the estimated customer needs, market potential, competitor assessment, investment requirements and also the overall risk
Langerak et al. (2004)	Case study	Strategic planning	Preliminary assessment of market opportunities, required resources and the strategic directives
		Idea generation	Perform elaboration and generation of solution that potentially could solve the strategic market opportunities
		Idea screening	Screen the above generated solutions
		Business analysis	Assess the new products market opportunities, required resources, strategic and risk directives
Heising (2012)	Literature review	Opportunity identification	Identify different opportunities areas
		Ideation	Aim to generate new ideas through working in creative environments
		Evaluation	Perform a evaluation of the ideas and the market success factors

Table 1. An overview of the literature regarding activities and phases in the FEI. Compiled by the authors.

As seen in Table 1 above, there are similarities throughout the literature regarding the FEI and which activities are performed. One apparent similarity is that the initial activities in the FEI are all related to identifying opportunities and ideas. This stage is then followed by activities to translate these opportunities and ideas into specific technology and business opportunities. Then the final stage involves activities in order to estimate the customer needs, competitor assessment, market potential, investment requirements, technology unknowns, and the overall project risks. From this brief overview of the literature on the FEI topic, the authors decided to narrow in on Koen et al. (2001) description of the FEI and The new concept development model developed by Koen et al. (2001).

2.1.1 The new concept development model

The goal of the model is to provide a structured foundation in order to decrease the fuzziness of the FEI (Koen et al., 2001). The authors Blank, (2006) and Mootee, (2011) argue that it is a model that is beneficial to use in order to combine creative and analytical processes when collecting customer insights, customer's needs, explore white spaces and thereby create valuable opportunities. It is a non-sequential process and does not follow a linear process as other models often do within the same field. The model is described from a process perspective. However, its circular shape illustrates the importance of iterative thinking. The new concept development model is divided into three parts illustrated in Figure 2: engine, influencing factors, and inner area (Koen et al., 2001).

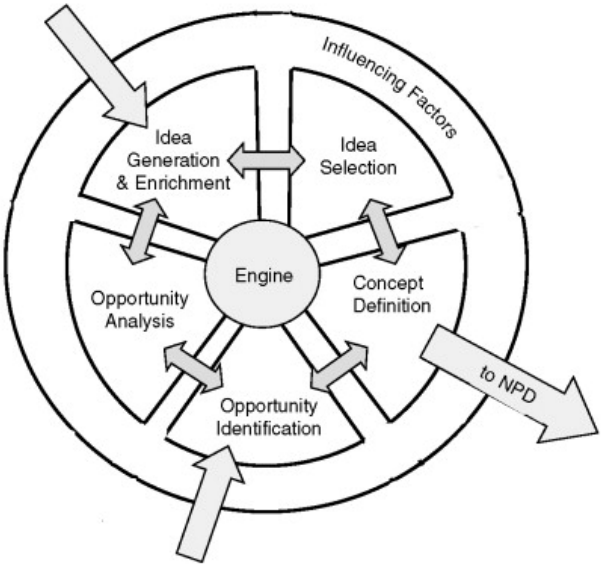

Figure 2: The New Concept Development Model (NCD) provides the possibility of iterative thinking from a process perspective (Koen et al., 2001, p.47).

The engine in the middle of Figure 2 affects the other parts of the model and could be compared to the organizations' culture, context, and leadership that the organisation's management could control (Koen et al., 2001: Danes & York, 2011). How well an organization manages these elements partly divides less innovative companies from the highly innovative ones (Koen et al., 2001; Dess et al., 2004).

The circle at the far end in Figure 2 illustrates the influencing factors. This part contains all possible factors that could influence the FEI Examples of factors could be stakeholders, social and economic trends, organizational capabilities, business strategy, and external distribution channels (Koen et al., 2001). These factors are mainly uncontrollable for the organization, however, they influence the entire innovation process (Koen et al., 2001). Even though they are mainly uncontrollable, it is crucial for the organization to be aware and understand them since they will have an impact on how and if the innovations will be adopted within the society (Koen et al., 2001; Frankelius, 2001).

The five triangles in Figure 2 illustrate the five elements within the FEI that are all controllable. The elements are Opportunity identification, Opportunity analysis, Idea genesis, Idea selection, and Concept and Technology Development. As stated above the model is a non-sequential process which means that there exists iteration between these five elements. The ideas, concepts and opportunities are able to iterate, flow and circulate between the five elements. This differs when comparing with other models within the same field such as the linear NPD where iterative between elements is perceived as a gating error, and not as a useful way to gain positive correction (Koen et al., 2001; Danes & York, 2011). According to Koen et al. (2002) looping back could potentially delay the concept and technology development, however, it will instead shorten the entire total cycle to launch a service or product. The five elements in Figure 2 are presented in more detail below.

1. Opportunity identification.

Within this element, the firm is identifying potential opportunities to develop. An opportunity could be a smaller incremental innovation for an existing product or service, or it could be a totally new direction for the firm. Furthermore, it could also be a new manufacturing process or a new product platform for example. It might happen from recognizing previously undetected issues or unmet customer needs (Koen et al., 2001, 2002).

According to Florén & Frishammar, (2012) and Gama, Frishammar & Parida (2019) the process should be formalized since it captures ideas and encourages the employees to be creative. Furthermore, Frishammar et al. (2016) stresses the importance of constructing these teams with individuals from divergent backgrounds since it will increase the number of newly identified ideas.

2. Opportunity analysis.

Within this element, the identified opportunities are transformed into specific technology and business opportunities which requires that additional information is added to the opportunities. For organizations to receive additional information could be problematic and the team needs to clearly understand what kind of information they require in order to fill in the gaps (Stevens, 2014). This could be achieved through market studies, scientific experiments, and focus groups (Koen et al., 2001). Furthermore, tools that are commonly used are strategic framing, market segment assessment, competitor analysis, and customer assessment (Koen et al., 2001).

3. Idea Genesis

It is in this element the opportunity becomes a concrete idea. This process is done through that ideas are combined, reshaped, built upon, upgraded, and modified. An innovation idea may be iterated and changed along the process due to development, discussions, and examination along with other elements of the inner area. To connect with external stakeholders such as potential users and customers of the idea and also competitors and institutions is valuable within this part of the process. Other examples of activities performed in this element are brainstorming or other similar activities to come up with a modified concept of the idea. The final output from this element is to possess a more well-developed and complete description of the identified idea (Koen et al., 2001).

According to Brown (2009), it is not beneficial to create these ideas in isolation by solely in an abstract way or only using words. Instead, the most beneficial way is to use multiple tools and methods. Furthermore, to refine the ideas other people should be included in the process to ensure that the team is cross-functional (Florén & Frishammar, 2012), which according to Khurana & Rosenthal, (1998) will enable the concept to be further defined. It is also crucial to ensure the quality of the idea, and include estimated risks, and reduce the uncertainty as much as possible (Florén & Frishammar, 2012). Finally, according to Frishammar et al.

(2016) to make sure the idea is explained in an easy and simple way that is easy to understand will enable a shared understanding within the team.

4. Idea Selection

In order for firms to receive as much business value from their innovation effort as possible, it is critical that the firm has a process of how to select which of the firm's ideas to allocate resources to. The characteristics of this selection differ, it could be that the individuals select among self-generated ideas or more formalized as having a predetermined portfolio method. To have the latter, a more formalized selection process within these early stages is often problematic due to limited understanding and information. Furthermore, financial criteria tend to be just "wild" guesses. Instead, this process should make sure it includes and considers technology and market risk, competitive realities, level of investment, the firm's capabilities, and other unique advantages beyond just financial returns. The idea selection will also consist of several iterative series of activities within the other inner areas and also receive new directives from the management in the engine and new insights from the surrounding influencing factors (Koen et al., 2001).

An organization that has a process that enables going back and forth between the different elements will create an ideal selection that is easier to perform (Brown, 2009). Kock, Heising & Gemünden (2014), highlights that when performing the idea selection, it is crucial to not solely assess the idea by itself, instead have a perspective of the ideas addition to the organizations' idea portfolio in order to secure a variety of different concepts and ideas.

5. Concept and Technology Development

It is within this element that the firm developed a business case of the idea that is based on estimations of investment requirements, technology unknowns, customers needs, the market potential, assessment of potential competitors, and other risks. This is the final exit element before moving the idea into the NPPD process, however, the authors stress that it is common among firms to consider this stage as the initial stage of the NPPD process instead. The degree of formality often differs between the different business cases depending on the characteristics of the idea (Koen et al., 2001). According to Stevens (2014), it is crucial to within this stage perform trade-offs regarding time, resources, and money that the ideas will require.

2.2 Evaluating Innovation Ideas

Idea screening and evaluation of innovation ideas is a crucial part of the FEI since it helps organizations both to select ideas for development and to focus their limited resources on ideas that are considered promising (Toubia & Floréz, 2007). Once the ideas are in the idea management process, they need to be evaluated to determine if they have the potential to add enough value to be taken a step further in the process, closer to more rigorous development, and finally implementation.

Evaluation of ideas is mostly done by people with the relevant domain knowledge, referred to as experts (Denker, 2018; Magnusson, Wästlund, and Netz, 2016). The task for these experts is then to find good ideas that can be developed into innovation projects (Cooper, 2014; Florén & Frishammar, 2012; Koen et al., 2001). However, evaluation of innovation ideas is a task with complex dimensions since the experts may need to approach it from multiple perspectives and rely on different criteria, while simultaneously being efficient when evaluating ideas (Dziallas, 2020).

A literature review was conducted in order to understand how existing research has studied evaluation methods to evaluate innovation ideas. The result of this literature review is illustrated in Table 2 below.

Author(s)	Intuition	Analysis	Hybrid	Key focus/insights
Runco (1988)		✓		Originality is a crucial aspect of creative ideas but should be balanced with usefulness.
Balachandra & Friar (1997)		✓		Despite different contexts, there should be three general criteria used for evaluation of ideas: (1) the innovation's nature, (2) the market's nature, and (3) the nature of the technology.
Carbonell-Foulquie et al. (2004)		✓		There should be five dimensions of go/no-go criteria: (1) feasibility, (2) strategic fit, (3) market opportunity, (4) acceptance of customers, and (5) financial performance.
Sadler-smith & Shefy (2004)	✓	✓	✓	If there is a lack of consensus regarding key variables, it is necessary to combine analytical and intuitive evaluation
Dean et al. (2006)		✓		Creative ideas are built upon (1) workability, (2) relevance, (3) specificity, and (4) novelty.
Dane & Pratt (2007)	✓			Intuitive evaluation of ideas is suggested as rapid approach to deal with complex situations.
Hodgkingson et al. (2009)	✓	✓	✓	Essential to balance balance analytical and intuitive decision-making
Sadler-smith & Sparrow, (2009)	✓	✓	✓	Analytical and intuitive evalution can function in parallel and should not be seen as mutually exclusive
Dayan & Di Benedetto (2011)	✓			Creative decision-making and the effectiveness of intuitive judgements are boosted by relevant experience.
Kudrowitz & Wallace (2013)		✓		Evaluation of ideas are suggested to have three attribute metrics: (1) Feasibility, (2) usefulness, and (3) novelty.
Magnusson et al. (2014)	✓	✓		Decisions that are based on holistic intuition can be explained by: (1) use value, (2) producibility, and (3) originality.
Pretz et al. (2014)	✓			Three types of intuition are identified: (1) affective, (2) holistic, and (3) inferential.
Eling et al. (2015)	✓	✓		Combining rationality and intuition improves both the speed and quality of idea evaluation.
Stierand & Dörfler (2016)	✓			Intuition is composed of both judgments based off intuition, which generates tacit decisions and intuitive insights which acts as a form of tacit sensemaking.
Petervari, Osman & Bhattacharya (2016)	✓			Intuition can be used to form coherent view of ill-defined ideas.
Frederiksen & Knudsen (2017)		✓		Three criteria are outlined that might lead to innovation performance: (1) usefulness, (2) novelty, and (3) market potential.
Sukhov et al. (2018)		✓	✓	Personal values influence how people analyze ideas for innovation.
Dziallas (2020)	✓	✓		A structured front-end process for decision-making is needed to deal with the challenges of uncertainty and complexity.

Table 2. An overview of the literature regarding evaluation methods for evaluating and selecting innovation ideas. Compiled by the authors.

The literature review in Table 2 above revealed that extant research has primarily studied the evaluation of innovation ideas by drawing on three evaluation methods: intuition, analytical thinking, or a hybrid of these two. These perspectives are not mutually exclusive but focus on different aspects of the evaluation stage, and how these perspectives can affect the judgment of ideas. These studies have provided important insights into different dimensions of the evaluation of innovation ideas. In Table 2 the usage of the three evaluation methods is illustrated as well as a short description of the key findings from every research. These three evaluation methods will be further described below.

2.3 The Three Evaluating Methods

The evaluation stage of innovation ideas can be done in different ways. As seen from Table 2 above, three different methods are the most commonly used to evaluate ideas; analytical, intuition, or a hybrid approach. The analytical approach is formally the most common (Magnusson et al., 2014). The analytical and intuition approach can be derived from the dual-processing theory (Evans, 2008; Hammond, 1996). Dual-process theories of reasoning and thinking have become progressively influential (Evans, 2010, Evans & Frankish, 2009). The dual-processing theories distinguish between system 1 (intuition) and system 2 (analytical) (Dane & Pratt, 2009). System 1 is usually described as unconscious, automatic, rapid, and is linked to intuition. By contrast, the latter is inherently conscious and controlled and is linked to rational argumentation (Evans, 2008). Analytical evaluation is grounded in system 2 where it is based on several explicit, potentially weighted criteria by one or more competent assessors.

The three evaluation methods will be further described below. First off, the analytical evaluation will be described, since Koen et al. (2002) consider it to be the mainstream way for idea management. Secondly, the "intuitive evaluation" will be described and lastly, a combination of these two will be described as the “hybrid evaluation”.

2.3.1 Analytical evaluation

In order to analytically evaluate ideas, the evaluators need a framework to which they can relate these ideas and determine their quality (Phillips et al., 2016; Zhou et al., 2019). Thus, organizations often produce specific criteria that guide evaluation toward relevant outcomes (Zhou et al., 2019). Analytical thinking also enables generic ideas to be divided into components that can help evaluators deal with potential uncertainty during idea evaluation (Dziallas, 2020). By using an analytical approach, the evaluator thinks hypothetically, processes ideas in detail, and rationally evaluates ideas through criteria (Colom et al., 2004). In practice, the evaluator uses a rule-based framework based on different criteria to assess an idea's quality (Hammedi et al., 2011). If the idea satisfies the predetermined criteria, the idea will be considered high quality; whereas, if the idea does not satisfy the criteria, it will be considered low quality and thus be rejected (Dean et al., 2006).

However, analytical evaluation is a time-consuming and effortful activity for the evaluator (Eling et al., 2015). The importance of a specific criteria and how it should be used may also vary from idea to idea as its relevance could vary depending on its relevance to the idea (Hammedi et al., 2011).

The advantages of using analytical evaluation include increased control over the evaluation process and work when evaluating low complexity ideas (Sadler-Smith & Burke, 2009). One challenge with analytical evaluation is how the chosen criteria should be weighted (Soukhoroukova et al., 2012). Furthermore, the criteria are limited to evaluating ideas within a specific context and phase (Magnusson et al., 2014).

2.3.2 Intuitive evaluation

An intuitive evaluation is in contrast to an analytical evaluation and is based on the assessor's intuition about an idea. Thus, the idea's assessor decides whether the idea is of sufficient value to be approved based on intuition. Dane & Pratt (2007) define intuition as affectively charged judgments that arise through rapid, unconscious, and holistic associations' that leads to a much faster process of evaluating ideas, though it requires significantly more expertise of the assessor.

Organizations thereby use Intuition-based idea evaluation due to its increased speed (Dane & Pratt, 2007; Eling et al., 2015) and its simplicity (e.g., Onarheim & Christensen, 2012). Furthermore, an intuitive evaluation can be preferable when evaluating high complexity ideas, or when an idea is very loosely defined (Hodgkinson et al., 2009; Sadler-Smith & Burke, 2009).

Intuition is partly based on past experience, where its accuracy is correlated to whether or not the evaluator is familiar with the context (Sadler-Smith & Burke, 2007; Salas, Rosen, and DiazGranados, 2010). Moreover, intuition is derived from an individual's ability to quickly process information using heuristics and can be characterized as unconscious and holistic judgments (Kahneman & Frederick, 2002)**.** Intuitive activities in the evaluation process can take the form of instances of judgments that are unconscious, rapid, holistic, and affective (Dane & Pratt, 2007; Evans, 2008).

One closely related perspective of using intuition in the evaluation of ideas is sensemaking. This perspective emerged from the organization and social psychology studies and explains the interpretive processes that individuals perform in order to create plausible meaning to base decisions about (Maitlis & Christianson, 2014; Weick, Sutcliffe, and Obstfeld, 2005). The sensemaking stage is performed in situations characterized by discrepancy and ambiguity (Sandberg & Tsoukas, 2015; Weick et al., 2005) and involves recognizing hints from retrospection and the environment (Maitlis & Christianson, 2014; Weick, 1995; Weick et al., 2005).

