Management and leadership within the FFE

Management-and leadership effects on time efficacy within the Fuzzy Front End of the New Product Development process.
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Have a nice time reading!

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Today’s fast-paced and increasingly competitive market has added pressure on companies and NPD-teams to improve both the quality of the products they provide, as well as the speed in which the products are introduced to the market. The main purpose within this study was to investigate two research questions; (a) How can various management- and leadership styles improve time efficacy without impairing the successes of the FFE of the NPD process; and (b) How can/does the uncertainty within the FFE affect project managers within the NPD process?

Qualitative methods have been used within this study to gain a greater understating of the tasks and activities management have applied within the FFE to reduce and save time. A multiple case study, in the form of interviews, was performed in order to obtain raw empirical data. Eight interviews were conducted with individuals whom possessed managerial roles such as project managers, within the NPD process. The information was later analyzed and evaluated with the help of a thematic analysis.

The main findings within this thesis contradict previous studies and literature which state the need for “more time” within the FFE of the NPD process. The result within this study suggest that project managers do not seek to extend the time provided within the FFE, rather identify task and methods which can enable them to use the time afforded wisely and efficiently. The managers do not seek to eliminate any tasks or activities; however, they do wish to identify less relevant activities in order to spend more time on valuable and beneficial tasks which increase the likely-hood of developing high quality products.
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1 Introduction

This chapter introduces the main subjects and the purpose of this study, along with background information to support the problems managers face within the FFE of the NPD process regarding time pressure.

This thesis has been conducted by two students in the Engineering Management Master’s program at the University of Jönköping during the spring of 2018. This study includes information gathered from previous studies and publications along with new information collected from interviews. The newly obtained information will either support or contradict theory and practice and can therefore contribute to existing knowledge.

The project aims to sift through previous studies and publications regarding New Product Development (NPD), Fuzzy Front End (FFE), time management and leadership in order to gain a greater understanding of the need for enhanced efficiency within FFE. The research has been complemented by a number of interviews conducted with companies located in Sweden. These interviews aim to identify unique and innovative ways in which companies tackle today's fast-paced market along with the needs of their customers.

1.1 Background

Today's fast-paced and increasingly competitive market has added pressure on companies and NPD-teams to improve both the quality of the products they provide, as well as the speed in which the products are introduced to the market (Tersine & Hummingbird, 1995; Chong, Van Eerde, Chai, Rutte & Brombacher, 2005). Due to the increased demand for speed amongst consumers, managers have been forced to re-consider, modify and decrease the time needed within the FFE of the NPD process. This contradicts an abundance of research which support delegating a large amount of time within the NPD to the FFE in order to obtain successful, economical and innovative products (Herstatt & Verworn, 2004). The more time spent in the beginning of NPDs’ the better since this can decrease costs as well as increase product quality in the end of the NPD process (Herstatt & Verworn, 2004).

This problematic position, decreasing the amount of time needed in the NPD whilst developing high quality products, emphasizes the need for competent managers and leaders who can enable the project team to be more efficient in the FFE.

1.1.1 Introducing the FFE and the NPD process

NPD is something that can vary in methods and size and is defined as the process where new ideas are generated and realized either to make additions or improvements of existing products. It can also be when a brand-new product is developed and commercialized (Oxford Reference, 2016).
The NPD process is a part of core business activities and needs to be closely linked and connected to a company's business strategy (Khurana & Rosenthal, 1997). Companies who wish to compete on a basis of product innovations need to be adept and competent to execute all of the NPD stages (Khurana & Rosenthal, 1998). Therefore, companies who only excel within one or a few of the stages within the NPD process will not obtain long term success.

Although all stages within the NPD process are important, Khurana and Rosenthal (1998) state that the key factors to success lies within the front-end activities of the process. Therefore, Khurana and Rosenthal (1998) accentuate that if a company is seeking to improve their NPD process, the changes and effectivities should be implemented within the front-end in order to gain the most beneficial results.

The FFE of the NPD process includes opportunity identification along with exploration. The FFE is considered to be the more creative and “free” spectrum within the NPD process (Backman, Börjesson & Setterberg, 2007). There are four key roles within the front end of the NPD process, one of which is the project leader (Khurana & Rosenthal, 1998). Khurana and Rosenthal (1998) state the project leader acts as a communicator, facilitator and motivator for the team.

There are also different characteristics that will affect the NPD process. In Figure 1-1 the relationship between time and other characteristics within the NPD process as well as the FFE are shown (Herstatt & Verworn, 2004). The colored curved arrows symbolize the amount of effect the product development team has on the influence, cost of change and information during the innovation process.

The graphs in Figure 1-1 visually illustrates how the influence of the product drastically declines after the FFE while the cost of change increases exponentially. Figure 1-1 also shows that the amount of information increases towards the end of the process (Herstatt & Verworn, 2004). The graphs highlight the importance of successfully performing the FFE due to costly complications that occur whilst making changes in the latter stages of the process. Therefore, it is of utmost importance to have a high performing FFE that encapsules product specifications and requirements (Herstatt & Verworn, 2004).
1.1.2 Time pressure within the FFE and the NPD process

The total amount of time within the NPD needs to be shortened (Filippini, Salmaso & Tessarolo, 2004). However, previous research and studies support the need for time, efforts and resources in the beginning of the process.

In order for companies to remain competitive and relevant in today’s fast-paced market they need to constantly develop and introduce new products or updated models of existing products. This is due to the fact that customer requirements and technologies are changing in a rapid pace (Labahn, Ali & Krapfel, 1996), as well as an increase in global competitiveness (Griffin, 1993). Therefore, Meyer and Utterback (1995) states that in order to be successful a company needs to have shorter NPD time compared to their competitors.

Filippini et al. (2004) state that the use of a project manager within NPD can enhance time performance within a project. NPD has been acknowledged to be one of the more difficult projects for a company to manage, hence the need for competent and driven managers to lead the team (Clark & Fujimoto, 1991). In order to insure the success of the project, managers of a NPD must be able to communicate clear objectives to all team members (Murmann, 1994). If the goals and objectives of the project are un-clear much time and resources can be lost due to miscommunication, confusion and lack of leadership. Clear objectives and goals provided by product development leaders enables the product development team to have a positive effect on development time reduction (Karagozoglu & Brown, 1993).

1.2 Problem

It is of utmost importance in today’s fast-paced market to decrease the time to market in order for companies and products to remain relevant (Labahn et al., 1996; Griffin, 1993). The 20th century is not only time orientated, in need for speed, but also quality orientated. The focal point of the report aims to identify possible solutions and activities that can aid time management within the FFE of NPDs’ whilst still insuring the development of high quality and innovative products.
The FFE of the NPD is very important as its outcomes directly can contribute to the success of the newly developed product. Therefore, managing the FFE in an efficient and effective way becomes one of the most important tasks within the NPD process (Kim & Wilemon, 2002). Management within the FFE is stated as difficult, but very important in order to insure a successful outcome of the NPD (Kim & Wilemon, 2002).

Leadership and management issues regarding time management are circumstantial and can vary depending on the firm and process. However, identifying where the issues lie, whether it be a communication problem between group member's, ethical issues or other problems, it is imperative that the issue is realized, recognized and acknowledged in order for the FFE to run as smoothly and efficient as possible.

Leadership roles and management are the pillars on which a company rest upon. Therefore, management also needs to adapt skills and activities which can increase efficiency, i.e. increase time efficiency within the FFE. As the FFE is stated to be dynamic, commonly unstructured and having a low level of formalization, studying the FFE can be difficult (Murphy & Kumar, 1997). Reducing the uncertainty is therefore needed within the FFE. To do this Kim and Wilemon (2002) suggests to study issues in managing the FFE by looking at methods for acceleration of the FFE process, personal leadership qualities/styles, as well as benefits and challenges of FFE acceleration.

1.3 Purpose

The purpose of this study is based on two main objectives. Firstly, it is to explore what effects various managing- and leadership styles have on time efficacy within the FFE. The second main objective includes identifying configurations of management- and leadership behaviours and techniques that can potentially aid process efficiency within the FFE.
2 Theoretical frame of reference

The second chapter presents our review on current theories and knowledge that regards this study’s topic. At the end of this section the findings in our theoretical frame of reference are summarized and described in a research model, followed by two research questions.

The literature study was initiated by identifying suitable keywords in search of relevant academic journals and previously published articles within the selected topic. The key words used within this search included; Fuzzy Front End, FFE, New Product development, NPD, time efficiency, Stage gate, waterfall, lean product development, agile product development, Concurrent Engineering and management. In addition to the key words, synonyms and alternative formulations were used in order to broaden and refine the search.

The database Web of Science enabled the use of Boolean operators to refine and combine alternative formulations of key words. The advanced search tools within the data base were also utilized to target journals and previously published articles within management. The results of the searches were then evaluated based on their topic, abstract and to some extent which journal they were published in.

The selected articles were later organized within an excel document and main themes were generated. During this process, new and interesting topics emerged resulting in additional search words which aided and extended the context within the literature study. A snowballing approach was also adopted which enabled the study to utilize references within the selected articles. This facilitated the study with a greater understanding regarding the complexity of leadership and time management within the early phases, i.e. the FFE of the NPD process.

The theoretical frame of reference is the backbone and foundation on which the research model and questions were developed.

2.1 The Fuzzy Front End

The FFE can be defined as a period where an opportunity is recognized and prematurely developed and evaluated. This includes identifying whether the concept should be pursued or killed (Kim & Wilemon, 2002).

The ambiguity of an ideas quality within the FFE can hinder an idea from entering further development stages (Kim & Wilemon, 2002). These ambiguities are claimed to possibly come from the company’s capabilities, limitations, resources and general “fit” for the project, as well as, market, technology, and required resources (Kim & Wilemon, 2002).

2.1.1 Separating and connecting the FFE from the NPD process

Koen et al. (2001) define the FFE as the activities and tasks performed prior to the NPD. Koen et al. (2001) states that the separation between these two processes, FFE and NPD, is
due to the organization, or lack of within the processes. The FFE tends to be messy, impulsive and formless as the rest of the NPD process is more formal and well-structured.

Khurana and Rosenthal (1998) claims that the key to success within NPD can be detected in the activities that are performed in the front end of the NPD, the FFE. These activities include opportunity identification, idea generation, assessment, project planning etc. The NPD is most efficient and often significantly more successful when improvements are implemented in the FFE of the process (Khurana & Rosenthal, 1998).

The front end of the NPD process can be seen more explicitly in Figure 2-1. The Front End of NPD consists of three parts that are preceded with the foundation elements of NPD and are proceeded by the "go or no-go" decision of the projects. These three parts are the Pre-Phase zero, Phase zero and Phase one (Khurana & Rosenthal, 1997).

2.2 The FFE and various NPD practices

There are various processes to choose from when developing new products that all entails different positive and negative aspects. There are sequential processes such as Stage gate and then there are practices who are developed to have a more simultaneous process between all departments, such as Concurrent Engineering.

2.2.1 Sequential NPD processes - Waterfall and Stage gate

The Waterfall model is a common and well-known linear NPD process, see Figure 2-2. The first phase within the process represents the idea generation and assessment stage; the second phase includes concept development and product planning. These two phases are followed by the development phase and later by prototype making and pilot tests. The last phase within the process represents production, market introduction and penetration.
Another common and well-known NPD process is the Stage gate process. Benchmarking studies have uncovered that many companies have misunderstood and misused the Stage gate model (Cooper, 2008). Previous studies have shown that the companies have missed key features, principles, and methods within the system resulting in poor outcomes (Cooper, 2008).

The Stage gate model is a theoretical and operational guide for companies to move NPD and projects from idea to launch and beyond (Cooper, 2008). The Stage gate process enables companies to locate and discover flaws and opportunities within the NPD process by integrating Go/Kill options within the process, see Figure 2-3 (Cooper, 2008).

As opposed to the Waterfall method, the Stage gate model is not a completely linear process (Cooper, 2008). Each stage within the model is intended to collect information in order to reduce uncertainty and risks within the project (Cooper, 2008).

What can be argued for both looking at the Waterfall and the Stage gate model is the possible lack of early involvement of people with various competencies and background. From a FFE point of view this would mean that the needed reduction of different uncertainties wouldn’t take place until respective problems within the process reveal themselves. This could then result in both inefficient and elongated processes as well as late detection of problems or faults e.g. regarding project scope, specification, or economics, which could be devastating time- and resource wise.
2.2.2 Concurrent Engineering

Concurrent Engineering, CE, also known as simultaneous engineering, includes methodically working towards decreasing development time within product development, consecutively reducing time-to-market (Eskilander, 2001). Concurrent Engineering includes managing tasks, activities and tools to reduce the amount of time needed during product development (Boothroyd, Dewhurst & Knight 2011). The amount of time needed to develop products is reduced when the different stages within the process run simultaneously rather than consecutively. There are four main building blocks that dominate the NPD process, these are; Marketing, Design, Engineering, and Manufacturing. In comparison to the standard linear product development process where these activities are completed in stages, CE works with all four elements instantaneously, see Figure 2-4.

![Figure 2-4 Concurrent Engineering, all tasks are performed simultaneously](image)

The global manufacturing competition has increased significantly over the last few decades resulting in the need for change within product development (Wang, 1999). In order for companies to remain relevant and maintain a competitive edge they must be able to accelerate the product development process (Brookes & Backhouse, 1998).

Seeing as CE have these simultaneous ongoing activities, it makes the process more efficient. The early involvement of all different departments must relieve the FFE since there are easier access to vital information and competencies that can help and reduce uncertainties within the process. We believe this ensures that the right information is obtained faster in order to make the right decisions at the right time. However, we believe it is vital that the communication and access between these different departments and competencies is easily accessible otherwise the positive benefits of CE will be lost, and therefore also the positive effects for the FFE.

2.2.3 Lean Product Development

The goal of using Lean Product Development, LPD, compared to a more traditional approach such as the Stage gate model, is to make sure that the value that gets added for the customers, employees, stakeholders, society as well as the suppliers is maximized (Tortorella,
Marodin, Fetterman & Fogliatto, 2016). Lean Product Development initially focuses on what creates value for the customer, then explores probable synergies between the different resources held by the organization, such as tools, technology, processes and people. This is done to induce and add new profitable value streams within the organization (Tortorella et al., 2016). Within LPD there is something called "enablers" which are; tools, techniques and practices (Tortorella et al., 2016). These are used to enable continuous improvements of the NPD process as well as reducing waste within the process. Also, the use of cross-functional development teams is used within LPD (Tortorella et al., 2016). One method of LPD is Set-based design, where the number of different opportunities or possibilities of a product gradually is reduced to finally converge to a final solution. It is important within Set-based design that before committing to an idea to make sure that it can be feasible (Schulze, 2016).

Reducing waste is important within Lean thinking, both in regard to product and process (Christopher, 2011). It is therefore vital to continuously improve upon the process management and simply do more with less resources (Christopher, 2011). Having an inefficient FFE could therefore both result in an unproductive process, as well as outcomes that would hold a lot of “waste”. A faulty FFE process might also result in having a defective foundation of information that decisions are based on later in the process. Since Lean thinking focuses on reducing unnecessities, having a wrong base of information could mean that the wrong things could be eliminated.

Lean product development puts pressure on the efficiency and the outcomes of the FFE. What can be brought from Lean thinking into improving the FFE is to possibly add the analytical procedures of making sure that everything done adds value and reduces waste, either for the product or process. What also seems beneficial is that the use of cross-functional teams, and that there are several phases of the development ongoing at the same time. If this also is added to the FFE, it seems like further reduction of time needed could be done.

**Kanban development**

Kanban is a technique that was developed for managing product development and focuses on aiding and equipping a company for continuous distribution (Sugimori, Kusunoki, Cho & Uchikawa, 1977). The Kanban method is designed to help teams work together more effectively as well as ensure that the development team is not overstrained or understaffed. The work load of the product development team is constantly reviewed in order to ensure that the team in not overworked or overburdened (Sugimori et al., 1977).

The Kanban method can be separated into two main building blocks. The first is the famous “Just in time production”. The “Just in time production” is closely linked to Lean product development and is especially important in an assembly industry (Sugimori et al., 1977). The “Just in time production” focuses on only addressing and stocking the bare minimum in order for a company to remain functional, profitable and able to produce to needed number of products (Sugimori et al., 1977).
The second building block includes creating the best possible work environment for the assembly staff as well as the development team. The concept is constructed around three guidelines; (1) Eliminating as much waste as possible; (2) Implementing and increasing consideration for workers’ safety at all times; and (3) Enabling workers to grow by entrusting them with greater responsibility and authority.

Kanban development emphasizes the need to create environments where employees will thrive and feel secure to increase efficiency. This provides arguments for the view that in order to make processes effective there is not only need for structural improvements but also organizational improvements that will enable people to thrive and feel comfortable. Within the FFE this could mean that in order to maximize the efficiency in the early phases, the managers task is to create an environment that will allow everyone within the team to flourish and contribute to their best abilities. Management within the FFE is further discussed in section 2.3 Management and innovation within the FFE.

2.2.4 Agile Product Development

Looking back at the latter part of the 1990’s and the early 2000’s, problems within IT development were faced that the traditional sequential processes, such as Waterfall or Stage gate, couldn’t deal with (Cooper, 2016). To cope with these problems Agile development arose and was seen as a solution to this problem. Agile development dealt with issues by implementing adaptive planning, evolutionary delivery, flexible responses to change, as well as with a time-boxed iterative tactic (Cooper, 2016). This can be compared to the traditional processes that usually focuses more on vast long-term goals and major features of the final product (Cooper, 2016).

The aim with using the Agile methods is to try to reduce and minimize the potential effects of changes within the product life cycle (Karlström & Runeson, 2005). It is stated that planning too much up front within projects will lead to extensive change management within the latter part of the projects. Compromises later on in the process are said to be a result of committing early to features and schedules. Binding early to major features, having too long schedules and feedback loops, along with the replanning which is characteristic for traditional product development processes, results in inefficiencies and slows down the development cycle (Cooper, 2016).

Researchers have found that the emerging mixes between Agile development and the traditional Stage gate process creates better internal team communication. The combination can also result in more efficient planning due to the early feedback from users on vital product features (Cooper, 2016).