According to Sukhov et al. (2018), the literature shows that an individual's background and identity do have an effect on the way the individual makes sense of innovation ideas. This is in line with Ulrich et al. (2015), who argues that sensemaking will have an effect on how the evaluators frame the ideas. Therefore, sensemaking does explain the interpretation process that individuals use in their decisions to both reduce and form an understanding of the ambiguity (Sandberg & Tsoukas, 2015; Weick et al., 2005).

The meaning-making activities help to understand the idea, and how to during the idea screening act, besides that it will also hold generative properties which enable the persons to both reframe the already existing understanding in different ways and also to create new ideas (Avital & Te'Eni, 2009; Drazin et al., 1999; Ulrich et al., 2015). To sum up, sensemaking

actions aim to reduce ambiguity since they will enable the decision-makers to take further actions.

2.3.3 Hybrid Evaluation

According to Hodgkingson et al. (2009), it is essential to balance analytical and intuitive decision-making. If one puts too much emphasis on the analytical approach, it is easy to miss the bigger picture. On the other hand, if one focuses on the intuitive ability, that carries a risk of overlooking crucial details (Hodgkinson et al., 2009). A few essential factors to consider when it comes to an intuitive evaluation of innovation ideas are decision-makers expertise, the nature of the ideas, and the awareness of distinguishing intuition from impulsive instincts. Neither the analytical nor the intuitive evaluation perspective is limited to selecting specific methods for evaluating ideas in purely practical terms, as they are rather ways of thinking than concrete frameworks (Hodgkingson et al., 2009).

Furthermore, Sadler-Smith (2009) argues that the analytical and intuitive evaluation can function in parallel, and should not be seen as mutually exclusive. The increased complexity in organizational systems and technological advancement has resulted in large amounts of available data, which decision-makers need to comprehend (Sadler-Smith, 2009). Using exclusively analytical evaluation would make the process of handling the data less efficient, therefore, making it necessary to consider a balance between intuition and analytical evaluation (Sadler-Smith & Shefy, 2004). Furthermore, Sadler-Smith & Shefy (2004) argue that it is necessary to combine the analytical and intuition evaluation process where there is a lack of consensus regarding key variables among the decision-makers. These variables can be uncertainty, cause- and effect relationships, and organizational goals. If one can not predict these variables, an intuitive evaluation process needs to complement the analytical evaluation process (Sadler-Smith & Sparrow, 2009). Table 3 below presents a summary of the three evaluation methods described above.

Perspective	Definition	Characteristics of idea screening activities	Key references
Intuition	Quickly make a holistic judgement based on subjective and/or undefined criterias	- Quick - Holistic - Affective - Unconscious	Pretz et al. (2014), Evans (2008), Dane and Pratt (2007)
Analytical	A conscious, slow process that involves logical evaluation and reasoning build upon knowledge that create a judgement	- Rational - Rule-based - Controlled - Conscious	Hodgkinson & Sadler-Smith (2018), Hammedi et al. (2011), Evans (2008)
Hybrid	Enables a combination between intuitional and analytical evalution that improves the balance of the evaluation	- Intuition complements analytical evaluation - Analytical complements Intuition evaluation	Sadler-smith & Shefy (2004), Hodgkingson et al. (2009),

Table 3. A summary of the three evaluation methods: Intuition, Analytical, and Hybrid. Compiled by the authors.

As seen in Table 3 above the three evaluation methods differ, where the intuition-based evaluation is characterized by a quick evaluation and the analytical is a slower more conscious evaluation. The hybrid method is a combination of these two where the two methods complement each other in different ways.

2.4 Synthesis of Literature and Conceptual Model

Based on the conducted literature review above, the authors of this study have developed Figure 3 below to illustrate the findings from the literature review that are aligned with the purpose of this thesis.

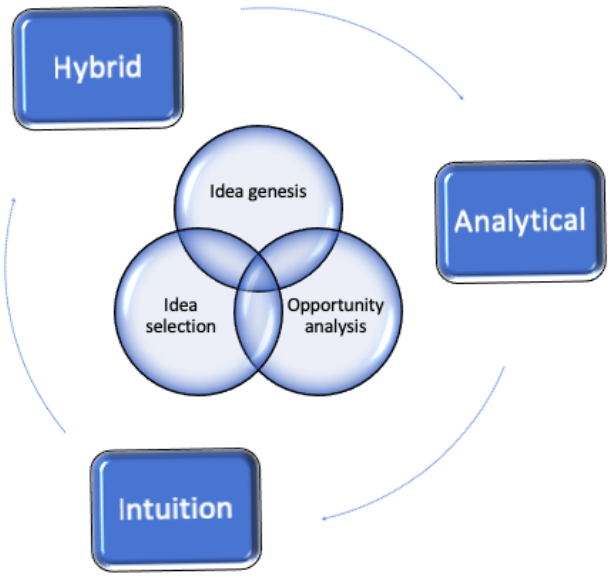

Figure 3. Synthesis of literature and conceptual model. Compiled by the authors.

The three circles in Figure 3 demonstrate the three processes within the FEI that involve firms' evaluation and selection process of innovation ideas. Those are the Opportunity analysis, Idea genesis and Idea selection. Due to the fact that this study aims to answer the research question regarding how firms evaluate and select innovation ideas, the elements "Opportunity identification" and "Concept and Technology Development" from Figure 2 are excluded in Figure 3. This since the author's perception is that the element "Opportunity identification" regards more the identification of opportunities rather than the evaluation and selection process. Furthermore, the "Concept and Technology Development" element is excluded due to the fact that it is perceived as the stage after the firms have evaluated and selected innovation ideas. This is in line with Koen et al. (2001) who highlighted that it is common for firms to view this element as the initial stage of the NPPD process instead of the last within the FEI. The three surrounding rectangles in Figure 3 above demonstrate the three identified evaluation methods that firms could utilize within the FEI in order to evaluate innovation ideas. These are the presented methods in the literature review; Analytical, Intuition as well as Hybrid method.

3. Methodology

This chapter presents a comprehensive view of how the study was conducted. First, the chosen research strategy will be presented, followed by the research design. Thereafter, the method for data collection and data analysis will be presented. Advantages, disadvantages and the rationale behind the choices will be presented in all sections. Lastly, the chapter will be finalized by discussing the quality of the study and ethical considerations.

3.1 Research Strategy

As stated previously, the study's purpose is to investigate how established Swedish firms evaluate and select innovation ideas in the FEI. In order to answer the study's purpose of how established Swedish firms evaluate and choose between innovation ideas, a deep description of the phenomena based on the respondents point of view is required.

A qualitative approach is beneficial in order to collect the necessary data and enable a deeper contextual understanding of the subject Yin (2007). As argued by Bryman, Bell, and Harley (2019), there are other approaches, such as quantitative or mixed approach. However, a qualitative approach was found to be most appropriate for this study. Bryman, Bell, and Harley (2019) describe a qualitative research strategy as more descriptive than a quantitative approach. It is a research strategy that emphasizes words rather than quantification in the collection and analysis of data and is, therefore, more concerned with the respondents' point of view rather than the researcher's point of view (ibid). This is in line with Eisenhardt & Graebner (2007) who argue that qualitative research will provide insights into a phenomenon, and produce deep descriptions that would not be possible if a quantitative approach had been chosen.

The study will use an inductive approach between theory and research to answer the research question. The focus will be on observing and exploring how established Swedish firms evaluate and select innovation ideas in the FEI and combine these observations with theories on the subject to answer the research question. Moreover, the research aim is more general and appellate to generate descriptive evidence through observations, rather than to test a produced theory on established Swedish firms. The study's empirical data is, therefore, the ground of the study’s theory. When doing so it is important to make sure it is possible to make comparisons based on deep and varied empirical data for the thesis results to be both

robust and reliable (Eisenhardt & Graebner, 2007. Miles & Huberman, 1994). Furthermore, according to Bryman, Bell, and Harley (2019), qualitative research predominantly emphasizes an inductive approach to the relationship between theory and research.

3.2 Research Design

This study's research design will be presented in this part, why a particular research design was chosen and how it will be executed.

The study was conducted in the form of a multiple case study with a comparative design. The comparative design uses more or less identical methods of two or more contrasting cases, realized through qualitative or quantitative research. It embodies the logic of comparison. It can be applied to a multitude of situations to inform several levels of analysis. The design can be applied to a qualitative research design strategy and takes the form of a multiple-case study (Bryman, Bell, and Harley, 2019).

Yin (1994) argues that if a study aims to increase the knowledge of a previously almost unexplored area and that the study aims to generalize the results into theory a multiple-case study is recommended. Yin (2007), also argues that the different cases within a multiple case study will be used to replicate, develop new or existing theories, or demonstrate constraints among theories. Furthermore, Eisenhardt (1991), stresses that different cases will illustrate the different and complementary aspects of a phenomenon. This enables the researcher to combine different findings from different cases in order to create a more complete theory of the phenomenon.

Eisenhardt & Graebner (2007), argues that the development of theories from case studies is an approach that produces a correct, interesting, and testable theory due to the fact that case studies emphasize the rich, real-world context that the phenomena are occurring in. This in comparison with more laboratory experiments that are more isolating the phenomena from the context.

Miles (1979) stresses in his criticism towards qualitative approaches that a case study requires large time requirements to perform. This means that researchers with finite resources always need to make the trade-off between broadening the study or a more in-depth view.

The choice of using a multiple case study for this thesis is partly based on Eisenhardt & Graebner (2007) arguments that single case studies are suited to investigate a specific case, however, multiple case study is more suitable when the study aims to achieve a broad view.

3.3 Primary Data Collection

As mentioned, qualitative interviews were performed as the method for collecting the study's primary data. When performing qualitative interviews the researcher needs to decide on how structured the interview should be (Bell, Bryman, and Harley, 2019). For this study, the authors have chosen to use a semi-structured approach which means that the questions in the interview guide were formulated in an open way that encouraged the respondents to answer in their own way and less directed to a specific direction of their answer. Furthermore, it also provided the opportunity for the authors to ask follow-up questions when the authors believed it was beneficial. The reason for the choice of this approach is due to the fact that it encourages discussion within the interviews that creates useful empirical data that was required to succeed with the purpose of the study. According to Bell, Bryman and Harley (2019), semi-structured interviews will generate data that make it possible to get a deep understanding of the respondents' answers, which is required for the authors to succeed with the study's purpose.

Another approach that could have been used is an unstructured approach when collecting the data. However, the authors believe that this approach would have been too flexible to be able to fulfill the study's purpose in the most foremost way. This is due to the fact that Bell, Bryman and Harley, (2019), favor a semi-structured approach when investigating a certain topic which is what the authors did in this study. Furthermore, the authors also argue that using semi-structured interviews compared to unstructured interviews was a better approach due to the fact that it enabled comparison between the cases. By comparing several cases, one can analyze the circumstances in which a theory will or will not hold (Bryman, Bell, and Harley, 2019). A combination of semi-structured interviews and a comparative research strategy could, therefore, were seen as a beneficial fit for the study.

3.3.1 Interview Guide

An interview guide was performed once our understanding of the subject was adequate to understand the most relevant questions in order to receive as useful empirical data as possible. This interview guide was then used when performing interviews and was sent out in advance to the respondents in order to give them the possibility to understand the questions in advance and potentially prepare answers which improved the quality of the answers that we received from the interviews.

3.3.2 Conducting Interviews

Twelve semi-structured interviews were conducted with one respondent each from twelve case companies. Before conducting the interviews, the respondents were provided with the purpose and research question of the thesis and the interview guide. Furthermore, a request for participation and information about the interview regarding the possibility to record the interview as well as stating that the respondent has the option of not answering any questions was provided to the respondent.

All of the interviews were conducted through Zoom due to external factors. According to Bryman & Bell (2011), it is important to not underestimate the right environment for an interview. A calm and private environment will make it easier for the respondents to express thoughts and answers (ibid). By conducting the interviews through Zoom, it enabled the respondents to decide on a place for the interview, a calm and private environment was achieved.

Before the interview was started, the authors presented the purpose of the study and asked the respondents for permission to record the interview. Furthermore, the authors asked the respondents for permission to use the case company name in the thesis. It was also explained that the video recordings would only be used to transcribe the interviews. All the respondents from the case companies gave their approval to record the interviews. According to Bryman & Bell (2011), one advantage of recording qualitative interviews is that it allows the interviewers to fully concentrate on what is being said, instead of focusing on taking notes. One possible disadvantage when audio-recording an interview is that the respondent may become self-conscious and overthink what they are saying. Furthermore, transcribing an interview is highly time-consuming. All though, it facilitates the analysis of the data as it

allows for repeated examination of the answers (ibid). All the interviews were fully transcribed shortly after the interview was held.

3.3.3 Language

All of the interviews in this study were conducted and transcribed in Swedish. After the transcriptions were done, they were translated into English. Before the interviews were started, the respondents had the choice of either being interviewed in English or Swedish. As all of the respondents were of Swedish natives, they chose Swedish as it would be more comfortable. Offering the choice of language is supported by Bryman & Bell (2011) who argues that while conducting an interview the researcher must consider potential restraints of language.

Bryman & Bell (2011) argues that there are two limitations. First, in socio-cultural, a person needs to possess a certain cultural background to understand sayings or phrases (ibid). Secondly, in linguistic terms, there are Swedish words that have no equivalent in English (ibid). The authors of this thesis translated and transcribed the interviews carefully with these limitations in mind.

3.3.4 Choice of Respondents

What constitutes a case within a case study is according to Yin (2007) decided from the study's aim and research question. A case could consist of an individual, a group of individuals, a process, or even an entire organization. The definition is, therefore, flexible. Within this study, the studied firms did each represent a specific case that was studied within its own context. In total, the study consisted of 12 cases.

According to Siggelkow (2007), there are several benefits for a study to use what he referred to as special cases. In comparison with quantitative research where the chosen cases should be selected based on the aim to represent the population. The author argues that for case studies the cases should instead be selected based on the special information they will provide to the specific research. This is in line with Eisenhardt and Graebner (2007) who advocate the replication logic, where the cases should be viewed as an analytical unit that stands on its own. This enhanced the researcher to more easily and accurately identify patterns among the cases and also decrease the risk of wrongly identified patterns.

The cases were selected through a non-probability sampling method called purposive sampling. This since according to Bryman and Bell (2011), a purposive sampling method's goal is to achieve a sample of cases strategically. Thus, achieve a relevant sample for the study's research purpose. According to Bryman and Bell (2011), the purposive sampling method is criticized due to its low likelihood of representing the entire population. However, the critique regarding low generalizability can be to some extent be overseen when performing qualitative research (Bryman and Bell, 2011).

The authors wrote the thesis in collaboration with CGI where the goal is to provide insights regarding how established Swedish firms evaluate and select innovation ideas for CGI in their development of a future digital innovation platform. The chosen inclusion criteria for the selected cases were decided in collaboration with CGI. This approach of selecting cases based on a purposive sample, will according to Bryman and Bell (2011) ensure the relevance of the selected cases. The chosen inclusion criteria, as well as the exclusion criteria for the cases, are shown below in Table 4.

Cases
Purpose of study: How do established Swedish firms evaluate and select innovation ideas in the FEI?
Inclusion criteria for cases & respondents: 1. Established firms that have been operated for at least five years 2. Minimum revenues of 1000 (MSEK) in 2019 3. Swedish firms 4. A firm that has a stated innovation department 5. The respondent has a decision making role in the evaluation and selection process of innovation ideas in the firm
Exclusion criteria for cases & respondents:
1. Firms that have been operated for less than five years 2. Revenues less than 1000 (MSEK) in 2019 3. Non-Swedish firms 4. A firm that does not have a stated innovation department 5. The respondent does not have a decision-making role in the evaluation and selection process of innovative ideas in the firm

Table 4. Summarization of inclusion and exclusion criteria. Compiled by the authors.

In order to achieve an understanding of the study's purpose 12 interviews were conducted. The inclusion criteria above in Table 4 were used in order to find appropriate cases. The first criteria were chosen due to that CGI whom the authors collaborated with wanted insights from established firms that have been operated for at least 5 years in order to exclude start-ups that were not in their interest. The second criteria relate to that a firm should have earned revenues of at least 1000 (MSEK) in 2019. This is to further prove that the included companies are established. The choice of looking at the firm's revenues in 2019 is due to the fact that 2020's annual reports were released after the inclusion criteria were performed. Furthermore, the data presenting the revenues in Table 5 below were collected from each firm's annual report of 2019. Thirdly, CGI wanted insights from firms that operate mainly in Sweden. The fourth criteria were developed in order to achieve insights from companies that have a dedicated innovation department and thereby experience from innovation processes. Lastly, in order to achieve a deep understanding of the respondents' evaluation process, a representative with a decision-making role within the firm's innovation process was chosen. Furthermore, the authors perceived one respondent from each firm as sufficient to provide the necessary insights to answer the research question. By implementing these four criteria it would ensure the respondent's ability to contribute to the research purpose. All cases are presented in Table 5 below.

Case company	Position of interviewee	Revenues, 2019 (M)	Interview duration	Date	Interview approach
C1 (Atrium Ljungberg)	Business Developer Manager	2 811	37 min	2021-02-15	Zoom
C2 (Castellum)	Project Manager, Strategic Initiative	5 821	34 min	2021-02-17	Zoom
C3 (Essity)	Global Technical Innovation Manager	128 975	31 min	2021-02-19	Zoom
C4 (Holmen)	Vice President Business Development	16 960	21 min	2021-20-24	Zoom
C5 (ICA)	Marketing Director	119 295	26 min	2021-20-24	Zoom
C6 (Liseberg)	CFO	1 265	35 min	2021-02-15	Zoom
C7 (MTR)	CEO	5 805	28 min	2021-02-17	Zoom
C8 (SKF)	Head of PMO, R&D Operations	86 000	30 min	2021-02-18	Zoom
C9 (Polestar)	Business growth & Innovation Manager	1 255	54 min	2021-02-17	Zoom
C10 (Stena)	Business Developer Manager	23 658	24 min	2021-02-25	Zoom
C11 (Swedavia)	Digital Innovation Manager	6 235	46 min	2021-02-24	Zoom
C12 (Wallenstam)	Innovation & IT Manager	2 026	23 min	2021-02-25	Zoom

Table 5. Summarization of the cases used in the study. Compiled by the authors.

The respondents were initially contacted by the authors through phone, either directly or through the firm's receptionist. After a short description of the thesis purpose and the aim of the interviews, the authors and the contacted respondents together decided which representative of the firm would be appropriate to fulfill the inclusion criteria. This is something that Bryman and Bell (2011) also stress, that authors should aim to identify relevant respondents within the chosen firms that fulfill the inclusion criteria. After performing 12 interviews the authors experienced data saturation since the answers became repetitive and did not provide any new insights which decided the sample size to 12 cases. This is in line with Francis et al. (2010) which stresses that once data saturation is achieved, no additional data from additional interviews will contribute to further understanding of a concept.

3.4 Secondary Data Collection

The secondary data collection began by conducting a systematic literature review. A systematic literature review is beneficial because biases may be limited, and actions such as decisions, procedures, and conclusions, taken by the researcher can be traced (Bell, Bryman & Harley, 2019). Furthermore, conducting secondary data collection and acquiring information on existing research will help to answer the research question. According to Bell, Bryman, and Harley (2019), some of the benefits of using secondary data is that it is a time-efficient and easily accessible source of high-quality data. The secondary data collection began by conducting literature related to the management of the Front-End of innovation and innovation portfolio management. In order to find literature for the secondary data, keywords relating to these fields were used. The following keywords were used in different combinations: evaluating innovation, front end of innovation, selecting innovation ideas, idea screening, innovation portfolio, early stages of innovation, FEI, decision-making, and evaluation. Theories in these fields are necessary in order to understand the theoretical model for which the primary data collection was based upon. Highly technically oriented literature was excluded in the data collection, due to the fact that there was no need to achieve such an in-depth technical understanding for this study's purpose. Literature regarding smaller firms such as start-ups were also excluded from the data collection.

The sources that were used throughout the literature review were a mixture of articles and books, with an emphasis on articles. Two main databases when collecting secondary data were used: GU Super Search and Google scholar. Peer-reviewed articles have been prioritized in the thesis to guarantee the quality of the literature used in the secondary data collection.

3.5 Data Analysis

This section summarizes how the collected data was concerted and analyzed into useful findings in order to answer the research question.

3.5.1 Thematic analysis

Once the interviews' transcription was done, and we possessed a clean and clear text, the empirical data was analyzed. To perform an inductive qualitative approach together with a multiple case study research design provides fairly unstructured empirical data. As stressed earlier, the authors needed to create a good understanding of what the respondent's viewpoints were on the subject. To achieve this, a thematic analysis was carried out and was seen as the most appropriate method to transform the collected empirical data into themes that would provide a basis in order to answer the research question (Castleberry & Nolen, 2018). Thematic analysis has been widely performed in qualitative data analysis in order to organize, identify and interpret themes from textual data (King & Brooks, 2018)**.** The choice of thematic analysis as an appropriate method is due to Braun and Clarke (2006), arguments that it is a useful method in order to identify themes from qualitative data, and also that it is a useful method to get an understanding of the context of different cases. This is in line with King (2004) argument that thematic analysis is perceived as useful when comparing different cases' viewpoints.

Performing a thematic analysis will have its drawbacks as well. It is a method that could be seen as subjective and requires a deep understanding from the researcher (Bell, Bryman, and Harley. 2019). To mitigate this risk, the authors of this thesis made sure that they had a deep understanding of the subject before performing the analysis, and focus was put on understanding the meaning behind the respondents' answers completely. To achieve a deep understanding of the subject the authors performed a systematic literature review.

According to King (2004), it is also problematic to maintain the right balance between too detailed defined initial themes and too loosely defined initial themes. Moreover, the interpretation part is also a critical aspect of the thematic analysis method (Braun & Clarke, 2006). Even though interpretation is useful, it could sometimes be problematic to truly understand the meaning of the respondent's answers. To mitigate this risk, the authors went through the transcripted material individually and then compared how the authors had interpreted the results with each other, by doing so the authors' personal view and its effect on the result was mitigated.

The initial step was coding which was used to break down the collected data into multiple concepts. The authors used Raskind et al. (2019) approach of how to perform the coding, which was to create a list of codes based on the interview guide, the transcripted data together with the systematic literature review. In order to increase the study's validity, the authors gave the same attention to all parts of the raw data. Once the initial coding was performed and the authors possessed multiple concepts, the next step was to separate these into fewer themes. The systematic literature review and conducted interviews were used as a guide to developing the final following themes; The FEI process which contained and grouped together the First, Second and Last stage of FEI. Apart from the theme The FEI process, Analytical, Intuition, and Hybrid evaluation methods were also developed themes. These identified themes were used as headings in the empirical findings (Chapter 4).

This stage also includes a lot of interpretation, and to mitigate the risk associated with this, the authors made sure they established a consensus on how to interpret the data. To make it as logical and coherent as possible the step was performed in close collaboration between the authors. The coding chart that was used in this thesis can be found in Appendix 1.

3.6 Research Quality

3.6.1 Internal Validity

The level of internal validity in a qualitative study is determined by the fit of the study's empirical results compared to the researchers' developed theoretical ideas. Closely linked is the term credibility which is regarding what degree the researcher has understood the social reality. In order to improve these, the different choices made for this study regarding

methodology choices have been clearly explained above. Furthermore, other actions were also taken, such as that the interviews were transcripted and sent to the respondents for validation. In accordance with Bell, Bryman and Harley (2019), this was done to ensure a correct interpretation of the data.

3.6.2 External Validity

When it comes to the level of external validity, it is regarding the generalizability of the results. As mentioned earlier the generalizability of the results could be considered low due to the fact that it will be limited to firms in Sweden. This is in line with Bell, Bryman, and Harley (2019), arguments that it is difficult to accomplish high generalizability when performing case studies on a relatively small sample.

3.6.3 Internal reliability

Internal reliability regards when there is more than one researcher in the group and the extent to which the researchers agree or disagree with each other's findings (Bryman and Bell, 2011). As mentioned when discussing thematic analysis both researchers went through the transcripted material separately in order to improve the internal reliability. Furthermore, both researchers were present during the interviews with the respondents as another effort towards increasing the internal reliability.

3.6.4 External reliability

The level of external reliability depends on the replicability of the study (Bell, Bryman and Harley. 2019). This study's external reliability is most likely relatively low since social circumstances will play a major part in the study and will thereby be difficult to replicate next time. This is in line with Bryman and Bell, (2011) who argue that due to the fact that there are few standard procedures to follow within qualitative research it is difficult to achieve external reliability. Eisenhardt and Graebner (2007) response to this criticism is that the purpose of a case study is to develop a theory and not to test it which makes a theoretical sampling method appropriate. This means that the cases were selected on the argument that they are suitable to illuminate and extend relationships and logic within constructs.

However, actions taken throughout the study to increase the external reliability were to explain the choices taken in the study. Examples of this were to provide detailed information regarding the participants' criteria, the interview guide, and the codes used in the thematic analyses.

4. Empirical findings

This chapter will present the study's collected empirical data from the performed interviews with 12 different firms presented in Table 5. The data originate from the study's interview guide presented earlier and attached in Appendix 2. The chapter is divided into six themes; First, Second and Last stage of FEI as well as Intuition, Analytical, and Hybrid evaluation in order to provide the reader a detailed assessment of how the interviewed firms evaluate and select innovation ideas. The presented data will be the basis for the study's analysis in chapter 5.

4.1 First Stage of FEI

One frequently addressed part of the process was regarding the initial stage of the FEI process where several firms stressed the importance of quickly assigning an idea owner to the innovation idea. The definition of the initial stage is the first evaluation that occurs in the FEI process which happens shortly after the idea has been submitted to the innovation department.

4.1.1 Idea owner

The firm [C11] explained that their first initial stage was to assign an early idea owner consisting of one or more people who have experience from the area the innovation aims to develop. The early idea owner will make a first screening of the idea and own the idea throughout the FEI process. The early idea owner makes a first evaluation based on whether the idea fits the company's current business operation and also if the idea has previously been approached in the organization. In those cases where the early idea owner's perception is that the innovation idea regards another department instead, it is the early idea owner's responsibility to assign another early idea owner that is more suitable.

> *"The next step after an idea is given to us is that we try to understand who can evaluate this idea, or who should own the idea. The others and I in the innovation team are never the ones who own an idea, it is assigned to someone in the organization, what we call an idea owner." – Swedavia*

When the respondent from firm [C1] was asked about their initial stage she also highlighted the importance of an idea owner.

"It is crucial that there is someone who owns the idea and drives it forward. My innovation department can assist with competence, but it is important that there is a recipient who can take the idea and continue to push it forward, otherwise, the idea will just be short-lived flare". - Atrium Ljungberg

With a short-lived flare, the respondent meant that her past experience is that by not assigning an idea owner leads to that no one takes the responsibility of the idea and the idea will therefore peter out. Once an idea owner is assigned and if the idea is approved, it will move into a concept phase where the idea is refined and developed upon. This initial stage of the process is in line with the firm [C6] process which also states the importance of finding employees that are interested in pursuing a specific idea. The reason is similar to other firms, where the idea owners assure that the organization continues with an idea.

The firms [C7] and [C10] have a similar initial strategy as addressed above where the CEO in [C7] and the business developer manager in [C10] make a quick evaluation with the help of experts in the organization. After that, they distribute the idea to an idea owner that will own the idea and develop it in further steps in the FEI process. Their process, therefore, differs slightly in terms of that they themself make a quick initial evaluation of the idea before the idea owner is assigned.

"First, we have a quick screening process that I do with the help of experts that we have out in the organization, and many of these ideas are assigned to someone who will continue to work on it" - Stena

4.1.2 Criteria in the first stage

In regards to what criteria firms use in their initial screening of innovation ideas differs. The respondent from firm [C5] addressed that their first initial evaluation of an idea is done in what they call phase 1 and within this phase, their evaluation puts great emphasis on the desirability of the idea.

"The first aspect of an idea we evaluate on is its desirability". - ICA

When discussing the initial stage with the firm [C8] the respondent addressed that they use a waterfall stage-gate process to evaluate their innovative ideas. In this process, their first evaluation comes after the scoping phase and includes analyzing the ideas' potential value, the competitors, and risks associated with the idea. This is similar to the process of the firm [C3], which uses an innovation funnel where they place a lot of emphasis on the commercial evaluation, where they try to get the commercial confirmation of an idea as an initial requirement.

> *"We place a lot of emphasis on the commercial evaluation where we try to get the commercial confirmation of an idea". - Essity*

Two firms that highlighted the idea's feasibility in their initial screening are firm [C12] and [C3]. The firm [C12] explained that they use an innovation council in the first evaluation phase where they select the ideas the organization wants to pursue into performing a feasibility study. The feasibility study is about defining what the firm [C12] believes are the benefits of the idea, how a test of this idea could possibly be executed, and the potential cost of it. The firm [C3]'s first initial stage is described as an exploratory phase, where the firm decides whether to invest resources into developing the idea based on the feasibility of the idea.

The firm [C9] addressed that they do put more focus on ensuring that the ideas' purpose is aligned with the firm's overall innovation strategy. Their first initial stage for an innovation idea is called "frame your idea". Here, the purpose of the idea is framed about what the idea is set out to achieve. Based on the purpose, an initial evaluation is done whether or not the ideas are aligned with the firm's predetermined innovation strategy which decides if the idea can move forward to the exploration stage. In other words, they emphasize the ideas strategic fit highly in their initial stage.

4.2 Second Stage of FEI

When discussing firms' second stage of their evaluation and selection process the firms addressed different parts that they involve in the stage as well as how much effort they put into this stage. Common for all firms was to in this stage aim to decrease the large

assumptions and uncertainties that innovation ideas possessed. This in order for the firm to make more accurate evaluations and selections of innovation ideas in their last stage. The method chosen to accomplish this however differed between the firms.

4.2.1 Test and prototype

One frequently addressed stage of the firm's FEI process was according to the respondent to include some form of testing or prototyping of the innovation idea. The purpose of including this stage was to receive valuable insights from the stakeholders regarding the innovation idea. Stakeholders were both the customers or the consumers of the innovation idea but also internal stakeholders that would be affected by the innovation idea in their daily work tasks. Frequently highlighted by the respondents was the importance of performing this stage in such a real environment as possible and also in a way that didn't require too much resources. However, the firms differed to some degree in what stage of the process they performed this testing. The most common among the firms was to involve it as early as possible, but as mentioned earlier this differed between the firms with the firm [C8] for example that used it as the last stage to validate the idea. However, the firms that use it as their second stage will be presented below.

After [C12] has performed a feasibility study in their first stage of the FEI process, their innovation council makes a second evaluation based on the results from the feasibility study. If the idea is approved from the firm [C12] first stage in regards to its feasibility, their next stage is to perform a small test on a small scale in order to investigate the idea further. This test involves predetermined questions that the test aims to answer. Examples of what these tests aim to provide answers to are how it could be implemented in the organization and of the required resources for the project.

> *"If we get an approval by the innovation council. We perform a slightly smaller test on a smaller scale where we in advance have the test project defined, what kind of questions we want answered, how do we think it should work, what is it that we actually want to test." - Wallenstam*

These results from their second stage testing process are then used in their last evaluation and selection stage. Another firm that uses testing as their second stage of the process is firm [C3]. The respondent addressed that after the exploratory phase, the firm moves into a

development phase where the product or service is further developed upon, usually with creating a prototype. As with the exploratory phase, the most crucial component to get commercial confirmation of the product or service.

When discussing firm [C5]s second stage the respondent also states that stage 2 in their FEI process is about exploring and testing the idea. Often by creating a small-scale prototype for the idea with the goal to receive insights regarding desirability, feasibility, viability, and strategic fit for the innovation idea. These tests often investigate these parameters through small experiments, market research, and customer research.

> *"Often we perform small experiments, prototypes, market research or customer research where we try to get confirmation of the idea's desirability, feasibility, and viability" - ICA*

Even though the majority of the firms performed tests and prototypes as their second stage, three of the firms stressed that they performed their tests in later stages. According to the respondent from firm [C9], their second stage is to explore the idea further by creating hypotheses about what the innovation idea will achieve and how the company can accomplish the set goals of the idea. Thereafter, the firm evaluates whether these goals are feasible and determines if the idea can move forward to a prototype phase. So they perceive the analysis regarding the hypothesis and the goals as their second stage, and the actual prototype and testing as part of their last stage in the FEI process.

If the appointed idea owner in [C11] accepts the idea, a first iteration of the idea is made. The firm brings the idea into their "concept development" stage, where they refine the idea and describe it in a "Swedavia way" using business value canvas and value proposition canvas.

> *"If the idea owner approves the idea, then we make the first iteration, refine the idea in a swedavia way. We do this by describing the idea in a value proposition canvas and in a business value canvas." - Swedavia*

After the "concept development" stage is done, a sponsor is assigned who makes the second evaluation of the idea. Apart from the sponsor the respondent and his innovation department also go through the different innovation ideas and rate these ideas based on different criteria with a percentage of how well they manage to fulfill the criteria. This process provides the firm [C11] with a prioritized scheme of which ideas to further develop.

Another firm that didn't address the use of testing or prototype as their second stage was the firm [C8]. After their initial scoping phase of an idea, where risks and the potential value of an idea are analyzed. Firm [C8] refines their idea through a business case that will provide the rationale for why a potential development should be done. The respondent from firm [C8] also states the importance to evaluate an idea depending on what kind of idea it is and to ensure flexibility in this stage. This since, their business cases for similar types of ideas should be presented in the same way in order for easier comparison. As well as being able to present ideas that aren't similar in different ways to ease the comparison between them as well.

4.3 Last Stage of FEI

The firm's approach to the last stage of the evaluation and selection process differs when it comes to how the process works in practice but they do have a similar overarching goal for the stage. Common for all firms was to validate the idea and achieve the final verdict on whether to pursue a full-scale innovation project. All though, the method for validating the ideas differed between the firms. The most common way of presenting the innovation ideas was through a business case or similar.