The use of Agile methods offers efficient tools for the NPD process, in which the FFE is included, for micro-planning, everyday work control, and progress reporting (Karlström & Runeson, 2005). Helpful effects of using Agile methods within Stage gate processes that
have been found are that it enables early feedback on features, it results in an avoidance of cramming of requirements, as well as that there are no delays of important product features (Karlström & Runeson, 2005). It also results in good internal communication. However, there is a risk that the project team isolates themselves from the rest of the organization which is something that needs to be taken into consideration (Karlström & Runeson, 2005).

Seeming as the loops within the Agile development process is much shorter, the feedback will reach the development teams much quicker and validation or the need for reconfigurations are more efficient. However, linking this to the FFE, Agile development is more commonly used during the development and testing stages that follows the FFE (Cooper, 2016). We believe the use of Agile development could have positive impacts on the FFE due to the early inclusion and feedback of users and customers within the development phase. This involvement reduces the uncertainty of what requirements are needed within the FFE. The shorter and quicker feedback loops also identify possible major faults earlier on within the process, hence alterations can be made earlier.

2.3 Management and innovation within the FFE

Generally, the attention to management within the FFE has been sparse (Reinertsen, 1994). The lack of attention paid to the FFE opens up for the possibility of cost reduction if management within the FFE is improved upon (Reinertsen, 1994).

When managing the uncertainty and ambiguity of the FFE (Kim & Wilemon, 2002) it has been found that successful project teams have the common trait of being good at efficient uncertainty reduction during the planning phases (Moenaert, De Meyer, Souder & Deschoolmeester, 1995). That said, it is project teams that can reduce the uncertainties regarding market as well as technology who are the most successful.

Koen et al. (2001) conducted a study where eight companies were compared to each other and examined in order to determine the best practices of the FFE of innovation within NPD. The comparison was proven to be extremely challenging due to the lack of a common language between the companies, as well as a shortage of a consistent definition of the fundamental elements of the FFE (Koen et al., 2001). In order to obtain a constructive and fair comparison between the companies as well as create a common language, a new model was developed, New Concept Development Model, NCD, see Figure 2-5 (Koen et al., 2001).
The core of the NCD model represents senior- and executive level management support. The senior- and executive level management controls the residing five components within the model (Koen et al., 2001). This is to say, the senior- and executive level management is the foundation on which all decisions are made as well as where the five components obtain their information. The engine can be seen as a communication hub where the five components seek approval and/or dismissal. The black outer area of the model represents influencing considerations that affect the decisions of the inner parts within the model (Koen et al., 2001). Evaluating companies with the help of the NCD model displayed that highly innovative companies were more capable in the FFE of an NPD, as well as in numerous sections within the NCD model (Koen et al., 2001).

There are variations to what can be stated as causes of delay within the FFE. The driver of process performance within the FFE include; how high the demand is; if the process capacity is sufficient or not; and how the process is managed (Reinertsen, 1994). There are 10 listed failings which are the most common and result in a slower front end process. These are as followed; (1) An excessively broad strategy; (2) Portfolio bloat; (3) Lack of evaluation capacity; (4) Process bottlenecks; (5) Downstream overload; (6) Lack of process measurements; (7) Too much work on the critical path; (8) “All or nothing” funding; (9) Failure to re-plan; and (10) “One size fits all” processes (Reinertsen, 1994). The first three have to do with too high demands. If the vision or strategies of companies are too broad, they usually tend to have an ineffective front end. This is due to the fact that if the vision or company strategy does not act as a first review filter, too many opportunities are accepted for further review (Reinertsen, 1994). Having a broad strategy allows for a lot of ideas being considered as possible fits for the company resulting in resources being stolen from other potentially more prosperous projects (Reinertsen, 1994).

Kim and Wilemon (2002) suggest a few practices for managing and reducing the uncertainty within the FFE in a more effective way; (1) Is to appoint a knowledgeable individual or team member
to lead the FFE; (2) To provide support and commitment; (3) Acknowledge and support product champions; (4) Understand FFE behavior and decision making on screening; (5) Consider many possibilities for fuzzy ideas; (6) Build an information system; (7) Formalize and create a holistic FFE process; (8) Emphasize customer involvement; (9) Attain internal cooperation and support; (10) Involve senior management; (11) Cooperate with suppliers and intermediaries; and lastly, (10) Seek horizontal cooperation. These practices are summarized and can be seen in a visualization in Figure 2-6.

Figure 2-6 Practices that can improve FFE performance (Kim & Wilemon, 2002)

These practices push the fact that the FFE needs to be made more formalized and receive more attention as it acts as the entire foundation of the rest of the NPD process. Many of the ten listed failings of process management presented by Reinertsen (1994) makes it clear that the “Lean thinking” and waste-reduction, see section 2.2.3 Lean Product Development, isn’t as present in the FFE as it is in the latter part of the NPD process.

2.3.1 The importance of managing time within the FFE

Companies that develop products’ during the time new technology is being industrialized end up reaching the market in the perfect time (Bstieler, 2005). This is to say the new product reaches the market in a synchronized speed in which the users identify a need for the product (Bstieler, 2005). This synchronization between product launch and the discovered need by the users is of utmost importance to insure the success of a new product launch (Bstieler, 2005). This can be seen in Figure 2-7 where there is an illustration of a products life cycle and the importance of meeting decline in popularity in one product with a new product to sustain profit (Boulaalam, Habib Nfaoui & Beqqali, 2013). The introduction is the first phase when the product is initially released to the market. The growth phase is where the product increases in demand as well as profit margins grow. The maturity phase of the red graph is where the product has peaked and reached its full potential and maximum sales. After the maturity of the products life has passed, the interest amongst customers declines and sales
rapidly decrease. As soon as product 1 starts to decline it is vital to meet consumers’ needs and introduce an additional product to the market, shown as product 2 (the grey dotted graph) in Figure 2-7.

Figure 2-7 Product Lifecycle (Boulaalam et al., 2013)

Time pressure is becoming progressively obvious within NPD teams and has proven to affect many aspects within the process such as communication and performance (Chong et al., 2005). Time pressure is most evident within companies whom produce and develop products with a short life-cycle (Chong et al., 2005). This is due to the need for these companies to constantly develop and alter existing products in order for them to remain relevant, as well as the need to handle a growing amount of information in a limited amount of time (Chong et al., 2005).

The FFE can include various methods used for screening ideas (Koen et al., 2001). Improving and altering these screening methods is of utmost importance to shrink the amount of time needed to determine whether an idea is valuable. This often results in reduced costs for the company. This implies that to be able to reduce time within the FFE, there is a need for managers to have extensive knowledge of suitable screening methods to take quick and good decisions.

Chong et al. (2005) states that time pressure within NPD teams often negatively affects how employees handle information as well as communication. Communication and information processing are the two key drivers to the success of the NPD process (Chong et al., 2005). Therefore, the need for competent leaders who know how to manage the impact of time pressure on NPD performance is vital to insure and maximize results within the process (Chong et al., 2005). As it is stated that time pressure and the management of it is really important for the overall NPD process, this must also be the case for the FFE seeing it lays the foundation for the rest of the NPD process. It could even be argued that the pressure of time can be even more difficult within the FFE since the outcomes of the front end determines whether or not the time that’ll be spent during the rest of the NPD is productive or even necessary at all. The negative effects of time pressure such as impaired communication and information management can also be connected and compared to the positive effect of the Kanban thinking, mentioned in chapter 2.2.3 Lean Product Development. In
Kanban development it is considered to be very important to create environments that enables employees to thrive and feel comfortable. This highlights the need for managers to try to reduce time pressure and stress in the FFE while still meeting deadlines and the high tempo on the market, which inevitably is a difficult puzzle to solve.

2.3.2 Leadership within the FFE

Leadership is a vital part within organizations to foster innovation processes and activities in organizations (Oke, Munshi & Walumbwa, 2009). Innovative behavior and beneficial activities can be enhanced with the help of a positive and encouraging attitude of the leader (Oke et al., 2009).

One of the most challenging aspects for contemporary leaders is how to lead innovation (Oke et al., 2009). Leadership can be regarded as the social process that occurs within a group setting in which the leader influences his or her follower’s actions and performances so that they strive towards fulfilling organizational goals and visions (Oke et al., 2009). A leader needs to take on different roles according to different contexts. If there is a need for a leader that is inspirational, motivational, and visionary, then the leadership style can be referred to as transformational. If the leadership style is more to construct a suitable organizational context, then it would refer to a transactional leadership style (Oke et al., 2009).

Within the early stages of product development, the FFE, it is argued that there is a need for creative ideas and contributions from various sources, a tolerance for uncertainty, and room for unstructured communication (Oke et al., 2009). The latter stages of the NPD rely more on formal procedures, incentives, and systems to enable coordination across different organizational units to ensure an effective, well-organized, and timely commercialization. These differences imply that there is certainly a need for taking on different leadership styles within the different phases of the NPD (Oke et al., 2009). However, it would probably be most feasible with a transformational leadership style in the FFE.

When team members are inserted into a positive and encouraging environment they are more likely to develop radical and innovative ideas and concepts (Oke et al., 2009). A positive environment supplied by leaders enables employees to engage in innovative ideas rather than worry and doubt themselves (Oke et al., 2009). Transformational leaders embody the skills and tools which enable them to create and enhance creativity and innovation as well as the application of individualized consideration (Oke et al., 2009). Oke et al. (2009) states that employees are more likely to engage and work harder to achieve project goals and objectives when being guided and lead by a transformational leader.

2.4 FFE and management within Interorganizational project teams

Bstieler and Hemmert’s (2010) article Increasing Learning and Time Efficiency in Interorganizational New Product Development Teams studies causes and factors that support and motivate increased time efficiency in interorganizational, I-O, project teams in vertical product development.
partnerships. I-O project teams include a shared information system among a group of organizations. The most common way for companies to share and receive information is through Electronic Data Interchange, EDI. This enables users to instantaneously transfer information from computer-to-computer (Bstieler & Hemmert, 2010). Vertical partnerships are project-based alliances between a manufacturer and a customer (Bstieler & Hemmert, 2010). This partnership can also be between a manufacturer or a customer and a supplier-partner to develop and commercialize the new product or service.

I-O teams within NPD projects are commonly staffed and built with individuals from external firms (Bstieler & Hemmert, 2010). This is done to enhance diversity, maximize the chance of meeting customer needs and wants as well as reducing development time (Bstieler & Hemmert, 2010). Due to the extreme pressure of these requirements and challenges faced by the team members', many partnerships fail or come to an abrupt halt prematurely. This can inflict huge financial repercussions on both, if not all, partners involved (Bstieler & Hemmert, 2010).

Bstieler and Hemmert (2010) state it is of utmost importance for I-O teams to have a shared purpose in order to function as efficiently as possible, this is where management comes in. Bstieler and Hemmert (2010) claim that managers of I-O teams are often known to be more discrete leaders compared to managers of other in-house teams. This can lead to uncertainty and inconsistencies regarding project goals and objectives. This uncertainty can easily progress and cause unfavorable effects on task-related activities within the project (Bstieler & Hemmert, 2010). Therefore, it is a critical requirement for I-O project teams to be provided with clear direction and objectives by management in order to establish needed guidance and expectations within the team (Bstieler & Hemmert, 2010). Clear instructions from management has been proven to provide teams with the foundation needed to motivate individuals to engage in challenging tasks, as well as facilitate communication between group members. Clear direction and objectives set by management aids the success of group projects by “getting off to a good start” and building the groundwork to a positive and unified group. This should be imperative within the FFE as well seeming the negative effects that follow an insufficient FFE.

2.5 Research model and questions

A research model is a tool which enables its users to build a logical structure whilst planning a project or study. The model can aid its users by highlighting critical variables and attributes within a project. This is done by identifying key factors within the project, recognizing desired outcomes and developing a strategy to meet the required outcome.
A research model was developed in order to visualize and clarify the purpose and goal with this study, see Figure 2-8. As stated within the purpose, see section 1.3 Purpose, the aim is to explore management and leadership within the FFE. This required trying to explain the relationship between the FFE and the project manager, as well as how these two inflict each other. An additional aspect we seek to investigate includes how this relationship can be managed and lead to increase time efficacy. This relationship is illustrated at the top of the research model, see Figure 2-8.

![Figure 2-8 Visualization of the relationship between the FFE and the Project manager](image)

The research questions within this study have been built upon previously discovered difficulties within the FFE along with recognizing research gaps within existing literature.

The theoretical frame of reference has provided a lot of support that the FFE is under a lot of pressure and that all the time spend during that phase needs to be spent wisely. The relationship between the FFE and the project manager is therefore interesting in regard to trying to optimize time efficiency within the FFE process. The first question is therefore;
1. How can various management- and leadership styles improve time efficacy without impairing the successes of the FFE of the NPD process?

The second research question is more about identifying what pressures project managers can face during the execution of the FFE, i.e. What types of challenges can/ do project managers face whilst tackling the FFE.

2. How can/ does the uncertainty within the FFE affect project managers within the NPD process?
3  Method

The third chapter provides an explanation of the adapted research approach for this study, how the study was designed, as well as the different methods used during the process. This section also concerns the important issues of how trustworthiness was established and what ethical considerations there might be within our study.

The first parts of this report’s method chapter have been inspired by the Four ring model (Easterby-Smith, Thorpe & Jackson, 2015). The Four ring model represents the connection and relationship between ontology, epistemology, methodology and methods and techniques, see Figure 3-1.

![Figure 3-1](image.png)

*Figure 3-1 Figure inspired by the four-ring model by Easterby-Smith et al. (2015)*

The inner layer, ontology, represents the nature of reality and existence. The second layer, epistemology, includes identifying the best way to enquire into the nature of the world. The first two layers of the Four ring model (Easterby-Smith et al., 2015) have been integrated into the research approach within this study, see section 3.1 Research Approach. The third layer, methodology, includes the research technique which has been used within this study to extract information regarding a specific situation, the FFE. The third layer of the model is mostly described in section 3.2 Research Design. The fourth and last layer within the model, methods and techniques, includes a combination of means used to obtain and analyze information. The content of the fourth layer is mostly described within section 3.3 Research Methods.

3.1 Research Approach

The FFE is a complex and difficult phenomenon. The name “Fuzzy” implies itself that the phenomenon is difficult to fathom. This can be due to the lack of research and studies conducted within the subject. We believe that the uncertainty within the FFE can be reduced with the help of more research to generate a greater understanding of the phenomenon. In order to reduce the “fuzziness” and provide more clarity and structure to the front end of the NPD process, more information regarding the origin of the process must be reviewed.
This includes gaining a greater understanding of why and when difficulties within the FFE occur, as well as identifying the factors and components that are involved.

Ontology is defined as the views about the nature of reality, i.e. what philosophical assumptions that are held by the researchers (Easterby-Smith et al., 2015). According to Easterby-Smith et al. (2015) one person's truth may or may not be shared by other individuals, and the facts presented are not independent on the individual viewpoint of the observer. This is to say, the gathered and presented empirical data within this study is very much dependent on the individual's perception, which is relative i.e. there can be multiple truths. However, the participants, interviewees, within this study have ample amounts of experience managing the FFE of the NPD process. These experiences have been dissected and evaluated in order to identify relevant patterns and similarities between behaviors, patterns of actions, and psychological as well as social traits. Due to the experience possessed by the participants, the study is able to reduce the uncertainty regarding management within the FFE.

This study has assumed that a phenomenon is the result of occurring events, behaviors, and interactions between people. In order to increase the understanding to why this phenomenon has occurred, the study has investigated further into these events. We believe that the events of interest within the FFE of the NPD process have occurred because of it being socially constructed. This is in line to what is defined as a constructionist perspective by Burr (referred to in Braun & Clarke, 2006), that rather than inhering within individuals, meaning and experiences are created and recreated socially. Social construction, also known as constructivism, stems from the view that individuals build their own personal perceptions of their reality from human communication. Hence, the adopted epistemological framework for this study is social constructionism. The FFE within the NPD process is a complex phenomenon. Therefore, we believe that the FFE cannot be described nor explained with only one truth or solution on how to perfectly execute it. An approach where multiple aspects of the FFE and its context were investigated needed to be adopted in order to gain a greater understanding of the phenomenon and what it entails.

The purpose of this study is to explore and identify patterns within management and how leaders tackle time pressure within the early stages of product development, the FFE. As previously stated within the background of this report, 1.1.5 Time Management, uncertainty is high and time is scarce within the early stages of the product development process. Qualitative methods have been implemented in order to gain a greater understanding of the tasks and activities management have implemented within the FFE to reduce and save time. One of the largest benefits of implementing qualitative methods during the initial stages of investigation is the boost in peripheral vision (Sofaer, 1999). This is of utmost importance in order to integrate and include all aspects within the topic, the FFE.

According to the theoretical frame of reference, 2 Theoretical frame of reference, the phenomenon of time management within the FFE needs further investigation and explanation. Previous information and research regarding the topic points in multiple directions and lacks structure
in the form a unanimous conclusion. Therefore, qualitative methods have been used to assist
the identification of patterns and configurations amongst numerous variables. This process
aids studies whilst trying to identify meaningful explanations of a phenomenon (Sofaer,
1999).

3.2 Research Design

The purpose of describing the research design is to provide a description of the various
components of the research project (Myers, 2013). It should present what philosophical
assumptions that are made, the adapted research method, data collection techniques, data
analysis approach, how the material will be presented, along with how the findings are
planned to be published (Myers, 2013).

Our adopted research design is summarized in a flow-chart, see Figure 3-2, representing the
progress of the study, according to the model presented by Myers (2013). Looking at Figure
3-2 the flow of it is bottom-up and starts with the philosophical assumptions that were made
and discussed in 3.1 Research Approach. It is then followed by the chosen research techniques,
which will be presented in this section, along with the adopted data collection- and analysis
strategies that are further discussed in 3.3 Research Methods.

![Figure 3-2 Visualization of our research design, model adopted from Myers (2013)](image)

When choosing the appropriate research techniques, we started off with analysing the
purpose of this thesis. Since this study’s purpose, as described in section 1.3 Purpose, is to
explore and gain a greater understanding of leadership and management within the early
phases of the NPD, i.e. the FFE, the focus lies within the effects of leadership traits and
skills, as well as effects of time pressure. To gain a greater understanding of the contexts’
both the social as well as organizational circumstances needs to be investigated. When a study
is of the nature as ours, Yin (2014) argues that case studies are useful, as it is favourable when trying to contribute to a greater understanding of different contexts.