4.3.1 Presentation of the idea

When discussing the last stage, the respondents frequently addressed that innovation ideas that were resource-heavy needed to be presented in a more strictly defined way than other smaller ideas. They also highlighted the importance of enabling comparisons between the ideas due to the fact that it is often other persons such as an investment board that makes this final evaluation. To accomplish this the majority of the firms perform business cases or similar.

> *"However, suppose an idea will most likely become a bigger and more expensive project. In that case, a business case with more analytical analysis has to be made in order to convince the investment board" - MTR*

The respondent from firm [C6] explained that once a decision needs to be made whether to proceed into a new project, the firms' steer groups are sitting together and evaluating and prioritizing the different innovation ideas business cases with different scoring methods. These scoring methods involve evaluation of required resources, economical dimensions, and the complexity of the idea. Once this is done, the firm possesses a priority order among their innovation ideas and could select those ideas that suit their overall strategy the most.

Even though the majority of the firms used business cases, the respondents often stressed critics towards using business cases for innovation ideas due to their uncertain nature. Often stressed was that the large assumptions that needed to be made will decrease the business case reliability.

4.3.2 Test and prototype

The respondent from firm [C11] addressed that once an idea has gone through the "concept development" stage, and been evaluated by the sponsor, the last test stage called "function factory" is initiated

.

> *"If the sponsor says that the idea feels very exciting then we move on to step number 3 which is the test phase. There we have a concept called the function factory where we experiment and test, usually we make a prototype and test it in an environment as close to reality as possible." - Swedavia*

In the "function factory", a prototype is created and tested in an environment as close to reality as possible. Before a prototype is tested, three hypotheses are created. The first one relates to what the prototype should test. The perception from customers, passengers and employees is also a crucial part to evaluate, which is the second hypothesis. The last hypothesis regards if it is technically feasible to execute. After the "function factory", the last evaluation is done, which decides whether or not a full-scale innovation project should be initiated.

As stressed earlier the firms [C9] and [C8] also used testing and prototyping as their last stage of the FEI process. Within this last evaluation, firm [C9]'s focus is put on whether the created goals and hypotheses created in their second stage are achieved. These inputs will then be

used in their way of presenting the ideas, by developing value matrices. By presenting the ideas in several matrices, the firm is then able to prioritize between the ideas on several different aspects compared with their current market situation and trends.

> *"A person tests their created hypothesis through a prototype. The next step is to present the value they achieved through our value matrices. Examples of matrices are effort vs value, feasibility vs time, strategic fit vs non-strategic fit" - Polestar*

For firm [C8] the focus is on whether or not the prototyping provides the same insights as their previously created business cases have assumed. Based on the results from the prototype stage they then perform a final evaluation and selection process that decides whether the idea should be developed into a full-scale innovation project or not.

When discussing firm [C5]'s FEI process the respondent addressed that their last stage is similar to their second stage, whereas the idea is explored upon through experiments, market research, and customer research. The difference is that these tests in the last stage are performed at a bigger scale than in the second stage. After these more in-depth tests are done, one last evaluation is made that decides if the idea should become a full-scale innovation project.

4.4 Intuitive Evaluation

Most of the study's respondents highlight that intuition is part of the evaluation and selection process of innovation ideas. However, they differ to what extent intuition is used, especially in what part of the process they evaluate and select based on intuition. The respondent differed as well regarding the benefits of using intuition within the evaluation phase. When discussing involving intuition from a group of people in the evaluation process, the respondent from the firm [C2] highlighted that the firm must make sure it is a heterogeneous group with different views and backgrounds that are evaluating and providing feedback to the innovation idea.

4.4.1 Intuition used as an initial screening process

One frequently addressed part of the evaluation process where intuition is used is within the initial screening process. The respondents use intuition within this stage partly to get a fast screening whether or not the firm has already done or rejected a similar innovation idea or if a similar idea is already within the process. The firm [C11] initial process starts with that the innovation idea is sent out to what they call an early idea owner as presented earlier. When receiving the innovation idea the early idea owner should have a business perspective and base his or her screening on intuition. If the intuition or knowledge is that the idea has already been done or investigated earlier or if it is already within development the idea gets rejected.

> *“The idea owner should keep track of "have we heard this before?" and also look from a business perspective if this idea is interesting. We emphasize that they should not be any kind of no-sayers, rather the contrary. The idea owner should encourage the idea creator "oh how exciting that you come with new ideas" . If the idea owner believes the idea sound exciting, we make the first iteration” - Swedavia*

However, if the early idea owner's intuition is that the innovation idea would potentially fit better in another department, the idea is sent to another early idea owner which goes through the same initial intuition screening process.

According to the respondent, the firm [C12] also involves intuition within the first stage of their FEI process. In their case, the intuition is not based on a single idea owner's intuition. Instead, they aim to get a rough early understanding of what the innovation councils collected “gut feelings” are regarding the innovation ideas’ potential value. Furthermore, their collected intuition will also aim to provide insights into how a test or prototype of the innovation could be implemented and the required resources of the prototype. This since firm [C12] states that the complexity and costs of testing the innovation idea also are a parameter in their future evaluation and selection process of innovation ideas.

> *“I work with an innovation council where we have regular meetings where we discuss things that happen in the organizations and potential ideas. Through discussions, we arrive at which ideas we find most interesting, and which should be further explored” - Wallenstam*

Apart from using intuition in order to investigate the ideas' newness, its value, and its potential prototype, firms use intuition for other reasons as well. The respondent from firm [C5] refers to this initial stage as their stage 0, and within that stage, the innovation department performs a quick evaluation of the innovation ideas desirability and strategic fit based on intuition. If intuition of the innovation idea meets both the customer's desirability and strategic fit with their predetermined overall strategy, the idea goes into the next stage. It is first in this next stage they perform a more in-depth analysis of the idea.

> *"In stage 0 it's a lot about identifying ideas, we call it stage 0 because that's where we scout ideas and briefly assess them based on desirability and strategic fit, further exploration and more thoroughly evaluation comes at later stages" - ICA*

This illustrates the frequently addressed fact that firms do involve intuition in their first initial screening process. However, the respondents often highlighted that ideas that go through the initial screening process need to in a later stage be backed up by proof that supports the positive initial intuition. For firm [C11] this is crucial since they stress that the sponsors that will be involved later on also need to understand the value that the intuition indicated. This process of backing up the initial intuition with more analytical methods will be further discussed under the 4.6 Hybrid evaluation.

4.4.2 Intuition used for evaluating small and emergent ideas

Apart from involving intuition within the first stage, several respondents addressed that they use intuition within their evaluation process for innovation ideas that are either emergent or require a low amount of resources. Firm [C7] stressed this and explained that they viewed innovation from two different perspectives. One more "fast-footed" perspective where the company moves one small step at a time, and then there is the other perspective with larger more resource-heavy projects which have a larger impact on the overall company. The latter requires more motivation based on business cases, however, innovative ideas in the former perspectives are more often based on intuition. The respondent from [C7] highlights that these projects often involve small changes that the person with the mandate could make by him/herself without any analytical evaluation. This in order to speed up these processes and the innovation ideas time to market and lower the required resources.

“We believe that there are two different roads when working with innovation. One is the simple and fast-footed where you can pursue an idea based on intuition and the other track is when you have heavier projects that require more resources, and that process looks more "normal" where you justify the idea with a business case” - MTR

Except for innovation ideas that required a low amount of resources. Some respondents highlighted that the firm solely uses intuition for those innovative ideas that aim to solve emergent issues. The respondent from [C9] explained that once an emergent issue is identified and they possess an innovation idea to solve this issue, they are able to skip the otherwise more in-depth process that the idea needs to go through and just initiate the innovation idea. Their attitude was that risks associated with a less analytical process are lower than the risk of not handling the identified emergent issue quickly.

“If the purpose of an idea is to solve an emergent matter, the idea immediately turns into a project” - Polestar

This is according to the respondent stated as a strategy by the firm. This is in line with [C12]’s FEI process as well. The respondent from firm [C12] stresses that they also involve intuition for innovation ideas that will solve emergent issues. Therefore, the purpose of an innovation idea also decides the evaluation and selection process.

The respondent from the firm [C8] argues that involving the intuition of a group of experienced experts in the evaluation process is beneficial since it involves individuals' knowledge from past experience. Therefore, it could be a helpful tool to involve well-experienced individuals that will provide feedback that otherwise would be difficult to capture.

“I would like to praise gut feeling as a role in the process, because it is your collective experience that you somehow boil together. Therefore, it is key to find someone who is experienced and who has a good background for that particular project.” - SKF

4.4.3 Innovation department collective intuition

So far, the individual's or collective intuition's role in the first initial stages of the FEI process has been presented. To include it later on in the process when the idea has been analyzed more in-depth is rarer. However, some of the firms address that their innovation department was allowed to in some situations make their own decisions which ideas to pursue based on their collective intuition in later stages as well. This was used within situations where the innovation ideas were difficult to motivate based on an analytical evaluation but that the innovation departments collective intuition evaluated the idea as valuable. The respondents from [C12] and [C11] stated that their innovation department thereby had a mandate and an own budget to proceed with these ideas without the same requirements of analytical evaluation as other ideas had.

> *"We also know that some ideas are more difficult to motivate or become less prioritized. We as the innovation department have a budget to do a couple of innovation projects per year selected solely by us. Then we are the ones who sponsor everything in that project."* - *Swedavia*

According to the respondent from [C12], an example of using intuition in their evaluation process is for ideas which the short-term consequences and benefits are difficult to motivate. However, they believe the potential long-term consequences make it worth proceeding with the idea. The risk of being the last actor within a transformation was, according to him, enough to motivate the innovation idea if intuition was used, but difficult to motivate with more analytical evaluation.

Another example that the respondent from [C2] stresses is that they use intuition when evaluating ideas that aim to create attention to the firm's brand. They then perceive intuition to be helpful in order to understand the current trends in the market and society and thereby work as a helpful tool to evaluate which innovation ideas would receive the most attention within the society and in the media.

4.4.4 Critic to intuition

Even though intuition is used within different stages of the firm's FEI process, the respondents frequently addressed criticism towards intuition in the evaluation process.

The firm's size affects the results of intuition-based decisions, which the respondents from [C8] highlight. She argues that due to her firms' large size and employees around the world, to base too many decisions on intuition would create more of an ad-hoc innovation strategy. This could lead to innovation projects are initiated without knowledge of another department's innovations project and thereby miss out on potential synergies between the projects. It could also lead to that the firm "invents the wheel again" since the innovations are already done or are within the innovation projects in another place in the firm.

> *"It is very easy for projects to start a bit "ad hoc". SKF is a very large company with many simultaneous projects, not everyone knows what everyone does, and then many projects can be started without the knowledge of others. This can lead to missed opportunities and synergies between projects." - SKF*

When discussing the drawbacks to use intuition within the evaluation, the respondent from the firm [C9] stresses its potential effect on the innovation portfolio. He has experienced that some ideas are started based on some manager's "gut-feeling" and are thereby not as well thought through as the other innovation ideas. These innovation ideas then tend to not include the same information in their presentation as the other ideas. Which will according to him lead to problems in the comparison stage where the innovation ideas should be evaluated towards each other.

4.5 Analytical Evaluation

The respondents address several different analytical criteria they are performing in their evaluation and selection process of innovation ideas. When discussing it, it becomes evident that the criteria desirability, feasibility, and strategic fit are the most common. However, the firms do differ in how much focus they put on each of these criteria, what they include in the criteria, and when they implement specific criteria. Apart from the most common criteria, the firm's degree of flexibility between these criteria, and their usage of innovation portfolio will be presented.

4.5.1 Strategic fit

An initial stage that was frequently addressed is to start with analyzing whether or not the idea is aligned with the firm's strategy. The respondent from the firm [C4] discussed that their first screening process of innovation ideas is whether it is aligned with their strategy and what department of the firm it belongs to since they have several departments within different industries.

> *"The first gate-keep we have is if the idea really is something for Holmen AB and within our scope and strategy" - Holmen*

Firm [C8] also addresses that their initial screening is to make sure the innovations are aligned with the firm's overall strategy, in other words, that it possesses strategic fit which is analyzed in an analytical way.

When discussing the initial stage of the evaluation with the respondents from the firm [C9] the respondent explains that they aim to create a direction for what they are innovating around. This is to make a rough initial selection of their innovation ideas to see if they fit in with the overall innovation direction. In order to set up this direction, the firm does work with several scenario planning methods. This direction is well known within the organization, and the different innovation ideas need to align with the direction for it to go through the first screening.

> *"We work with different scenario modelling. It gives us a direction and understanding of how we should move towards a goal. Within this set direction, we will innovate so that all ideas from the organization can fit in there. The first evaluation of an idea is based on whether it matches the set direction." - Polestar*

The respondent from firm [C9] further explained that they focus on including a deep understanding of the stakeholders' demand in the early stages of FEI as well. Through a deep understanding of their stakeholders, they aim to create what they call "jobs to be done". By combining the "jobs to be done" with the firm's already decided innovation direction, they identify the intersection between these two which they call the "common ground", and that is what they should innovate and develop innovation ideas around. In other words, when evaluating and selecting between innovation ideas, the first screening method is whether or

not the idea achieves both strategic fit with the firms' innovation direction as well as desirability.

4.5.2 Feasibility

Apart from the initial screening based on strategic fit, respondents highlighted other criteria as well. The respondent from the firm [C4] addressed that the idea's feasibility is a vital criteria for them. By feasibility, he means utilizing their already existing machines and competencies for the innovation idea. Furthermore, a feasibility analysis is performed regarding the potential profitability, market size, and competitors. This analysis is, according to the respondent, not that in-depth. Instead, they aim to provide a rough understanding of whether the idea will provide any value.

According to the respondent from the firm [C5], one way to achieve the information needed regarding the innovation ideas possibilities to be feasible for the firm is to discuss with internal departments such as the IT department and others in order to receive their expert insights on the idea. The reason connects to their belief that the innovation department by themself sometimes lacks the knowledge regarding the feasibility of the idea.

When discussing which ideas that most often tended to be rejected. The respondent from the firm [C7] stressed that they often reject innovation ideas due to the fact that it turns out to involve too many dependencies or are too risky given the current market situation. In other words, it lacked the required feasibility.

> *"When it comes to projects being rejected, the gap is a little too big to reach the payback you desire. There may be too many dependencies or too risky given what market situation you're currently in" - MTR*

4.5.3 Financial criteria

When solely discussing firms' usage of financial criteria, the most common mentioned criteria was NPV, ROI, and different break-even analysis. How they performed these differed between the firms, and they also had different strictness in what they required to achieve.

The respondent from firm [C12] explained that financial criteria are almost always a parameter in their evaluation. The firm had no specific requirements for a certain level of profitability. However, he stressed that the innovation idea should at least possess a break-even in order for it to motivate the evaluators enough. Another interesting finding regarding [C12] was for innovation ideas which had a positive sustainability aspect as well. For these ideas, the firm is aware that these ideas' benefits are harder to quantify and the requirements of the financial criteria are, therefore, seen as less for sustainability innovation ideas due to their other potential effects.

> *"Financial criteria are always included. Then it is not always the case that it needs to be profitable to implement. But it will be easier to justify if there is at least a break-even in it. The aspect of exceeding our customers' expectations is always included. Also a sustainability aspect, where we do innovative things for our sustainability that may not always be quantifiable but that can lead to other effects." - Wallenstam*

A finding from the interview with [C6] was that when they used financial criteria such as cost-benefit analysis for a single innovation idea, they did not solely perform the analysis on that specific idea. According to the respondent, a single analysis would lead to that all large innovation ideas being difficult to motivate but taking customer experience and attention into consideration, the motivation is more straightforward.

When discussing how firm [C3] evaluates the ideas feasibility and the financial criteria they are using, the respondent highlighted that one of their methods to do this is through an NPV calculation. When performing an NPV calculation for an innovation idea, it is crucial, according to the respondent, that it is stated if the numbers originate from an established or new market. This was stressed by firm [C11] as well, according to him, without requirements of proof behind assumptions, lead to a process where the person who is best at lying in their business case presentation will win, and their idea will receive resources and be developed.

> *"As an innovation idea has an uncertain outcome, it makes it difficult to assess the idea without making assumptions based on nothing. This can lead to business cases where the one who lies the most using financial criteria the most wins and gets their innovation project approved." Swedavia*

Another finding was that the respondent from firm [C6] highlighted that most of their innovation ideas have such large sunk costs, making it almost impossible to cancel once a decision is made to start the project. They, therefore, involved the innovations sunk cost in their financial criteria.

4.5.4 Desirability

The desirability criteria are addressed among all the respondents. Firm [C1] highlights that they are a heavily customer-driven firm. To truly understand their customers, they use surveys and insights studies that are taken into consideration in their evaluation and selection process to make sure the innovation ideas are aligned with the customers' desire.

An interesting finding of how to accomplish future desirability is the firm [C5]s method. To achieve this, they perform market analysis by looking at what different start-ups are doing within the same market. This will indicate current and future customer trends that should be considered. Apart from this, the firm [C5] performs customer surveys, does prototypes, tests the idea with the customers, and receives their feedback.

When discussing rejected ideas with firm [C9], the respondent highlighted that the most common reason is that the idea is not fully thought through from the customers' perspective. They call this step the emphasis stage, and they put a great effort into making sure they emphasize with the customers to secure the desirability of the innovation idea. For firm [C9], 30% of the innovation ideas get rejected just due to a lack of empathy with the customers.