Furthermore, looking at the research questions they all start with “how”. This indicates that the primary aim with this study is to contribute to knowledge by explaining certain events and concepts in their contexts. Generally, when a study aims to answer “how”-questions, case studies are the most suitable research design (Yin, 2014).

Whilst trying to shed light on management within such an uncertain phase of the NPD, it is of utmost importance that the conclusions drawn from the findings are generalizable. Therefore, it was important to gain insight into several cases and conduct a multiple case study. Conducting a multiple case study has several benefits compared to single case studies as they are considered to be more convincing and therefore more robust (Yin, 2014). Due to the aforementioned arguments about multiple case studies and the fit with the purpose of this study, it was adopted as the research technique for this thesis.

3.3 Research Methods
The research methods chapter within this report represents the third layer within the Four ring model (Easterby-Smith et al., 2015). As stated in section 3 Method, methodology includes a number of techniques and methods that have been used to obtain and acquire information for a specific situation. The methods and techniques within this study have been intended to obtain as much relevant information as possible regarding management difficulties within the FFE of the NPD process.

3.3.1 Development of Interview Questions
Before venturing into conducting the interviews it was important to address a few issues. Firstly, the level of interview structure needed to be decided upon, as well as how the different problems within the thesis topic should be addressed to benefit the study the most.

An interview study can have different levels of structure, ranging from unstructured to highly structured (Easterby-Smith et al., 2015). In-between these extremes of structures lie the semi-structured form of interviews. The latter mentioned type of interview was used during this study. These types of guided open interviews allow the researchers to make sure that all topics are covered while still having the ability to investigate further into matters or interesting topics that arise during the interviews (Easterby-Smith et al., 2015). While conducting a semi-structured interview it is recommended to construct a topic guide with opening questions, questions regarding key topics, and then closing questions (Easterby-Smith et al., 2015). The topic guide within this study was constructed accordingly, with opening questions acting as “ice-breakers”, easing in on the subject to get the conversation going. These opening questions were then followed by questions around our key topics such as FFE within the NPD process, leadership and management, as well as time management. These key topics for example addressed views on effective leadership and/or management techniques and challenges within the FFE. At the end of the topic guide, closing questions about if they think that we missed something important or if they have anything they would
like to add were included. Then to make sure that the respondents knew that we appreciated their contribution to our study, notes about thanking them for participating and for taking their time by talking/meeting us were added at the end of the guide. The interview topic guide created for this study can be seen in Appendix A.

The argumentation to why we used open questions within this study is fourfold. Firstly, open questions were used to make sure that the respondent simply could not answer yes or no to our questions. We wanted to “dig” deeper than that and understand why events occur and the characteristics of them, as well as how they are tackled/not tackled. Secondly, open questions are used as a means for the researcher to avoid becoming bias since it can avoid that the researchers own frame of reference is inflicted onto the respondent (Easterby-Smith et al., 2015). The third reason is that the degree of confidentiality usually is higher since the responses the respondents’ give are more likely to be more personal in nature (Easterby-Smith et al., 2015). The last argument for the use of open questions within this study was that it enables the identification of non-verbal communication that can be used as means to develop secondary questions (Easterby-Smith et al., 2015). These non-verbal communications can be in the form of facial expressions or inflections of the voice (Easterby-Smith et al., 2015).

3.3.2 Selection of cases

The most important factor that was taken into consideration whilst choosing participants included their work experiences as project managers within the NPD process i.e. the likelihood that they possessed vital information for this study. An additional factor taken into consideration whilst choosing interviewees included the individuals’ capability to answer fairly and truthfully when questioned. The study needed to obtain honest answers regarding challenges and difficulties whilst managing the FFE of NPD process in order to obtain relevant information.

This study focuses on management and leadership within the FFE of firms that develop products rather than services. Therefore, only companies that develops physical products were contacted for interviews. The product development requirement set by the project enabled the study to conduct a fair comparison between the diverse information and statements made by the interviewees.

Web searches and personal contacts were used to gain contact information to possible companies where suitable respondents could be found. Choosing respondents at companies initiated with the precaution that they had to be managers with ample experience from overseeing project teams within organizations that develops or works as consultants within NPD. Possible respondents were then contacted either via email or telephone where the purpose and background of our study was explained as well as what their contribution would entail. Appointments were then made, and the interviews were conducted. At this point in time, the interviewees were presented with a written form of consent which is further discussed in section 3.5 Ethical considerations. All of the interviews were initiated with a brief
reminder of the purpose of our study and their contributions along with a short introduction to the studied topic of FFE.

Table 3-1 presents the cases within this study along with their alias that they will be referred to from this point onwards. The table also showcases what type of interview each case was along with their durations. The table also displays the interviewee’s position at their companies and a description of what type of company that is.

Since the cases only were selected on the premises that they developed physical products and that the respondent held a managing position, the companies within the cases varied in size as well as if they develop their own products or are consultant firms. The interviewees all attained managerial positions within various sized firms within multiple regions in Sweden. Some of the interviewees were also active participants within their project group, while some only held a strict project managing position.

Table 3-1 Case number, type of interview, managerial position, and type of company

<table>
<thead>
<tr>
<th>Case number and Alias</th>
<th>Type of interview</th>
<th>Duration of interview</th>
<th>Position</th>
<th>Type of company</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case 1 (C1)</td>
<td>Face to face interview</td>
<td>115 min</td>
<td>Project manager/engineer</td>
<td>Product development firm who develops technological products for both public and private use</td>
</tr>
<tr>
<td>Case 2 (C2)</td>
<td>Skype interview</td>
<td>60 min</td>
<td>Project manager (sometimes also a participant)</td>
<td>Medium sized consultant firm who develops product with various technological degrees</td>
</tr>
<tr>
<td>Case 3 (C3)</td>
<td>Face to face interview</td>
<td>95 min</td>
<td>Project manager</td>
<td>Product development firm who develops technological products for both public and private use</td>
</tr>
<tr>
<td>Case 4 (C4)</td>
<td>Phone interview</td>
<td>45 min</td>
<td>Project manager/participant</td>
<td>Small consultant firm who develops products with various technological degrees</td>
</tr>
<tr>
<td>Case 5 (C5)</td>
<td>Skype</td>
<td>55 min</td>
<td>Project manager/participant</td>
<td>Medium sized consultant firm who develops product with various technological degrees</td>
</tr>
</tbody>
</table>
### Table

<table>
<thead>
<tr>
<th>Case (C)</th>
<th>Method</th>
<th>Duration</th>
<th>Role</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C6</td>
<td>Phone interview</td>
<td>35 min</td>
<td>Project manager</td>
<td>Product development of low tech products for public environments</td>
</tr>
<tr>
<td>C7</td>
<td>Skype interview</td>
<td>60 min</td>
<td>Project manager / participant</td>
<td>Small consultant firm who develops product with various technological degrees</td>
</tr>
<tr>
<td>C8</td>
<td>Skype interview</td>
<td>25 min</td>
<td>Project manager</td>
<td>Medium sized consultant firm who develops product with various technological degrees</td>
</tr>
</tbody>
</table>

#### 3.3.3 Data collection techniques

In order to gain a greater understanding of the difficulties and challenges organizations face within the FFE of the NPD process the study needed to implement a flexible and open interviewing technique. It was of utmost importance that the chosen interviewing technique empowered the interviewee to speak freely and openly regarding these trials. The information obtained from the multiple interviews was later analyzed and dissected in order to reveal similarities and differences between the organizations.

Within the field of management research, language data is commonly used as a means of collecting and gain insights into social and organizational realities (Easterby-Smith et al., 2015). The most common method for this type of data collection includes in-depth interviews. In-depth interviews enable researchers to gain insight regarding views, perceptions, and opinions, and can be performed either individually or in groups (Easterby-Smith et al., 2015). In-depth interviews were therefore chosen to get the most profitable insights and information from multiple individuals. The in-depth interviews provided this study with information from different sources that later was compared and analyzed to draw conclusions on leadership- and management effects on time efficacy within the FFE.

The foundation of this study is built upon different views, perceptions, and opinions supplied by multiple interviews of how managers tackle this uncertain period within the NPD process i.e. the FFE. In order for the study to be as accurate as possible, it was imperative that the interviewees were able to disclose their difficulties and challenges in their own words. Occasionally interviewees find it difficult to know where to start and need support. Therefore, to keep the ball rolling and the information flowing, guidance in the form of open questions were generated in order to encourage the interviewees to speak.

The interviews were executed in a semi-structured configuration which enabled the interviewees to answer the questions with their personal thoughts and opinions. Semi-structured interviews with open questions often induce a higher degree of trust which inspires interviewees to speak freely and openly (Easterby-Smith et al., 2015).
The interviews were performed either in person i.e. face-to-face, via telephone or via Skype (video call). Face-to-face interviews often aid the interviewer whilst documenting vital verbal information as well as non-verbal communication such as facial expressions and body language. The skype interviews were highly effective whilst interviewing individuals whom were situated far way and allowed the study to witness non-verbal communication. However, it was not possible to conduct all interviews in person or via Skype, and two interviews were held over the phone. To ease the communication between us and the respondents during the interviews, the decision to perform them in Swedish was made due to the fact that all interviewees were Swedish.

Whilst conducting the interviews the technique of laddering up and down was used to further improve the outcomes of the interviews (Easterby-Smith et al., 2015). By asking the question “why?” after some of the statements we could gain deeper understanding to the underlying thought and context to the respondents’ statements. When laddering down we for example asked respondents to explain or give examples of, or try to further illustrate, the occurrence of the described events.

3.3.4 Data analysis techniques

The goal with this study was to explore and gain a better understanding of leadership activities, methods, and processes that aid managers within the FFE. To explore the subject and to improve the understanding of it, empirical data was gathered from the multiple interviews with various leaders with managerial positions. The information need to be organized and evaluated in a methodological manner in order to gain a greater understanding of the challenges managers faced during the FFE, as well as identify similarities between the multiple interviews by comparing the data.

A way of encoding the empirical data that is gathered in qualitative studies is by conducting a thematic analysis (Boyatzis, 1998). This method is stated as useful both when a study aims to reflect reality, as well as unravelling the surface of reality (Braun & Clarke, 2006). As previously mentioned, the adopted epistemology is constructivism. Seeming as we focus on identifying latent, i.e. underlying or hidden themes by searching through empirical data to identify recurring patterns of meaning, a thematic analysis fits the purpose (Braun & Clarke, 2006).

There are six steps in which a thematic analysis is performed (Braun & Clarke, 2006). Initiating with familiarization with the data by transcribing, reading, and re-reading the gathered data. This is followed by the generation of initial codes. Amongst these initial codes, potential themes are searched for. These themes are then further reviewed to see if they fit in relation to the codes generated in the first phase. The fifth step is then to more clearly define and give suitable names to the generated themes. This phase is done to further refine the specifics of all themes. The final step is to produce the report. This is where excerpts from the analysis, that are clear and compelling, are chosen to act as the foundation for the final analysis where those excerpts are compared to existing literature and related back to the research questions (Braun & Clarke, 2006).
Our analysis process started with familiarizing ourselves with the empirical data by transcribing the interviews using the recordings. As our interviews were executed in Swedish, this step also included the process of translating the statements of the interviewees in a fair way. The transcriptions and parts of the recordings were then re-read or re-listened to before the initial coding started. The transcribed material was then searched through to find codes. During this process these codes were discussed amongst us to ensure coherence of the meaning of the them. The codes were later expressed either in keywords or short sentences to describe them on small pieces of paper. As all of these first codes had been identified we searched for emerging themes within them. These themes were then reflected upon and discussed so that they in a good way reflected the initial coding. At this stage a few changes were made, and a couple of the themes were revised before further refinement. This refining of themes included defining the meaning of them, and to further analyze what the relationship between the themes and the codes were. At the last part of our thematic analysis we explained and discussed the themes in writing and connected them with our findings from 2 Theoretical frame of reference, as well as the purpose and research questions, 1.3 Purpose and 2.5 Research model and questions. From this we drew conclusions and updated our research model accordingly to show what the result of our study was, see 5.6 Conclusions and 5.6.1 Updated research model.

3.4 Trustworthiness

To be able to prove that our study is worth paying attention to and can be taken into account, the trustworthiness of it needs to be presented in a definite and persuasive way (Lincoln & Guba, 1985). To establish this study’s trustworthiness Guba’s four Quality criteria’s have been used as guidelines (Guba, 1981; Lincoln, Lynham & Guba, 2011). The four principles used within this study include; Credibility, Transferability, Dependability and Confirmability (Guba, 1981; Lincoln et al., 2011).

3.4.1 Credibility

To achieve higher credibility actions such as persistent observations, peer debriefings, triangulation, and member checks can be used (Guba, 1981). Credibility was established within this study with the usage of well recognized research methods as well as reoccurring peer debriefings with fellow students and our supervisor. This was done to discuss both the quality of our process and progress as well as our findings.

Triangulation was used by including different perspectives of theories on the subject that were compared and checked against each other, as well as compared to our interpretations of our own findings. Triangulation to improve a study’s credibility is also accomplished when different investigators, not only one, are used (Guba, 1981) which was the case for this thesis.

A higher degree of credibility was also reached by the active work to extract non-bias information and statements from the participants. All participants included in the study came from different companies and regions. This is to say, no one participant was employed by the same company which ensured that they did not influence each other’s answers.
Crafted data from the interviews, as well as interpretations of the data, was discussed thoroughly with the interviewees prior to drawing any conclusions within this study. Furthermore, in line with establishing credibility, examinations of previous research and findings within the subject have been executed and presented within the literature study of this report, see section 2 Theoretical frame of reference.

3.4.2 Transferability

To gain desired transferability it is important that the reader can make judgements about whether or not the findings can be applied to other possible contexts. To reassure that these judgements can be done it is imperative that there is a thick description of the study and the subjects context (Guba, 1981). Something that also can improve the transferability is the description and execution of the case sampling (Guba, 1981). If the sampling is done in order to maximize the range of information, this strengthens the study’s transferability (Guba, 1981).

The transferability of the study’s findings has been added through the detailed background chapter regarding leadership, the FFE and NPD, see 1.1 Background. The thorough background description of the study has allowed the crafted material and results to be compared and potentially used for further research within the area, as well as being applied in other contexts. The sampling was also done in order to try to maximize the ranges of attained information by making sure that the sources of information was dispersed to different companies and industries. Therefore, the information and the conclusions drawn would not be specific for certain industries or companies.

3.4.3 Dependability

The in-depth presentation of the methods used within this study i.e. methodologies, research design and approach, insures that the findings dependability can be confirmed as it describes in detail how this study could be replicated. As suggested by Guba (1981) one other way to achieve dependability is the “stepwise replication” where the research team is split in two and separately deal with the interpretations of data which is later compared. This was done by splitting our group of two and then individually interpret the gathered empirical data. These interpretations were then compared and discussed to reach a unanimous understanding and meaning to the data, making the findings more dependable. The sources of information that is not our own have also been referenced to ensure that the statements are traceable.

3.4.4 Conformability

The final and fourth quality principle, conformability, is about making sure that the findings are not depending on who the investigators are and their own beliefs (Guba, 1981). This has been tackled by presenting our beliefs and assumptions as researchers, as well as possible shortcomings and their effects of our study. The previously mentioned in-depth methodological description also adds to this study’s conformability.
3.5 Ethical considerations

Whilst conducting research within this specific field it is very unlikely to lead to physical harm, to either the participants or the researchers. However, the process of investigation and the results could lead to psychological or economic harm (Easterby-Smith et al., 2015). To avoid this from happening Easterby-Smith et al. (2015) suggest ten ethical principles to be considered. These ten guidelines are seen in Table 3-2 and can be divided into two main sections. The first six guidelines have to do with protecting the interests of the informants or research subjects, whilst the remaining principles are more concerned with ensuring the accuracy of the research as well as avoiding bias within the study’s results (Easterby-Smith et al., 2015). The last four are therefore concerned with how the integrity of the research community can be protected (Easterby-Smith et al., 2015).

<table>
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<tr>
<th>Principle:</th>
<th>Concerns:</th>
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<tr>
<td>1</td>
<td>Ensuring no harm comes to participants</td>
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<td>2</td>
<td>Respecting the dignity of research participants</td>
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<td>3</td>
<td>Ensuring a fully informed consent of research participants</td>
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<td>4</td>
<td>Protecting the privacy of research participants</td>
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<td>5</td>
<td>Ensuring the confidentiality of research data</td>
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<td>6</td>
<td>Protecting the anonymity of individuals or organizations</td>
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<td>7</td>
<td>Avoiding deception about the nature or aims of the research</td>
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<td>8</td>
<td>Declaration of affiliations, funding sources and conflicts of interest</td>
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<td>9</td>
<td>Honest and transparency in communication about the research</td>
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<td>10</td>
<td>Avoidance of any misleading or false reporting of research findings</td>
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To tackle the first section of the ethical principles, see no.1-6 in Table 3-2, the following stated actions were taken. Prior to conducting the interviews all respondents were informed of; (1) The purpose of the study; (2) Their contribution to the study; (3) What the study was going to be used for and where it was going to be published; and (4) Potential benefit connected to their contribution. Prior to initiating the interviews all interviewees were provided with an informed consent agreement to read and sign. This was done in order to ensure that all participants were aware of the nature of the study. The consent agreement also provided the interviewee with the option to remain anonymous, company name and the individuals name. Since some of the participants wished for the company name as well as their own individual name to be fully undisclosed, the decision was made to do the same for all participants names/identity along with their respective company name and industry. This created a coherency within the reporting of the empirical findings as well as in the analysis. Instead, we used aliases such as C1 for case 1, C2 for case 2, and so on. In order to further assure the anonymity of the respondents, the access to recordings and transcripts have been limited to us, the researchers.

For the second section of key principles, see no. 7-10 in Table 3-2, we made sure that we provided a thorough description in this report about the nature and aims of the research to avoid deception. Also, to ensure that we are transparent in the ways that we present our data, findings, and conclusions, we have provided a detailed presentation on how we have
executed and designed the study. We have also presented the empirical data and provided
argumentations for how the conclusions were drawn. Since this study is only executed as a
part within our Master's thesis course at Jönköping International Business School, and not
in cooperation with any other companies, there has been no affiliations that could harm,
affect, or inflict harm upon our findings. This is also information, that in addition to being
presented within our report, has been presented to the interviewees along with our wish that
we wanted to pursue publication.