> *"You have to look at the joint jobs and then we have to take the customer's problem, understand it, make it our problem and then express a solution. 30% of our ideas are being rejected in this stage." - Polestar*

4.5.5 Evaluation flexibility

When discussing the firm [C8]s analytical evaluation process, the respondent stresses that they are performing different criteria depending on the characteristic of the idea.

"My firm belief is that the valuation process needs to look a little different depending on what type of idea it is" - SKF

When evaluating and selecting breakthrough innovation ideas, criteria such as the ideas' effect on the customer value were commonly considered. For these breakthrough innovation ideas, more static criteria such as NPV or ROI are, according to the respondents, not suitable due to the uncertain outcome and the large assumptions that must be made. By employing a flexible evaluation process they aim to create a more adaptable method that does not reject ideas due to the fact that the idea could not be motivated through predetermined criteria.

4.5.6 Innovation portfolio

The respondents were asked whether or not their firm used any innovation portfolio management, and if they had, how that affected their evaluation and selection process. Most of the respondents used it to some degree. However, its effect on the evaluation and selection process differed, and also what parameters were taken into consideration in their innovation portfolios.

The respondent from the firm [C12] addressed that innovation portfolio management was used to some degree. The respondent highlights that they do compare the innovation ideas depending on the ideas' time-horizons. The ideas are also compared with current market trends and, based on the results, decide whether to proceed with the idea or save it for future development. Comparing ideas regarding their time-horizons and keeping a balance of the idea regarding their time-horizons is something that the firm [C10] also does.

"We strive to have a few more long-term projects that will be launched in 10 years and projects with shorter time-horizons such as three years and even monthly projects" - Stena

This does affect the evaluation of innovation ideas since they are partly valued based on their fit into this overall innovation portfolio that the firm has. This is in line with the firm's [C4] and [C5] portfolio strategies, which are also to keep a balance in terms of when projects will be launched and keep a good inflow of ideas into the innovation process.

> *"We have a lot of on-going projects, but we try to sift so we do not have too many parallel large projects at the same time. - Holmen*

For firm [C3], innovation portfolio is also involved in their evaluation and selection process, however, they include risk analysis as the parameter instead. They both divided the ideas into different categories depending on their degree of risk and also what kind of risk was associated with the innovation idea. By doing so they stressed that they achieved a much more well-balanced portfolio of innovation regarding risk.

> *"We usually do risk analysis at project level where it involves components from the commercial to production technology and also project risks. We also use risk analysis for our project portfolio in order to achieve a good balance between projects." - Essity*

Apart from keeping a balance between the risks of their innovation ideas, the firm [C3] also has predetermined growth targets for their different departments. Which also has an effect on their evaluation of ideas since they aim to meet all departments' growth targets.

4.6 Hybrid Evaluation

All the respondents agree that it is necessary to use an analytical approach with financial criteria in order to evaluate an innovation idea. The commercial value of an idea that either expresses itself through potential revenues or a higher customer value is easier to find out through financial criteria such as NPV. All though, the respondents stress that an innovation project has a more uncertain outcome than normal projects. The potential value of some innovation projects may not show in the initial stage of the evaluation. Therefore, only applying strict criteria may lead to ideas being rejected before their true potential can be seen. When discussing the firm's hybrid approaches, the respondents frequently addressed that they employ a hybrid approach either to complement their intuition by more analytical analysis or the other way around. The firm's usage of the two different concepts will be discussed below.

4.6.1 Analytical complements intuition-based evaluation.

Firm [C1] addresses that innovation ideas could either show direct or indirect values. According to the respondent, it is more difficult for the firm to motivate ideas with indirect values compared to direct values. The firm addressed that when working with innovation it often comes down to “this is what we believe”, and then the firm aims to test the intuition as fast as possible. Firm [C1] believes it is difficult to get all the answers in the first stage of FEI, without exploring and testing the hypothesis. Therefore, without complementing the intuition with analytical analysis throughout the process it would decrease the firm ability to evaluate and select innovation ideas.

> *“Whenever you work with innovation, it becomes more of "we think this" and then you test and see. You do not really know all the answers at first, you have to explore in order to achieve these answers.” - Atrium Ljungberg*

Firm [C7] highlights that hybrid evaluation is almost always present in their FEI. If a project seems to be within a specific investment mandate, they can pursue this idea solely based on intuition. However, suppose an idea will most likely become a bigger and more expensive project. In that case, a business case with more analytical analysis has to be made in order to convince the investment board. Furthermore, firm [C7] believes that projects often start based on a gut feeling, but that the gut feeling often has to be translated into criteria in order to motivate the initial gut feeling.

> “*There is almost always a combination of analytical and intuition. I have an investment mandate up to a certain degree, then my gut feeling for a project can go quite far if it is within my mandate. I can also build a business case on a gut feeling, but then you must also be able to translate the gut feeling into KPIs. Being structured is not the opposite of being innovative, sometimes it can be useful to build a business case on a gut feeling, combining both the analytical and intuition approach to a problem ” - MTR*

When discussing hybrid approaches with [C10], the respondents addressed issues with that innovation ideas tend to possess few aspects to calculate and evaluate around as well as the uncertain nature of these aspects.

"Doing an NPV or something similar requires that you have to make big assumptions. It's more about a belief in someone or something that you then have to work on. It is often too difficult to calculate everything in too much detail to see how the returns on an innovation idea will be." - Stena

Therefore, when performing evaluation based on financial criteria such as an NPV there are too many assumptions that need to be made, which can jeopardize the entire evaluation. In these cases, one has to believe in the idea and keep pursuing it based on intuition until there are enough known variables to execute an NPV.

From the interview with [C5] the respondent made a difference between innovation projects and more normal projects evaluation and selection process. In normal projects, they solely look at desirability, feasibility, viability, and Ica fit and then make a strategic decision whether to proceed or not based on analytical analysis. By doing so they often, according to her, end up late to the market, and the risk of committing large amounts of resources into bad ideas increases. However, when it comes to innovation projects their process is different, they adopt more of a lean startup methodology which is hypothesis-driven, and do throughout the process test these hypotheses. In other words, they form these hypotheses based on their intuition and then through analytical analysis aims to answer these hypotheses. By employing this methodology, they are able to in a larger extent cancel bad ideas earlier and faster and thereby save resources.

4.6.2 Intuition evaluation complements analytical evaluation.

According to the respondent from the firm [C8], an evaluation that is solely based on an analytical approach might miss elements of how the customer feels about a product or service. Therefore, [C8] complements their more traditional analytical evaluation with intuition-based criteria such as smileys that will capture the emotions of their customers which would not be possible with solely analytical approaches.

"How the customer will be affected by an idea is an important part of the valuation, customer perspective must always be included. How will the customer react? I work with smileys, the customer might be angry, happy, overjoyed etc ... and include it in all types of projects you do, and then complement with other valuation methods." - SKF

The issue with capturing customers' experience from solely analytical approaches is also highlighted by the respondent from the firm [C6]. He argues that when evaluating an innovation's effect on the overall customer's experience cannot solely be done with an analytical approach, and should instead be based on more intuition-based assessment.

The respondent from [C8] also highlights that "gut-feeling" will have an impact even though firms work with solely analytical evaluation models. This is due to the fact that in order to evaluate innovation ideas several assumptions are required and an individual that has a positive "gut-feeling" will, therefore, tweak these assumptions in order to get a positive outcome of the evaluation. According to the respondent, this shows that intuition will have an impact even though it is not stated by the firm that it should be used within the evaluation and selection of innovation ideas. Due to this, the respondent from [C8] argues that one solution for this could be to include "gut-feeling" as one of the criteria in parallel with more static analytical ones. By doing so the "gut-feeling" gets its attention and the risk of it affecting the other criteria decreases which, according to her, leads to a more objective evaluation and selection process.

> *"Suppose you add gut-feeling as a single parameter. In that case, you also get an outlet for this without affecting other parts of the valuation, enabling the other valuation steps to be more objective." - SKF*

The firm [C5] also addresses that they often use a hybrid approach when working with innovation projects in their middle stages of the FEI that are considered as non-incremental innovation ideas. Desirability, feasibility, and viability are always present as their evaluation metrics, but due to the uncertain nature of innovation projects, it is difficult to calculate future earnings for example. Therefore, [C5] also adds evaluation criteria that are more based on intuition. These criteria express themselves as "What have we learned", "Is this interesting enough to keep pursuing". In other words, criteria based on learnings complement the more analytical criteria in [C5]'s evaluation and selection process due to the uncertain nature of an innovation project. The respondents from [C1] addressed that they shared the same challenge.

> *"The majority of innovation projects would be rejected before there is a chance to find out the true value of an idea if one would solely use a more standard analytical approach". - ICA*

The respondent from firm [C4] also addressed that their evaluation method often is a mixture of both intuition and a more analytical approach. When discussing the desirability of an innovation idea, the firm often used an analytical approach to achieve this. However, this approach could, according to the respondent, be too static sometimes and a desirability trend could, therefore, be easier to detect by involving intuition as well.

> *"If there is a need that arise from many different customers with the same requests, then my gut-feeling says that we still need to pursue an idea that solves this, even if that idea may not initially be justified by a analytical evaluation" - Holmen*

5. Analysis

Within this chapter, the empirical data received from the interviews in chapter 4 will be analyzed against the literature review and will be structured based on the conducted analytical framework in Figure 4 which will be further explained below. This analysis will be executed by presenting the firm's similarities and differences in what activities they perform in the FEI. In order to achieve this, the analytical chapter will be divided into First, Second and Last Stage of the FEI.

5.1 Analytical Framework

The analytical framework in Figure 4 is based on inspiration from the "Synthesis of literature and conceptual model" in Figure 3 in combination with the empirical result. Figure 4 will be the basis of how the analysis and conclusion chapter will be structured and is presented below:

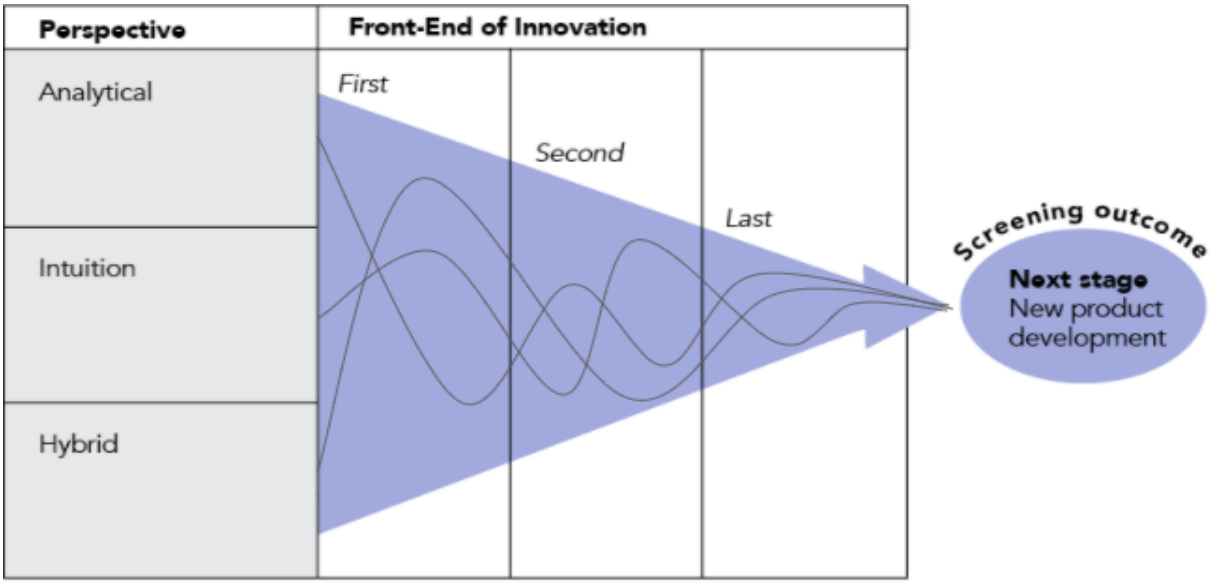

Figure 4. Analytical framework. Compiled by the authors.

In Figure 4 the FEI is divided into three stages; First, Second and Last stage, which is different to the more iterative non-linear process presented in Figure 3. The author's decision to construct Figure 4 in this manner is based on the fact that the empirics illustrate a tendency to divide the FEI into these three stages. The arrow in Figure 4 illustrates the funnel process where the ideas are evaluated and screened along the FEI process. Furthermore, Analytical,

Intuition and Hybrid evaluation are all part of every step within the FEI to different degrees, illustrated by the curvy lines throughout the stages in Figure 4.

5.2 First Stage of FEI

According to all of the respondents, one of the fundamental issues within the evaluating and selecting process and especially within their first stage of FEI is the uncertain nature that innovation is characterized by. This, since the identified opportunity often involves new markets, new customers, and requires the firm to receive knowledge outside of their current expertise. Stevens (2014), also stresses this issue as part of the opportunity analysis stage from Figure 2, where he highlights that it is often problematic for firms to receive the necessary additional information as well as for deciding what information the firm needs in order to fill in the gaps for innovation ideas.

Common among the firms was to within this stage perform methods in order to receive the required insights through different methods. According to the literature, tools that are commonly used to achieve this are strategic framing, market segment assessment, competitor analysis, and customer assessment (Koen et al., 2001). These presented methods were found to be used by the firms. However, they differed in which of the methods used. One reason for this difference in chosen methods could be due to the various opinions on what information the firms perceived as most desirable to receive within this first stage of FEI.

5.2.1 Idea owner

The empirics reveals that several firms' initial first stage of FEI was to identify an idea owner that should be responsible for the innovation idea. The criteria when choosing the decided idea owner was mainly that the person should have experience and knowledge of the area that the innovations concerns. Their goal by doing so is that the idea owner should, apart from being responsible for the idea, also make a first initial screening of the idea based on their intuition. The importance of choosing an idea owner carefully and to make sure the individual has knowledge is also stressed in the literature. According to Denker, (2018) and Magnusson et al. (2016) it is crucial that the evaluation of innovation ideas was performed by

people with the relevant domain knowledge. One criteria that the firm encourages the idea owner is to look at the ideas' newness to the organization, in other words have they performed this before. Apart from the ideas' newness, a rough estimation of the ideas potential value, if there is any desirability, and the ideas' strategic fit with the rest of the firm is also frequently addressed in the empirics as criteria looked at when performing an initial intuitive evaluation for the idea owner. The purpose was not to assign an idea owner that should investigate these criteria in depth, instead it was shown that the firms encouraged the idea owner to keep it short and brief. Commonly addressed was also that the idea owner should have a positive attitude towards the idea and base his or her decision on his or her gut-feeling. As seen, the idea owners are encouraged to base their first intuition on a rough estimation which could be connected to Hodgkinson et al. (2009), and Sadler-Smith & Burke, (2009) arguments that it is preferable to evaluate loosely defined ideas based on intuition. By doing so the firms make sure their first initial stage does not reject those ideas that possess an uncertain nature and thereby are loosely defined, instead allowing the ideas to be further developed upon.

Besides that the empirics illustrate that single idea owners are encouraged to perform an initial screening based on intuition, this was found to be the case for other firms as well but that they performed this in groups instead. Thereby perform an initial screening based on the collective intuition of the idea instead of just one single person. When performing this collective intuition screening, these firms also include their beliefs of how resource heavy a potential test could be as a criteria. To perform this initial intuition-based screening in groups could be connected to the literature that argues that the accuracy of using intuition is correlated to whether or not the evaluator is familiar with the context (Sadler-Smith & Burke, 2007; Salas, Rosen, and DiazGranados, 2010). Therefore, to perform this with groups instead of a single individual will increase the chances of involving evaluators that are familiar with the context which thereby will improve the firm's evaluations accuracy.

The empirics show that the main reason for involving intuition as an initial screening method is due to the fact that the firms then receive a fast and cheap initial screening of the ideas. This reason is in line with the literature regarding intuition as an evaluation method. According to Dane and Pratt, (2007), and Eling et al. (2015), it is a method with a lot of simplicity that will increase the speed of the process significantly. To involve intuition based on its speed could also be found to be the case for some of the firms when evaluating innovation ideas that are either small or that will solve an emergent issue for the firm. For

less resource-heavy projects, it was shown that firms didn't have the same requirements of a longer analytical approach, but instead could start the project based on intuition.

Regarding the ideas that will solve emergent issues, the benefits of speed that firms will receive through intuition is highly connected to Gassmann and Schweitzer (2014) arguments that there is a trade-off between carefully selecting the right project and at the same time keeping the time to market as short as possible. The risk associated with being late to market is well illustrated for these emergent solving ideas. One firm exemplifies this well when explaining that the risk of a quicker evaluation process with less control is lower than the risk with a slower more controlled process due to the fact that they then face the risk of not solving the identified issue.

The analysis above shows that final selection decisions are performed within the first stage of FEI for ideas that require few resources and those who will solve emergent issues. Which is in line with Koen et al. (2001) arguments that the idea selection in Figure 2 is a non-linear process. Apart from these two identified final selections, the empirics however, illustrate that the firm's activities within the first stage of FEI is most connected to receiving the necessary information for evaluation and selection in later stages, similar to Opportunity analysis from Figure 2 (Koen et al., 2001).

5.2.2. Critic towards intuition

Even though several firms stressed the benefits mentioned above of assigning an idea owner in the first stage of FEI, this method is criticized. This studys' third largest firm in regards to revenue [C8], argued that by trusting an idea owner's intuition in the first stage of FEI will significantly increase the risk of an ad-hoc innovation strategy. An ad-hoc innovation strategy might lead to firms missing out on synergies between projects and increasing the risk of "inventing the wheel again" due to lacking understanding of what the firm has done if only analyzed through an idea owner's intuition. The reason for stressing the criticising firm's size was that one logical reason for this disperse attitude could be the firm size. For large firms, it could be difficult to keep the firm's previous projects in mind, which could explain the different views of assigning an idea owner to make the first screening based on intuition. When comparing this with the literature, connections could be made to Sadler-Smith & Burke

(2007), and Salas et al. (2010) arguments that the result of intuition-based decision relies heavily on the individual's understanding of the context. Thereby, it could be argued that the respondent's perception of the increased risks with intuition decisions is based on that there is an increased lack of context understanding for large firms.

5.2.3 Desirability

The empirics show that several respondents highly valued receiving insights regarding the desirability from the intended customers when making an initial analysis. One addressed problem was for the firms to understand who the actual consumer was of the innovation since it could often be their customer's consumers, which illustrates the so often uncertain nature that characterised innovation ideas (Dziallas, 2020). The author Dziallas (2020), further argues that analytical evaluation enables the firms to divide the innovation idea into components that ease the evaluation. This usage of analytical evaluation to divide the innovation idea into components was seen in the empirics. Tools that the firms use to analyze their customer's desirability were both to perform broad market analysis to understand the desirability trend as well as specific surveys and insights studies to understand the specific desirability for innovation ideas. To analyze the desirability is further exemplified by another firm, which has predetermined criteria to emphasize with the customer in order to achieve what they call "jobs to be done". In their case they stress that lacking enough desirability is one of the most common reasons that they reject ideas in their first stage of FEI. These are examples of an activity performed to receive information of an area outside of the current knowledge that firms achieve through analytical analysis.

Regarding investigating the desirability through a hybrid approach one firm addressed that their primary approach was to evaluate the desirability of an idea in the first stage of FEI through analytical approaches and not based on intuition. However, the respondent highlighted that intuition could be used when the decision-maker identifies the desire for a specific product or service from several sources. Having this more flexible approach to evaluate the desirability of an idea could be connected to the literature. According to Hodgkingson et al. (2009), firms that evaluate innovation ideas solely through analytical approaches increase the risk of missing the bigger picture. This argument could be why the

firm above is mainly employing analytical evaluation, but for those situations where the intuition is grounded from several sources, they could base their evaluation on intuition.

5.2.4 Feasibility

Furthermore, many respondents highlighted the need to in their first stage of FEI receive information regarding whether the identified opportunity possessed the required feasibility. Furthermore, these respondents highlight that their innovation departments assigned to evaluate and select the innovation ideas often lacked the required knowledge to truly understand the potential feasibility. An example of how to solve this for one firm was to involve other internal departments as well such as the IT department or other departments that possessed expert knowledge. This is in line with Florén & Frishammar's (2012) recommendations of having a cross-functional team within the FEI and the empirics illustrates its benefits. Apart from involving a cross-functional team in order to analyze the feasibility, some firms perform feasibility studies consisting of what the collective intuition of an innovation council or similar are regarding the ideas benefits, how to test the idea, and potential costs.

5.2.5 Strategic fit

According to the empirics, one of the most crucial aspects of an innovation idea is its strategic fit for the firms. To be able to evaluate the innovation ideas' strategic fit in the first stage of FEI, several firms used different analytical methods. One of their methods was to make sure they have a predetermined innovation strategy within the firm, and to achieve this they perform different scenario planning methods. They argue that by having the innovation strategy predetermined, they will be able to make a fast screening of the ideas fit towards it and thereby also achieve a quick initial screening of bad ideas similar to firms arguments regarding using intuition in their first stage of FEI. Literature supports this by explaining that predetermined criteria within the early stages of the evaluation process in FEI will increase its chances of selecting ideas that are aligned with the firm's overall goals and strategy (Martinsuo and Poskuela, 2011).

However, the fact that the firm argues that they will, from this predetermined criteria, increase the speed of their process is not supported by the literature. According to Elling et al. (2015) analytical criteria are a time-consuming activity for the evaluator. Even though the literature stresses the opposite of the firm's arguments, the firm's arguments of an increased speed could be seen as valid for the specific evaluation and selection process. In other words, they perceive the time-consuming analytical process of performing these scenario models as beneficial since they could utilize the final innovation strategy towards all their innovation ideas evaluation and thereby speed up the individual evaluation and selection processes for each idea. Furthermore, the empirics also illustrate that some of the firms instead performed a quick intuition based analysis of the ideas' strategic fit instead of the more comprehensive analytical analysis discussed above.

5.2.6 Financial criteria

Even if several criteria are argued to be included within the firm's first stage of the FEI, none of the firm's addresses that they performed any financial criteria within this stage. When analysing this with the fact that all of the firms highlighted the uncertain nature around innovation ideas and that they throughout the process aimed at developing information to understand the ideas true value could explain the lack of financial criteria in the first stage of FEI. As the literature argues, static criteria such as financial criteria tend to be just “wild guesses” (Koen et al., 2001). Which indicates that within this first stage of FEI, where the least information is received, financial criteria would contain too large assumptions to draw any conclusions from and thereby explain the lack of it.

5.2.7 Innovation portfolio

Another part that was not specifically highlighted as part of the first stage of FEI was to involve the innovation portfolio within this stage. However, the reason behind that could be, as argued above regarding financial criteria, the firm's lack of information about the ideas that led to them not using this as criteria. Instead, the frequently addressed goal within the firm's first stage of FEI was to achieve additional information that is often connected to include an innovation portfolio in later stages.

5.3 Second Stage of FEI

Once the ideas have passed through the first stage of FEI, they move into the firm's second stage of the FEI. As stressed in the first stage FEI, the ideas that move into the second stage have been briefly screened in most of the firms and the firms aim to possess more information regarding the ideas characteristic as well as which information that is needed to fill the gaps. The empirics further illustrate that it is within this second stage that the firm performs more in-depth analysis regarding the ideas potential to improve the final evaluation and selection of which ideas they should move on into a project process.

There are several apparent similarities with how the firms performed their second stage with the presented element Idea Genesis from the literature (Koen et al., 2001). According to Koen et al. (2001), it is in this element that the opportunity becomes a concrete idea. Furthermore, for firms to connect with external stakeholders such as potential users, customers, competitors and institutions within this stage is beneficial and will ease the development of the concrete idea (Koen et al., 2001).

5.3.1 Test and prototype

The empirics show that most of the respondents involve parts of the Idea Genesis element discussed above within their FEI in the form of different tests and prototypes of the idea for the potential stakeholders. As stressed above in the literature, the empirics also clearly show that the firm's aim with the second stage is to turn the initial idea into a more concrete idea that will make it easier for comparison and evaluation in later stages. Apart from easing the evaluation stage, the firms argue that their final evaluation and selection process will possess fewer assumptions when involving insights from previously performed tests. These goals of achieving fewer assumptions could be connected to the importance of decreasing the fuzziness of the FEI process as argued by Koen et al., (2001). The findings regarding the firm's second stage will be presented below.

In order for the firms to achieve insights from stakeholders they aimed to perform their tests and prototypes in an environment close to reality. Apart from direct feedback on the stakeholders regarding the innovation, the firms stated that other useful insights were received from the tests, such as how the innovations would fit in with the current business

and what resources the innovation would require. This is aligned with the recommendation from the literature regarding the "Idea genesis" element, Which according to Brown (2009) is that it is not beneficial to create the ideas in isolation solely in an abstract way or only using words. Furthermore, as Florén & Frishammar (2012) argued, the best results are received if the firms are involving other people in the process to ensure that the team is cross-functional. These recommendations could be seen in the firms second stage activities, where most of the firms involve people with different backgrounds in order to receive different perspectives. Apart from including people with different backgrounds the firms also stressed to include different stakeholders such as customers, employees and others that will be affected by the innovation.

The empirics show that some firms aim to develop a "minimum viable proof of concept" which illustrates the frequently addressed argument that it is crucial to keep the test and prototyping process as cheap and effective as possible. The importance of keeping this stage as cheap as possible could be connected to the fact that literature stresses that an disadvantage with analytical evaluation such as prototyping, is that it is often a time-consuming and effortful activity (Eling et al., 2015). The firms thereby strive to achieve the balance between having an efficient second stage and to receive the benefits that a more in-depth analytical approach could provide. To include a resource-efficient strategy within this stage will contribute to the overall goal of achieving a FEI process that increases managers' ability to allocate the firms' finite resources among the several innovation ideas (Florén & Frishammar 2012). The most frequently addressed criteria the firms aimed to answer through the prototypes was the innovation ideas desirability, feasibility as well as its strategic fit. Which is the same criteria as the firms highlighted as most common within the first stage of the FEI.

5.3.2 Other activities in Second Stage of FEI

Apart from firms using tests and prototypes in their second stage, the empirics also shows that firms are performing other activities as well to develop the description of the identified idea. One firm highlighted that they perform what they called a concept development stage where they involve brainstorming activities. The goal of the concept development was to gather different views and knowledge regarding the innovation with the goal to be able to present the idea in a firm specific way to ease the comparison. To perform these kinds of

brainstorming activities within the second stage is also highlighted by Koen et al. (2001) when discussing the suggested methods to perform within the Idea Genesis element. To perform these brainstorming activities could also be connected to what the literature describes as sensemaking. According to (Avital & Te'Eni, 2009; Drazin et al. 1999; Ulrich et al. 2015) sensemaking could be utilized within the evaluation and selection process in order to enable individuals to both reframe their already existing understanding in different ways as well as to create new ideas. Therefore, firm's brainstorming activities in the second stage of FEI aim to provide firms with a process that enables the different individuals' intuitions to be both shared and reshaped together and thereby achieve a more well developed concrete idea through that.

Furthermore, the empirics showed that market and customer research was often used within this second stage as well. These methods are argued to also provide useful insights regarding the stakeholders, which Koen et al. (2001) argues are crucial to perceive in the Idea Genesis element as well. The fact that the cost of performing a prototype is a factor that influences the firms FEI process, these more cost-efficient methods such as market and customer research could be seen as useful methods to make sure that ideas which prototype is costly are not always rejected. Similar to how Gutiérrez and Magnusson (2014) argues that predetermined selection criteria increases the risk of a non-flexible process that often leads to missed opportunities. To have too static predetermined methods that are performed in the second could, therefore, also lead to the same risk as Gutiérrez and Magnusson (2014) discusses with missed opportunities.

However, as the empirics states, there are examples of firms that perform their testing and prototyping process as the last stage as well. Instead, as stated earlier that firms use the test's insights to create a presentation of the idea, their logic is the other way around. The firms' instead have their last stage to ensure and validate their already established business model canvases or similar determined in their second stage of the process. These firms argue that by allocating their second stage towards mainly creating hypotheses regarding the idea as well as creating first drafts of business cases will create an increased understanding of what the final test should evaluate. This could be connected to Stevens' (2014) arguments that an essential part of the Opportunity Analysis stage from Figure 2, is that it is often problematic for firms to receive the necessary additional information as well as for deciding what information the firm needs in order to fill in the gaps. This shows that these firms' second stage mainly

involves Opportunity Analysis from Figure 2 and thereby deviates from the majority of the firms who involve Idea Genesis from Figure 2 as their second stage.

5.4 Last Stage of FEI

The empirics shows that all firms agreed upon that their fundamental reason to perform their FEI process was to be able to choose the right ideas to move on into a development stage. Their arguments behind this are in line with Koen et al. (2001) arguments who stress that in order for firms to receive as much business value from their innovation effort as possible it is critical that the firm has a process of how to select which of the firm's ideas to allocate resources to. This is in line with Florén & Frishamar (2012) who highlights that all decisions to move an idea into a project involves financial investment from the firm. Which is also addressed by the firms as a reason for the importance of being able to choose the right ideas due to their finite resources.

The empirics shows that these decisions are mainly taken within the firm's last stage of the process with the help of previous screenings from the first and second stage and is based on the gathered information from the previous stages. This shows that firms mostly perform a linear evaluation process with some exceptions, which differs from how Koen et al. (2001) illustrates it as a non-linear process. However, even though most of the firm's final selection are performed in this last stage, the empirics shows that some firms allow an rejected idea to go back to a previous stage in order to receive new information and then go back again into the last evaluation and selection stage. This possibility to go back and forth is highlighted in the literature as beneficial since it eases and improves the idea selection (Brown, 2009).

Even though the firms were shown to share the same overarching goal with the last stage, their way of doing it and how their process works in practise differed. Furthermore, the empirics shows that the firms put great focus on how to present the ideas in order to ease the last evaluation and selection stage.

5.4.1 Lean start-up methodology

The empirics shows that the firms were aware that there existed a difference between normal ideas and innovation ideas in terms of how their evaluation selection process should be

constructed. For normal ideas, firms frequently performed one in-depth analysis of the opportunity, which laid the entire foundation for the evaluation and selection decision. Regarding innovation ideas, the majority of the firms as well as the literature argue that due to innovation ideas' uncertain nature, it is beneficial to instead perform a lean start-up methodology. This in order to continuously analyze the opportunity along the process (Stevens, 2014). By developing hypotheses based on intuition that will along the stages be analyzed through more analytical methods, the firm aims to adapt their last evaluation and selection process towards suiting the innovation ideas' uncertain nature better.

One benefit with a lean-startup methodology is that firms are able to in a larger extent cancel bad ideas earlier and thereby save resources. To be able to cancel some of these bad ideas in an early stage of FEI is according to the literature crucial for the firm's overall innovation success. According to Werworn et al. (2008), wrong decisions within the Front-End of Innovation tend to lead to time-consuming and expensive deviations in later phases. The firm's decisions to overcome this issue through a lean-startup methodology illustrates and motivates firms usage of an hybrid approach in the FEI. This approach is in line with the literature's arguments about employing a combination of Intuition and Analytical approaches to overcome uncertainty and that firms should not view the two different perspectives as mutually exclusive (Hodgkinson et al., 2009; Sadler-Smith & Shefy, 2004). In other words, the acquired information from previous stages is developed through a hybrid approach and is the basis for the last evaluation and selection.

5.4.2 Presentation of the idea

The empirics show that large focus is put on the importance of being able to present the innovation ideas in an objective and easy way within the last stage. The reason for this is due to the fact that the last evaluation and selection involves individuals that have not been part of the previous stages which needs to clearly understand the value of several ideas and be able to prioritize between these. Furthermore, by presenting the ideas in an unbiased way the firm also increases the evaluation and selection stage's objectivity. The importance of explaining the ideas in an understandable way is also highlighted by Frishammar et al. (2016) which stresses the importance of achieving a shared understanding within the team.

The firm's usage of a lean startup methodology as discussed above is also connected to the presentation of the idea. The empirics shows that to validate the individual's intuitions with more analytical analyses is to increase the consensus among the decision-makers of the evaluation in the Last Stage. Which is also stressed by Sadler-Smith and Sefy (2004), who argues that creating consensus regarding key variables is vital for a successful FEI process. In other words, the firm's perception is that analytical evaluation of the innovation idea will ease the presentation of the ideas to the deciding individuals.

The majority of firms are using business cases to present the idea in the last evaluation. Information from the activities in the previous stages accumulates into a business case or similar. Even though the empirics shows a tendency that firms partly screen ideas without a formal business case or similar, one common finding was that all firms used business cases or similar for innovation ideas perceived as resource-heavy. The reason for this is that the risk of an innovation idea increases in correlation with how much resources an idea requires, which is why there is a greater need for using business cases among the firms for resource heavy ideas. There are clear similarities with the firm's logic about these ideas with how the authors Goodale et al. (2001) argues that a formal process will decrease the innovation ideas uncertainty. In contrast to this, the authors Cooper et al. (2001) and Khurana & Rosenthal (1998) argue that a non-formal process will instead increase firms creativity. Firms' perception is thereby that the increased risk associated with resource heavy innovation ideas motivates them to use a formal process to decrease the uncertainty, and to accept the decreased flexibility that it will provide.

5.4.3 Criteria used in last stage

The empirics shows that within the first and second stage of FEI, the most frequently addressed and emphasized criteria are desirability, feasibility and strategic fit. The empirics shows that these criteria are all included as parameters within the presented business cases in the last stage as well. Apart from these, the firms highlighted that they also involved financial criteria as well as the innovation ideas' fit into the overall firm's portfolio.

The empirics further on shows that the intent or characteristics of an idea plays a vital role regards to what criteria should be included in the evaluation of the idea. This difference in preferable criteria thereby affects the way the firms present the idea for the last evaluation.