As for the possible ethical implications of our research topic and findings there are a few
issues that can be discussed. When researching and investigating into making processes or
phases more effective, the results’ might influence peoples’ day to day operations. Leadership and management are topics that are very closely related to individuals, and if there
are behavioural patterns that emerge that can affect the effectiveness of the FFE this might influence the expectations of how a manager could/should act or what leadership traits they
ought to have. However, we believe that the findings will not have any major ethical
implications as the study only seeks to investigate further into, and gain a greater
understanding, of a topic. The goal is not providing any exact recommendations of precise
actions, just indications on what might affect the effectiveness negatively and positively
within the FFE.
4 Results

This section of the report presents the results of the gathered empirical data. First, the different cases are introduced and are then followed by the presentation of the findings. The findings have been separated into three different themes that were derived from the Theoretical Frame of Reference; (1) The FFE process; (2) Time management; (3) and Leadership-techniques.

4.1 Theme no.1 - The FFE process

The first theme, Theme no.1, is the theme where the answers have varied the most. This is due to the various occupations of the firms. Firms whom develop their own products have had a far more stable and established FFE processes compared to consulting firms. The interviewees have stated that consulting firms are not always involved in the FFE of the NPD process, and can be appointed to a project during any stage within the development process. Furthermore, jobs can vary depending on what the clients are seeking from the consulting firms. This is to say that the projects are constantly changing for consulting firms regrading time, environment, product description, and requirements from the clients making it difficult for consulting firms to develop a fixed process to follow.

As previously stated, firms whom develop their own products such as C1, C3 and C6 have a more “fixed” FFE process. This is to say that the process has more established and agreed upon stages that occur within multiple projects, and minimal alterations are needed depending on the project/product.

C1 stated that the FFE within the NPD process includes a number of activities and field trips which are used to inspire and educate the development team. The interviewee stated that multiple trips to fairs in Stockholm were conducted each season along with yearly trips to various fairs to Milan, Italy and Paris, France. These trips are conducted in order to inspire the design team to be more innovative. The trips also provide insight to up-coming trends such as colors and shapes which will be relevant in the seasons to come. C1 also stressed the importance of including all price points within the product until delivery, i.e. it is not only the price of the product itself that needs to be considered and developed. Shipping logistics, materials, production and packaging are also factors to be aware of early on within the process. The importance of including early visualizations, i.e. prototypes, in the FFE as these can help identifying possible problems that the concept holds was also identified as an important factor. A prototype is also said to make the Go/Kill decision much easier by using a visualization, the feedback from users and potential customers is much more efficient and concrete.

C3 shared that much of the FFE within their firm was dedicated to brainstorming and idea generation. This phase included incorporating outside information and inputs into their internal brainstorming sessions. The outside information provides the firm with insight
regrading needs and wants of their customers. This information is provided by users of the products i.e. direct customers and consumers, as well as distributors. Some similarities regarding customer input were discovered within C1. C1 talks about including feedback from potential customers early on in order to gain insights that can help them decide whether to proceed with a concept or not. According to C1, selling statistics are also used as guidance for the development team. C1 claims that the selling statistics enable the development team to gain a greater understanding of trends, such as the wants and needs of their customers. Selling statistics were also mentioned as a way of knowing what type of products are popular and what requirements e.g. technical enhancements the customers want. The statistics also contribute with price points for the development team to follow. The interviewee stated that the price of the concept is very much included within the FFE of the NPD process.

Contrasting C1 and C3, C6 invests much of their time in the FFE investigating pros and cons of new product development in order to reduce uncertainty within the project. This is done by examining and attacking problems from many different perspectives such as the environment, the current market, and users wants and needs. This was difficult to understand at first how they developed lists of pros and cons prior to brainstorming a new product, but the interviewee informed us that examining and attacking problems from many different perspectives is how they established ideas. By identifying problem areas within current products i.e. customer difficulties, they could start to brainstorm a new solution.

One similarity that all three non-consultancy firms (C1, C3 and C6) had in common was that all areas within the firms were included in selected stages within the FFE of the NPD process. All firms had designated positions within the FFE such as designers and engineers, however, the selected stages within the FFE process included open brainstorming sessions with employees within marketing, finance and customer service. According to the interviewees this tactic enables the development team to “think outside the box” and incorporate promising alternative concepts and ideas into the new product.

The consulting firms C2, C4, C6, C7, and C8 focused much of the FFE to understanding the needs and wants of their clients rather than the end users or the customers of the product. The FFE is initiated with a brief description of the project which includes the goals and objects with the new product. Thereafter, more administrative details are discussed regarding time, cost and production alternatives. The number of consultants involved within the FFE varied depending on the size of the project as well as the financial flexibility of the clients. This is to say, the more time and man power needed to complete the project, the more expensive the project is estimated to be. It is evident that there is more pressure regarding time and cost within the FFE of the NPD process for consulting firms. C2 spoke a lot about establishing the prerequisites to each project, and that it is vital to know them prior to starting the project. C2 mentions that in order to know that important issues regarding projects haven’t been missed, they use checklists where the most important factors are listed. C2 also mentions that it is hard to not get ahead of oneself since the urge of wanting to start projects right away without knowing the prerequisites and limitations is very common. However, with
the following statement, C2 also stresses that it is probably better to restrict oneself of getting ahead within FFE;

“You want to start right away, but it's probably better to think first” – C2

C2 also mentions that they have adopted cross-checking and peer/superior reviews in order to improve the quality of the FFE process;

“You cannot work alone in projects, and for us it varies between two to six people. This is because you always have to review the things that are done. It's easy to become self-blinded by the things that you produce yourself and that you do not see your own mistakes”. – C2

4.2 Theme no.2 - Time Management

All cases have mentioned that fluent communication must be prioritized within all areas of the NPD process, first and foremost in the FFE. The interviewees have stated that the more fluent the communication is between all parties within the project; client; customer; consultants; marketing team; finance department, distributors and manufacturing, the less chances there are for misunderstandings. Miscommunication and misunderstandings can lead to very time consuming and costly repairs and alterations within a project.

Good and fluent communication is also stated as one of the most difficult things to accomplish within the FFE; a fact that is emphasized by C2's statement regarding administration within the FFE;

"Communication is important, however it should be executed with as little administration as possible". – C2

Regarding communication several interviewees preferred the communication to be more continuous with less information, rather than fewer more extensive sessions with larger exchanges of information. The constant streams of information were also stated as important means of keeping everyone within the team in the loop. This was also stated to save time by several respondents as it enabled the identification of possible problems to occur earlier on. Hence, the problems could be handled in a quicker and time efficient manner.

C2 stated that their company has taken an interesting approach in order to decrease the chances of misunderstanding between the multiple parties involved in the FFE of the NPD process. C2 claimed that checklists were used to strengthen communication and decrease the chances for misunderstandings;

“To make sure that time is not wasted on unnecessary and time-consuming tasks we have developed checklists. These checklists can be viewed as an agreement between parties regarding tasks that needs to be achieved along with the expectations of all individuals beforehand”. – C2

C1 also mentions that they have established checklists as means to make sure that they don’t do the same mistakes twice i.e. the checklist is continuously updated when new issues occur.
However, the checklists were only for the general NPD process and not for the FFE. This is to say, the later stages within the NPD process were far more controlled and analyzed compared to the FFE.

C7 states that managing time efficiently within the FFE is a constant struggle, and managers often cut corners in order to decrease the time needed. This can be done by increasing safety margins within CAD drawing due to the lack of time spent calculating “more” accurate tolerances. C5 states that rather than delivering high quality concepts and results, companies and employees are forced to either cut corners or extend deadlines;

"The wheels are spinning fast and people expect quick results and quick solutions, although, everything cannot be solved by increasing the speed and hurrying things". - C5

The size of the teams i.e. number of individual involved within the FFE, affects the amount of time needed. This relentless brawl between innovation and time is most present within companies that develop their own products. This is experience that C3 holds and expresses with the following statement;

"The smaller the group (working within the FFE of the NPD) the less innovative ideas are generated, but in a shorter amount of time. The larger the group the more innovative the ideas are. However, more time is needed to analyze the ideas and make sure they are “realistic” and “producible”. - C3

C6 states that it is very difficult to have too narrow time restrictions on a project. This is first and foremost difficult in the beginning of a project, the FFE, due to the amount of uncertainty within the scope and project description.

4.3 Theme no.3 - Leadership techniques
The answers regrading leadership and leadership techniques within the FFE of the NPD process have varied according to the interviewees. Some companies have designated the designers as the leaders of the FFE, whilst others have acquired project managers to lead the project throughout the whole NPD process.