The firm's viewpoint on what criteria should be included have great similarities with Hammedi et al. (2011) who argues that the importance of a specific criteria may differ depending on what type of an idea it is. Argued by the empirics, a cost-saving idea can not have the same criteria as an idea with the intent of increasing the customer's experience. This idea of customizing the evaluation criteria based on the idea also aligns with Zhou et al. (2019) who argues that organizations should produce specific criteria that will guide the evaluation toward relevant outcomes.

Another example of a flexible approach from the empirics was that firms' attitude towards solely using analytical criteria increased the risk that the individual's intuition will indirectly impact the presented analytical criteria even though it is not stated. This since the individual's personal intuition will tweak the analytical criteria towards the same way as their gut-feeling. This is connected to Ulrich et al. (2015), arguments that the individual's background and thereby sensemaking will have an effect on how the evaluators' frame the ideas. In order to overcome this problem, some of the firms included the individual's intuition as its own parameters in the last stage. By doing so they argue first of all that the individual's intuition is transparent as well as that it will decrease the risk of it affecting the other analytical criteria.

As discussed earlier, the firms did not utilize financial criteria as a method for evaluation in the two previous stages due to the fact that large assumptions had to be made with limited information. This is also stressed by Koen et al. (2001) who argues that financial criteria tends to be just "wild guesses" for innovation ideas. However, in the last stage of the FEI process, the firms possess greater information about the idea than previously, allowing them to utilize financial criteria to a greater extent. All though, the information is still limited to a certain degree. Therefore, the firm's attitude towards financial criteria is to utilize it with caution. Scepticism towards financial criteria is frequently addressed in the literature as well, where Cooper et al. (2001) for example argues that it is more difficult to apply financial criteria for the evaluation of innovation ideas due to the high uncertainty it is characterized by. This cautious attitude towards financial criteria is shown in the empirics as some firms are not employing financial criteria for breakthrough innovations ideas due to its low reliability and large assumptions. Having a non-flexible approach in terms of the usage of financial criteria would, according to the empirics, only favour smaller incremental innovation and reject all breakthrough innovation due to the high level of uncertainty and risks. However, by

having a more flexible approach the firms are able to achieve a greater balance between innovation ideas in regards to their uncertainty.

5.4.4 Portfolio Innovation management

Closely related to analysing the strategic fit, the empirics also shows that most of the firms to some degree involve portfolio innovation management within their last evaluation and selection process. The most frequently addressed parameters the firms used was to look at the ideas time-horizons, its size and its risk. As stressed earlier, the usage of portfolio innovation management is limited to the last stage of the FEI-process as it is only here that the firms possess the necessary information to perform an comparison and decide its fit into the overall portfolio. The usage of a more in depth analytical analysis is stressed in the literature as well. According to Kock, Heising and Gemünden (2014), firms should ensure they include a broad perspective if the idea does fit into the overall organizational portfolio. This in order to secure a variety of ideas and concepts, which is something that the empirics shows that the firms are aware of as well.

5.4.5 Selection based on collective intuition

The empirics shows that some ideas were difficult to motivate through standardized analytical criteria even though they possess potential value. These ideas are often characterized by small short-term benefits and that their long-term benefits are connected to softer values such as its effect on the firm's brand value. Some firms solve this issue by providing a budget mandate to the innovation department, allowing them to pursue these kinds of ideas. In other words, the innovation department has the possibility to, based on their collective intuition, move a certain amount of ideas into projects without the same analytical requirements as other innovation ideas. The potential benefits of involving intuition is also stressed by Hodgkinson et al. 2009; Sadler-Smith and Burke, (2009) who argues that intuition could be preferable to use when evaluating ideas that are highly complex or loosely defined. For these highly complex and loosely defined ideas, some firms are thereby solely employing intuition evaluation as their last evaluation.

6. Conclusion

The purpose of this chapter is to answer this thesis research question by outlining conclusions drawn from the analysis chapter. In order to achieve this, the conclusions will be divided into First, Second and Last Stage of the FEI. Lastly, a presentation of suggested future research is made.

6.1 Answer to the Research Question

The following research question has guided the research of this thesis: ***How do established Swedish firms evaluate and select between innovative ideas in the Front-End of Innovation?***

Based on the analysis chapter, the short answer to the research question is that all firms are employing an FEI process that is divided into different stages. Clustered together, these could be divided into a first, second and last stage where they throughout the process screened ideas that they could ensure wouldn't fulfill the firm's predetermined requirements. Apart from the screening within these stages, the firms aimed at throughout the process receive further information regarding the innovation ideas value in different areas.

Both the process of gathering information as well as the screening was performed through either intuition or an analytical approach and often through a mixture of these two called a hybrid approach. The firms most often performed a lean start-up methodology due to their lack of information about the ideas as well the uncertain nature that innovation ideas are characterized by. This methodology favoured utilizing intuition initially to set up hypotheses which then are analysed throughout the process with more analytical methods. In other words, the overall trend was that the usage of intuition was mainly performed within the first stage which then diminished along the process. In contrast, the usage of analytical methods increased along the process and was the main basis of the final last stage evaluation and selection. This difference in the usage of intuition and analytical methods is explained by the uncertain nature of innovation ideas with its limited amount of information. In correlation with the gathered information and thereby the decreased uncertain nature of an idea along the process, the firm's ability to perform more controllable and reliable analytical methods increased.

The conclusions above answer the thesis research questions broadly. In order to provide a more in-depth answer to the research question, the three stages will be answered separately.

6.1.1 First Stage of FEI

The main characteristic of the firm's first stage of the FEI process was to through different approaches receive further information regarding the innovation idea as well as to get an understanding of what information the firms lacked. Apart from these information-gathering methods, the firms also screened out some of the ideas the firms early on perceived as not worth pursuing due to the lack of desirability, feasibility, strategic fit or an idea’s newness to the firm.

The majority of the firms utilized an idea owner within the first stage of the FEI, either an individual or a group of individuals that the firms perceived as possessing the required knowledge of the innovation idea. These individuals were then responsible for the idea along the process and were often assigned to perform the first screening of the idea. The criteria used in this first screening regarded the ideas' newness to the firm, its desirability, feasibility, and also its strategic fit in the overall organization. These decisions taken by the idea owner are commonly based on their intuition. The firm's reason for applying this was due to the fact that it was perceived as a time-efficient and cost-efficient method to screen out the most obvious innovation ideas that are not worth pursuing with and spend the firm's finite resources on. To perform this first stage evaluation based on intuition is however found to be criticized as well, some firms believe that it could often lead to an ad-hoc innovation strategy where the potential synergies between ideas are missed out.

It was found that apart from rejecting ideas and gathering information, the idea owner should also investigate and select which ideas that could directly become projects and thereby skip the rest of the firm's FEI process. These selected ideas were characterised by requiring a low amount of resources or those that will solve an emergent issue for the firms.

Apart from assigning an idea owner that performs the first stage of FEI based on intuition, it was found that firms in parallel performed analytical methods in order to investigate the innovation idea in regards of its desirability, feasibility and strategic fit. The analytical

methods used in the first stage of FEI were strategic framing, market segment assessment, competitor analysis, and customer assessment. Finally, it was also recognized that several firms have in advanced performed scenario modelling in order to set an innovation direction that the idea was compared to in order to analyze their strategic fit. As seen, the firms utilize both intuition and analytical methods within the first stage and thereby illustrate a usage of an hybrid approach among the firms.

6.1.2 Second Stage of FEI

It was found that it was within the second stage of FEI the firms performed more in-depth analysis of the innovation ideas. These analysis was mostly performed through different tests and prototypes where the firms connected with potential stakeholders to receive insights. The overarching goal was similar to the one in the first stage of FEI to gather information regarding the ideas' desirability, feasibility, and strategic fit. In order to accomplish this, the firms aimed to perform these tests and prototypes in an environment close to reality to receive true insights. It was also found that the firms argued that it is crucial to perform these tests as cost-efficiently as possible. However, even though the majority of the firms performed tests and prototypes in the second stage of FEI, the empirics show that some firms instead performed business cases or similar within this stage that would be tested and evaluated in their last stage of FEI instead.

The fact that most of the firms performed a lean start-up methodology was shown in this stage as well. The firms highlighted the importance of setting up hypotheses in advance which the tests and prototypes aimed to answer. These steered insights will be used for further evaluation and decrease the large assumptions that idea selection of innovation ideas are characterised by. Apart from performing tests and prototypes within the second stage, it was found that some firms performed brainstorming activities with groups of experts as their way to receive more in-depth information of the innovation idea. It was shown that these activities were beneficial since it collected the collective intuition of experts which provided insights that were difficult to reach with solely analytical methods.

In sum, the main purpose for the firm's second stage of FEI was to perform in-depth analyses of the innovation ideas in order to gather information from stakeholders to ease the evaluation

and selection process later on. Most of the firm's activities to achieve this was through analytical methods such as tests and prototypes even though collective intuition methods were used to a certain degree. By combining intuitive and analytical methods in the second stage, the firms utilize a hybrid approach.

6.1.3 Last Stage of FEI

Even though selection decisions are performed in both the first and second stages, it is in this last stage most of the selections are performed. These decisions are based on the gathered information from the previous stages, mainly regarding the innovation ideas desirability, feasibility, strategic fit as well as financial criteria and its fit into the overall innovation portfolio. Compared to the other stages, it is first in this stage the firms are evaluating the idea based on financial criteria and its fit into the overall innovation portfolio. The reason for this was found to most likely be that the lack of information in the first stages of FEI made those criteria impossible to evaluate.

The firms emphasized that the way the ideas are presented for the last evaluation and selection is crucial for the overall success. The most common method to present the ideas for the firms was to perform business models or similar models that provided the evaluator with the necessary information to be able to perform a priority scheme of which ideas to move into the next stage. Having a flexible approach of how to present the final information and which criteria to involve was also stressed by the firms as important, since the evaluators often had several different innovation ideas with different characteristics to compare in this last stage. By utilizing a flexible approach, ideas that share the same characteristics could be compared to each other, and a better evaluation and selection could be done.

Even though financial criteria was highlighted as useful in this stage, the firms often highlighted their awareness that financial criteria was often developed based on large assumptions and uncertainty. Therefore, they strived to present the assumptions made behind their calculation as transparent as possible and tried to keep its usage flexible. Having a strict non-flexible approach to financial criteria would otherwise reject all large breakthrough innovations and ideas that are more difficult to quantify, such as an environmental improvement idea. This would decrease the firm's overall value received from innovation since the balance between different types of ideas would be damaged. Apart from financial

criteria, the firms also perform analytical analysis regarding the ideas fit into the overall innovation portfolio, in regards to its time-horizons, its size as well as its risk.

As stressed in the beginning of the conclusion, the firm's last evaluation and selection is mainly done based on analytical criteria. However, it was argued from some firms that intuition could be beneficial to include as well in order to complement the other static analytical criteria. Including the individual's intuition provides the evaluator with a transparent presentation of their intuition instead of the risk that it is hiddenly included in the other analytical criteria, and that it enables more soft values to be included as well.

Finally, the fact that some innovation ideas were more difficult to motivate in a typical business case led to the risk of them being rejected as stressed earlier. In order to overcome this issue, it was found that some firms used the innovation departments collective intuition to select some of these ideas to be developed without the same requirements of analytical evaluation. The innovation departments, therefore, had a limited budget or mandate that they could utilize for these situations. It shows that even though intuition is mainly used in the first stage of FEI, it is also included within the last stage of FEI.

6.2 Managerial Implication

The result of this research shows that the majority of the criteria used in the last selection process is based on analytical analysis that the firm has gathered information about in previous stages. However, this research analysis shows that managers must understand the potential drawbacks of doing so. Two identified risks will occur by solely selecting a certain number of analytical criteria to evaluate and select ideas upon. One risk was that the individual’s intuition would indirectly modify the presented criteria since the individuals performing the analytical analysis will interpret the result of the analysis differently depending on its intuition. Therefore, the managers believe they are making their selection on strictly objective criteria, which they are not. The other risk is that by excluding intuition in the final selection, the managers miss out on the potential soft values that the idea will generate. Therefore, a suggestion for managers would be, as one respondent addressed, to include intuition among all the other analytical criteria in the last selection of an idea. This would lead to the individual’s intuition being transparent towards the evaluators, and the risk

of his or her intuition affecting the other presented criteria is decreased. By doing so, the two above discussed risks could be mitigated, and the managers are able to perform a more objective selection process.

One interesting finding from the research was that none of the interviewed firms performed solely financial criteria in the first stages, which could be assumed to be done by for-profit firms in order to ensure the ideas' value. The interviewed firm's argument for not involving financial criteria in the first stage was that it would require too large assumptions. Furthermore, it would lead to radical innovation ideas being rejected, and firms solely favoured to innovate around smaller incremental innovation that consisted of fewer assumptions and would illustrate positive values in typical financial criteria. For the interviewed firms to solely innovate around incremental innovation ideas was not aligned with the firm's innovation strategy and was seen as not a desirable outcome. Therefore, for managers that want to achieve a balance between incremental innovation and radical innovation it is crucial to not perform financial criteria too strictly in the initial stages even though their intuitive-thought is to do so. Instead the managers should, as the firms in this research, focus on other values such as the desirability and feasibility of the idea in the first stage and to potentially involve financial criteria later on once further information is received and their understanding of the ideas are improved.

Lastly, most firms highlighted the importance of performing tests and prototypes of the innovation ideas to receive insights from stakeholders. By doing so, the firms would receive insights from customers and consumers of how they interpret the idea and its potential value. Apart from customers and consumers, the firms also aimed to receive insights from the internal employees that will somehow be affected by the innovation idea. These insights were highly valued later on in the selection process since they would provide reliable indications of the ideas value and different information that otherwise would be difficult to receive. Therefore, it is crucial that managers allocate resources towards this step, in order to receive these insights. However, the problem for managers is that a test and prototype of an innovation idea could often be seen as complicated and costly to perform due to the uncertain nature and fuzziness that innovation ideas are characterized by. Even though prototyping and testing might be complicated for innovations, it is recommended to perform it in a simplified and cost-efficient way due to the highly valuable insights it generates. Which is illustrated by

firms in their “minimum viable proof of concept”, where they perform prototypes and tests in an environment close to reality as cost-efficiently as possible. This concept is based on performing simplified prototypes tested in a real environment that led to reduced spendings, but still achieved reliable results. Based on this observation, managers should encourage the individuals that are involved in the innovation process to always perform some kind of test and prototype even if their attitude is that it is impossible and too expensive to perform. The focus should then be to perform the most simplified and approximate version of innovation ideas as possible. Another managerial implication when performing tests and prototypes is to conduct hypotheses before initiating a test or a prototype. These hypotheses should state what the aim of a test is and what should be measured. Managers should utilize this method in order to avoid false positives and to identify false negatives that might arise when analyzing the data achieved from the tests. False positive ideas are those ideas that are initially perceived as valuable but that turn out as non-valuable ideas. False positives is the other way around, with ideas that are initially perceived as non valuable but turns out to be valuable.

6.3 Future Research

This thesis aim is to investigate how established Swedish firms evaluate and select innovation ideas in the front end of innovation. However, it is a wide topic which therefore leaves room for future research, suggestions of future research will be provided below.

First of all, this study was conducted on established Swedish firm’s FEI process and thereby did not include smaller start-up firms. The results of instead reproducing this thesis on small start-up firms would also provide interesting findings. First of all because from the literature it was found that established firms tended to get outcompeted within their market due to their inability to recognize and identify new upcoming innovations (Chandy & Tellis, 2000). However, there was no identified literature regarding if this was the case for smaller start-up firms as well. Apart from this potential research gap, it was commonly stressed that it was beneficial if the evaluation of innovation ideas was performed by people with the relevant domain knowledge (Denker, 2018; Magnusson, Wästlund, and Netz, 2016). An assumption could be made that established firms possess to a larger degree experts with relevant domain

knowledge than smaller start-up firms do. Thereby an investigation of smaller start-up firms would thus possibly show a different result.

Secondly, since the chosen research strategy of this has been a qualitative approach and that the thesis does not provide conclusions regarding which methods have been proven to be the most successful for Swedish firms to perform when evaluating and selecting innovation ideas. A quantitative research would thereby be interesting to perform in order to investigate which chosen method has proven to be the most beneficial in the past. As Bryman, Bell and Harley (2019) argues, a quantitative research strategy is more concerned with the researcher´s point of view rather than the respondents´ point of view and would thereby provide an interesting viewpoint to this topic.

Lastly, the finding that some firms solely used their collective intuition as the evaluation for those situations where the innovation ideas were complicated to motivate through analytical criteria would be interesting to further investigate. According to the literature, if one focuses solely on intuition the risk of overlooking crucial details will increase (Hodgkinson et al., 2009). Thereby a research that investigates the outcomes of these ideas would be an opportunity to increase the understanding if the firm's collective intuition is correct and the benefits of it outweighs the disadvantages.

7. References

Achiche, S., Appio, F., McAloone, P., & Di Minin, T. (2013). Fuzzy decision support for tools selection in the core front end activities of new product development. Research in Engineering Design,24(1), 1-18.

Anzola-Rom´an, P., Bayona-S´aez, C., & Garc´ıa-Marco, T. (2018). Organizational innovation, internal r&d and externally sourced innovation practices: Effects on technological innovation outcomes.Journal of Business Research., (91),233–247.

Avital, M., and D. Te'Eni. (2009). From generative fit to generative capacity: Exploring an emerging dimension of information systems design and task performance. *Information Systems Journal 19* (4): 345–67.

Balachandra, R., and J. H. Friar. (1997). Factors for success in R&D projects and new product innovation: A contextual framework. IEEE Transactions on Engineering Management 44 (3): 276–87.

Bryman, A., & Bell, E. (2011). Business research methods (3rd edition).

Blank, S. (2006). The four steps to the epiphany: successful strategies for products that win (2nd ed.). Foster City, Calif.: Cafepress.com.

Braun, V., & Clarke, V. (n.d.). (2006) Using thematic analysis in psychology

Brown, T. (2009). Change by design: how design thinking can transform organizations and inspire innovation. New York, NY: HarperCollins Publishers.

Bryman, E., Bell, A., and Harley, B. (2019). Business Research Methods. 5th edition., Oxford: Oxford University Press.

Castleberry, A., & Nolen, A. (2018) Thematic analysis of qualitative research data: Is it as easy as it sounds? Currents in Pharmacy Teaching and Learning 10, pp. 807–815.

Chandy RK, Tellis GJ (2000) The incumbent's curse? Incumbency, size, and radical product innovation. J Market 64(3):1–17

Colom, R., I. Rebollo, A. Palacios, M. Juan-Espinosa, and P. C. Kyllonen. (2004). Working memory is (almost) perfectly predicted by g. *Intelligence 32* (3): 277–96.

Cooper, R.G. (1998) Benchmarking new product performance: results of the best practice study. European Management Journal, 16, 1–17.

Cooper, R., Edgett, S., & Kleinschmidt, E. (2001). Portfolio management for new product development: results of an industry practices study. *r&D Management*, *31*(4), 361-380.

Cooper, R. G. (2014). What's Next?: After stage-gate. ResearchTechnology Management 57 (1): 20–31.

Dane, E., and M. G. Pratt. (2007). Exploring intuition and its role in managerial decision making. *Academy of Management Review 32* (1): 33–54.

Danes, J. E. & York, J. L. (2011). Market driven customer, concept, and product development: New Views on the Discovery and Assessment of Innovation Development Hypotheses. The Journal of Product Innovation Management, 28(6).

Dayan, M., and C. A. Di Benedetto. (2011). Team intuition as a continuum construct and new product creativity: The role of environmental turbulence, team experience, and stress. Research Policy 40 (2): 276–86.

Dean, D., Hender, J., Rodgers, T., & Santanen, E. (2006). Identifying Quality, Novel, and Creative Ideas: Constructs and Scales for Idea Evaluation. Journal of the Association for Information Systems,7(10), 646-653,656-663,665-668,670-698.

Denker, F. (2018). The crucial role of domain knowledge in evaluating early-stage new product ideas. Wiesbaden: Springer Gabler.

Dess, G. G., Lumpkin, G. T., & Taylor, M. L. (2004). Strategic management: text and cases. Boston, Mass.: McGraw-Hill/Irwin.

Drazin, R., M. A. Glynn, and R. K. Kazanjian. (1999). Multilevel theorizing about creativity in organizations: A sensemaking perspective. *Academy of Management Review 24* (2): 286–307.

Dziallas, M. (2020). How to evaluate innovative ideas and concepts at the front-end?: A front-end perspective of the automotive innovation process. *Journal of Business Research 110*: 502–18.

Eisenhardt, K. M. (1991). Better stories and better constructs: The case for rigor and comparative logic. *Academy of Management review*, *16*(3), 620-627.

Eisenhardt, Kathleen M. & Graebner, Melissa E. (2007), "Theory Building from Cases: Opportunities and Challenges."Academy of Management Journal, Vol. 50, Nr. 1, s. 25-32

Eling, K., Griffin, A., & Langerak, F. (2016). Consistency Matters in Formally Selecting Incremental and Radical New Product Ideas for Advancement. Journal of Product Innovation Management, 33(S1), 20-33

Eling, K., F. Langerak, and A. Griffin. (2015). The performance effects of combining rationality and intuition in making early new product idea evaluation decisions. Creativity and Innovation Management 24 (3): 464–77.

Evans, J. S. B. T. (2008). Dual-processing accounts of reasoning, judgment, and social cognition. *Annual Review of Psychology 59*: 255–78.

Evans, J. S. B. (2010). Intuition and reasoning: A dual-process perspective. *Psychological Inquiry*, *21*(4), 313-326.

Evans, J. S. B., & Frankish, K. E. (2009). *In two minds: Dual processes and beyond*. Oxford University Press.

Florén, H. and Frishamar, J. (2012). From preliminary ideas to corroborated product definitions: Managing the front end of new product development.California Management Review, (4): 20-43.

Francis, J., Johnston, M., Robertson, C., Glidewell, L., Entwistle, V., Eccles, M., & Grimshaw, J. (2010). What is an adequate sample size? Operationalising data saturation for theory-based interview studies. Psychology & Health, 25(10), 1229-1245

Frankelius, P. (2001). Omvärldsanalys. Malmö: Liber Ekonomi.

Fredriksen, L. (2015). Top 5 business challenges management consulting for firms. Business to community.

Frishammar, J., Dahlskog, E., Krumlinde, C., & Yazgan, K. (2016). The Front End of Radical Innovation: A Case Study of Idea and Concept Development at Prime Group, Creativity and Innovation Management, vol. 25, no. 2, pp. 179 - 198

Gama, F., Frishammar, J., & Parida, V. (2019). Idea generation and open innovation in SMEs: When does market-based collaboration pay off most? Creative Innovation Management, vol. 28, pp. 113 - 123

Gassmann, O., Sandmeier, P., & Wecht, C. (2006). Extreme customer innovation in the front-end: Learning from a software paradigm.International Journal of Technology Management., (33(1)), 42–66.

Gassmann, O., & Schweitzer, F. (Eds.). (2014). Management of the fuzzy front end of innovation. Cham: Springer.

Goffin, K., & Mitchell, R. (2017). *Innovation Management: Effective strategy and implementation* (Third ed.).

Gutiérrez, E., & Magnusson, M. (2014). Dealing with legitimacy: A key challenge for Project Portfolio Management decision-makers. International Journal of Project Management,32(1), 30-39.

Hakkarainen, K., & Talonen, T. (2014). The innovation funnel fallacy.International Journal of Innovation Science., (6(2)), 63–72.

Hammedi, W., A. C. R. van Riel, and Z. Sasovova. (2011). Antecedents and consequences of reflexivity in new product idea screening. *Journal of Product Innovation Management 28* (5): 662–79.

Hammond, K. R. (1996). *Human judgement and social policy. Irreducible uncertainty, inevitable error, unavoidable judgement*. New York, NY: Oxford University Press.

Heising, W. (2012). The integration of ideation and project portfolio management—A key factor for sustainable success. International Journal of Project Management, 30(5), 582-595.

Ho, Y.-C. and Tsai, C.-T. (2011). Front end of innovation of high technology industries: The moderating effect of front-end fuzziness.The Journal of High TechnologyManagement Research, 22(1):47–58.

Hodgkinson, G. P., Sadler-Smith, E., Burke, L. A., Claxton, G., & Sparrow, P. R. (2009). Intuition in organizations: Implications for strategic management. *Long range planning*, *42*(3), 277-297

Hodgkinson, G. P., and E. Sadler-Smith. (2018). The dynamics of intuition and analysis in managerial and organizational decision making. *Academy of Management Perspectives 32* (4): 473–92.

IBM (2012) IBM global CEO study – the enterprise of the future. https://www.ibm.com/downloads/cas/XDWLBNZ2 - Received 2021-01-06.

Kahneman, D., and S. Frederick. (2002). Representativeness revisited: Attribute substitution in intuitive judgment. *Heuristics and Biases: The Psychology of Intuitive Judgment 49*: 81.

Khurana, A., & Rosenthal, S. R. (1997). Integrating the fuzzy front end of new product development. MIT Sloan Management Review, 38(2), 103.

Khurana, A., & Rosenthal, S. R. (1998). Towards holistic "front ends" in new product development. Journal of Product Innovation Management: An international publication of the product development & management association, 15(1), 57-74.

King, N., & Brooks, J. (2018). Thematic analysis in organisational research. The SAGE Handbook of Qualitative Business and Management Research Methods (Volume 2), Publisher: Sage, Editors: Catherine Cassell, Ann L Cunliffe Gina Grandy.

King, N. (2004). Using Templates in the Thematic Analysis of Text, Essential guide to qualitative methods in organisational research, vol. 2, pp. 256–270

Kim, W., & Mauborgne, R. (2004). Blue ocean strategy.Harvard Business Review.,(82(10)), 76–84.

Kock, A., Heising, W., & Gemünden, H. G. (2014). How Ideation Portfolio Management Influences Front-End Success, Journal of Product Innovation Management, vol. 32, no. 4, pp. 539 - 555

Koen, P., Ajamian, G., Burkart, R., Clamen, A., Davidson, J., D'Amore, R., & Karol, R. (2001). Providing clarity and a common language to the fuzzy front end. Research-Technology Management., (44(2)), 46–5.

Koen, P., Ajamian, G., Boyce, S., Clamen, A., Fisher, E., Fountoulakis, S., & Seib-ert, R. (2002). Fuzzy front end: Effective methods, tools, and techniques.The PDMA Toolbook 1 for New Product Development.

Koen, P.A., Bertels, H. M., & Kleinschmidt, E. (2014). Managing the front end of innovation-part I: Results from a three-year study. Research-Technology Management,57(2), 34-43.

Kohn, S. and Husig, S. (2003). Factors influencing the front end of the innovation process: A comprehensive review of selected empirical NPD and explorative ffe studies.

Kudrowitz, B., & Wallace, D. (2013). Assessing the quality of ideas from prolific, early-stage product ideation. Journal of Engineering Design,24(2), 120-139.

Langerak, F., Hultink, E. J., & Robben, H. S. (2004). The impact of market orientation, product advantage, and launch proficiency on new product performance and organizational performance. Journal of product innovation management, 21(2), 79-94.

Magnusson, P. R., J. Netz, and E. Wästlund. (2014). Exploring holistic intuitive idea screening in the light of formal criteria. Technovation 34 (5–6): 315–26.

Maitlis, S., and M. Christianson. (2014). Sensemaking in organizations: Taking stock and moving forward. *Academy of Management Annals 8* (1): 57–125.

Martinsuo, M., & Poskela, J. (2011). Use of Evaluation Criteria and Innovation Performance in the Front End of Innovation. Journal of Product Innovation Management,28(6), 896-914.

Montoya-Weiss, M. M., & O'Driscoll, T. M. (2000). From experience: applying performance support technology in the fuzzy front end. Journal of Product Innovation Management: An International Publication of The Product Development & Management Association, 17(2), 143- 161.

Mootee, I. (2011). Strategic Innovation and the Fuzzy Front End. Ivy Business Journal, April.

Miles, Matthew B. (1979), "Qualitative Data as an Attractive Nuisance: The Problem of Analysis." Administrative Science Quarterly, Vol. 24, Nr. 4, s. 590-602

Miles, Matthew B. & Huberman, A. Michael (1994), Qualitative Data Analysis: an expanded sourcebook. 2:a utg, SAGE Publications, Thousand Oaks

Nicholas, J., Ledwith, & Bessant. (2015). Selecting Early-Stage Ideas for Radical Innovation: Tools and Structures. Research-Technology Management, 58(4), 36-44.

Onarheim, B., and B. T. Christensen. (2012). Distributed idea screening in stage-gate development processes. *Journal of Engineering Design 23* (9): 660–73.

Petervari, J., M. Osman, and J. Bhattacharya. (2016). The role of intuition in the generation and evaluation stages of creativity. *Frontiers in Psychology 7*: 1420.

Phillips, W. J., J. M. Fletcher, A. D. Marks, and D. W. Hine. (2016). Thinking styles and decision making: A meta-analysis. *Psychological Bulletin 142* (3): 260–90.

Pretz, J. E., J. B. Brookings, L. A. Carlson, T. K. Humbert, M. Roy, M. Jones, and D. Memmert. (2014). Development and validation of a new measure of intuition: The types of intuition scale. *Journal of Behavioral Decision Making 27* (5): 454–67.

Rogers, E. M. (2003). *Diffusion of Innovations*. Simon and Schuster.

Runco, M. A. (1988). Creativity research: Originality, utility, and integration. Creativity Research Journal 1(1), 1–7.

Sadler-Smith, E. Shefy. (2004) The intuitive executive: understanding and applying "gut feel" in decision making. Academy of Management Executive, 18 (2004), pp. 76-91

Sadler-Smith, E., and L. A. Burke. (2007). Fostering intuition in management education. Journal of Management Education 33 (2): 239–62.

Salas, E., M. A. Rosen, and D. DiazGranados. (2010). Expertise-based intuition and decision making in organizations. Journal of Management 36 (4): 941–73.

Sandberg, J., and H. Tsoukas. (2015). Making sense of the sensemaking perspective: Its constituents, limitations, and opportunities for further development. *Journal of Organizational Behavior 36*: 6–32.

Schumpeter, J. (1934).The theory of economic development. Harvard UniversityPress.

Siggelkow, N. (2007). Persuasion with case studies. Academy of Management Journal. Vol. 50, no. 1, s. 20-24.

Soukhoroukova, A., M. Spann, and B. Skiera. (2012). Sourcing, filtering, and evaluating new product ideas: An empirical exploration of the performance of idea markets. *Journal of Product Innovation Management 29* (1): 100–12.

Stevens, E. (2014). Fuzzy front-end learning strategies: Exploration of a high-tech company, Technovation, vol. 34, pp. 431 - 440

Stierand, M., and V. Dörfler. (2016). The role of intuition in the creative process of expert chefs. *The Journal of Creative Behavior 50* (3): 178–85.

Sukhov, A., A. Sihvonen, L. E. Olsson, and P. R. Magnusson. (2018). That Makes sense to me: Openness to change and sensemaking in idea screening. *International Journal of Innovation Management 22* (08): 1840009.

Toubia, O., and L. Florès. (2007). Adaptive idea screening using consumers. Marketing Science 26 (3): 342–60.

Ulrich, F., S. A. Mengiste, and S. D. Müller. (2015). Informal evaluation and institutionalization of neoteric technology ideas: The case of two Danish organizations. *Communications of the Association for Information Systems 37* (47): 949–74.

Verworn, B. (2009). A structural equation model of the impact of the "fuzzy front end" on the success of new product development. Research Policy, 38(10), 1571-1581

Verworn B, Herstatt C, Nagahira A (2008) The fuzzy front end of Japanese new product development projects: impact on success and differences between incremental and radical projects. R&D Manage 38(1):1–19

Weick, K. E. (1995). *Sensemaking in organizations*. Thousand Oaks, CA: Sage Publications.

Weick, K. E., K. M. Sutcliffe, and D. Obstfeld. (2005). Organizing and the process of sensemaking. *Organization Science 16* (4): 409–21.

Yin, Robert K. (1994), Case Study Research: Design and Methods. 2:a utg, Sage Publications, USA

Yin, R.K. (2007). Fallstudier: design och genomförande. (1:th edition.) Malmö: Liber AB.

Zhou, J., X. M. Wang, D. Bavato, S. Tasselli, and J. Wu. (2019). Understanding the receiving side of creativity: A multidisciplinary review and implications for management research. *Journal of Management 45* (6): 2570–95. https://doi.org/10.1177/01492 06319827088.

8. Appendixes

8.1 Appendix 1 - Thematic analysis with concepts and themes

Concepts	Themes
Idea owner First evaluation Last evaluation Test and prototype Information gathering Present the innovation idea	**Front End of Innovation (FEI)**
Gut-feeling Critic towards intuition Experience and knowledge Fast-footed decisions Collective intuition	**Intuition Evaluation**
Desirability Feasibility Strategic fit Financial criteria Innovation portfolio In-depth analysis Criteria flexibility Rational evaluation	**Analytical Evaluation**
Lean start-up methodology Innovation uncertain nature Intuition complements analytical evaluation Analytical complements intuition evaluation	**Hybrid Evaluation**

8.2 Appendix 2 - Interview guide

Interview guide

Background

- Could you briefly describe your company and what position you have at the company?

Evaluation process

- Could you describe the innovation process? From the idea stage to releasing the innovation.
- Can you describe the process you use to evaluate innovation ideas? Please exemplify. What are some of the common challenges with the evaluation process?
- Are you employing the same process for evaluating every innovation idea? If not, what are the decisive factors for the choice of the process?
- In regards to FEI, what methods are you using to evaluate the innovation ideas?
- How flexible would you say your evaluation process is?
- Have you experienced any innovation projects that were rejected within the evaluation process? If yes, how come?
- How do you manage the trade-off between risk and opportunity when evaluating innovation ideas? How do you assess the risk of your innovation ideas?
- Does your firm use an overall innovation portfolio for managing innovation ideas?

Innovation maturity

- On a scale between 0-10 where would you put your organization's innovation maturity? For how many years have your company worked with innovation projects? Is there an increased allocation of resources towards innovation projects over the years?

Others

- Is there anything that you would like to add to the interview?