C1 is a project manager at a firm where the designers oversee the FFE. C1 stated that the FFE within their firm should not be controlled nor limited by a project manager. The designers within the NPD team are the ones that are invited and encouraged to attend the international and national design fairs for inspiration. Micromanaging the design team would be ineffective and defy the purpose of the creative trips;

“We do not feel that limiting the designers by pointing out flaws or technology imperfection within their designs aids the innovation process. These are issues we can discuss and tackle together whilst analyzing the concepts in a later stage of the NPD process”. – C1

C3 states that a project manager is always designated to a NPD project within their firm. The interviewee claims that planning is one of the most important leadership techniques that s/he
C3 states that it is extremely difficult to develop a classic GANTT schedule whilst developing a new product. However, guidelines must be established. C3 states that it is important to understand that the plan is a living document and that it can change depending on the obstacles the project faces;

"Time planning and lists of requirements are the most important thing to manage within the NPD process at our company. Things will go wrong. It is better to know that things will go wrong during a project than to panic when it happens." – C3

C7 states that his/her leadership techniques are very simple and include leading with a good example. C7 claims that s/he does not expect his/her team members to work the same number of crazy hours as he/she does. However, s/he does expect them to be productive and focused whilst they are on the job;

"I try to motivate and lead my teams by acting and working as I expect them to act and work. We respect each other and work together. If I see that a team member needs help or is struggling with a task, I do my best to aid them. However, it is important that team members help each other without jeopardizing their own tasks and work." – C7

C8 mentioned that incorporating team members from different fields encourages creativity within the FFE of the NPD process. C8 states that s/he tries to build teams with individuals who have diverse backgrounds and knowledge within multiple fields. C8 implies that this combination of individuals enables the project to incorporate creative opinions into the FFE process;

"The FFE is often very confusing. I believe it is always positive to incorporate as many backgrounds and expertise’s into the FFE as possible in order to increase and induce innovation into the NPD process". – C8

C2 states that it is difficult for a team to follow an incompetent leader. Therefore, C2 claims that prior to starting a project s/he tries to obtain as much information as possible about the new project. C2 develops a list which include the needs and wants of the clients along with additional research prior to introducing the project to the project team. By doing this C2 believes that s/he can best aid the development team in the FFE along with the rest of the NPD process. C2 also states that it is important to obtain a “helicopter perspective” of the project. This includes keeping tabs on the progress within the project as well as making sure your team knows that they can come to you with any problems or solutions they might discover during the project;

"You want to quickly come up with ideas. It might be good at first to develop ideas as quickly as possible to reduce the amount of time needed. However, if you do not keep a helicopter perspective (keep track of the conditions) I think it's easy to go wrong." – C2
4.3.1 Leadership difficulties

A difficult situation for all leaders to deal with includes conflicts between team members. According to C5 it is extremely time consuming and stressful when team members disagree about a concept or design. However, it is even more difficult when team members disagree about something more personal;

"Other team related issues are when political views are involved. It is very difficult to move forward with a project when people are fighting and becoming aggressive making them unable to work together". – C5

C6 states that s/he does not use any specific leadership techniques whilst tackling the FFE of the NPD process. However, s/he has identified some important issues that can occur whilst managing the FFE. C6 claims that one of the main problems includes managing time;

"When managers or project leaders stress the front end of the process they tend to lock on one idea or design. This disables the team from exploring other options and alternatives. This can be very destructive for the innovation process within the FFE, and potentially extremely costly for the project". – C6

4.3.2 Team dynamics

C1 states that they do not use any specific leadership techniques whilst navigating through the FFE of the NPD process. The interviewee describes their firm as a democracy rather than a dictatorship. This is to say everyone within the team has a right to voice their opinions and thoughts regarding the concept within the FFE;

"We have a very Swedish mentality regarding our hierarchy. This is to say no one is better than anyone else around the table. Everyone has a right to express their thoughts". - C1

We questioned C1 about this method and asked if it was difficult to make decisions with this type of working environment. C1 expressed that at the end of the day there was one person whom either granted or denied the purposed concept from FFE;

"This decision is based on three main questions from the head office; (1) The engineering (is it possible to develop the concept); (2) Economics (how much profit can be made); and (3) Statistics (does the new concept match the selling statistics)". – C1

An additional aspect regarding team dynamics is the ability to create the “we-spirit”. By this the interviewees state that it is important that all team members feel included in the success of a new concept in order to induce motivation amongst all.

C2 states that team members need to be non-prestigious in order for the outcomes to be as prosperous as possible. Internal rivalry within the group is therefore stated as not adding any value, instead it is stated as rather time consuming and negative.
Chapter 5 presents the results of our interpretations and analysis of the gathered empirical data. The identified themes, sub-themes, and codes seen in this chapter are based on the information gathered from the eight interviews. At the end of this chapter the conclusions drawn are presented along with an updated research model.

The interviews within this study have revealed numerous patterns and codes which resemble similarities within the answers. An overview of the derived categories and themes can be seen in Figure 5-1. An additional aspect that needs to be considered whilst analyzing the results includes the “area” or “firm” in which these managers work with the FFE. This is to say, the answers have at times been very similar, however, they can vary drastically when firms whom develop their own products are compared to consulting firms.

![Figure 5-1 Identified categories and themes]
5.1 Theme no.1- Leadership

The first main theme discovered within the analysis, Leadership, was a very broad theme that included many different aspects which affect leadership within the FFE of the NPD process. Leadership is a vital part within organizations to foster innovation processes and activities in organizations (Oke et al., 2009). The most reoccurring information within the codes were organized and separated into three sub-themes; (1) Communication; (2) Structure; and (3) Team management.

5.1.1 Communication

The codes that were designated to sub-theme Communication refer to internal and external communication conducted by the project manager/leader. The importance of communication, first and foremost how a leader communicates, has been stated by all interviews in one shape or form. This is very much in line with what Chong et al. (2005) states regarding communication and information processing. Chong et al. (2005) argues that these two are imperative in order to insure the successes of the NPD process. All codes within communication have been narrowed down to four categories; (1) Fluent communication; (2) Clear communication; (3) Easy contact; and (4) Transparency.

By fluent communication the interviewees claimed that it was of utmost importance that the group leader emphasized the need for continuous communication between all group members, as well as external parties involved within the FFE. Continuous communication between all parties involved insures that “everyone” is kept up-to-date regarding changes, alterations, and deadlines within the project. Hence, reducing the “lead time” and enabling the possibility to make faster and accurate decisions.

In order to aid the flow of information it must be easy to contact all parties involved. Therefore, interviewees stated that it was imperative that forums in the shape of group chats, emails, and data bases are implemented to ease the communication between internal and external parties. What can be derived from this is that it is important that the project managers know that s/he needs to establish good codes and patterns of communication along with providing the technical aids to communicate efficiently. This is also stressed by Kim and Wilemon (2002) who points out that building an information system is important to reduce uncertainty within the FFE. However, this information presented on communication is slightly contradicting to the argumentation of Oke et al. (2009). Oke et al. (2009) states that there is a need for unstructured communication within the FFE. This might be due to that there is a theoretical need for ambiguity within the FFE, though, there doesn’t seem to be room for that in reality. The need for effective communication and structured communication channels are on the other hand supported by the arguments and practices behind both Concurrent Engineering, Agile Product development, Lean product development, and the fusion of Agile and Stage gate, see sections 2.2.2 – 2.2.4.

Clear communication represents the way in which directions and progress within a project is documented or transferred between parties. The multiple interviewees stated that many group members found it “easier” to understand and document written communication, first
and foremost when the communication is external. Written communication is also used to document and backtrack methods and activities which have proven to be with successful or/un-successful within a project. Transparency within communication is needed in order for all team members to be kept up-to-date. No information should be hidden nor non-disclosed during the FFE of the NPD process. As clear communication also has to do with how information is transferred between and amongst various partners within the project, good leadership also include the ability to know how to be “clear” in his/her communication.

5.1.2 Structure

The sub-theme concentrates on how well a leader knows his/her process. The interviewees stated that they had observed that it was easier for team members to follow and respect a leader who was confident and expressed certainty within their role. This is supported by the findings of Kim and Wilemon (2002), that in order to reduce the uncertainty within the FFE it is important to appoint a knowledgeable person to lead a project team. This certainty that is expressed to be favorable is also something that requires real commitment, as well as real understanding of the fundamentals of FFE behavior (Reinertsen, 1994). This implies that in order to successfully lead and manage the FFE, the manager needs to know and “own” the process, in addition to be committed to continue to learn.

This sub-theme of structure included multiple codes that were combined into five codes; (1) Helicopter perspective; (2) Generating structure; (3) Clear directions; (4) Setting the pace; and (5) Awareness. All five codes can be implemented into the first code “Helicopter perspective” due to the definition of the two words. Obtaining a helicopter perspective includes keeping an eye on everyone and everything that is going on within the process. This includes generating structure and setting clear goals and objectives for your team members, along with knowing who to include and when to include them in the project. This is supported by Kim and Wilemon (2002) whom claim that time and resources can be saved by formalizing and creating a more holistic FFE process.

Setting the pace includes knowing when to either increase or decrease the speed within a project to match the set deadlines. Awareness includes the need for leaders to be aware of time constraints as well as current and up-coming costs within the FFE. It also includes that the leader needs to be aware of the overall purpose of the project along with the strategies of the company. Since without this, it can be hard for the manager to efficiently limit the project scope and therefore end up with a too wide variation of possibilities or concepts that do not align with the company’s strategy. Being too broad with strategy, or being unaware of it, could lead to too many concepts being considered or brought along the process too long. This makes the FFE much less effective which is supported by Reinertsen (1994).

5.1.3 Team management

The sub-theme Team management assimilates personal traits along with duties and responsibilities connected with the position of a leader within the FFE of the NPD process. Team management includes the obligations leaders face within the FFE along with tools that
can be used in order to insure the successes of the project. The sub-theme included six codes; (1) Knowing your team members; (2) Group dynamics; (3) Trust; (4) Motivation; (5) Stress; and (6) Time.

The code of knowing your team members includes the ability to identify hidden talents within a group and extorting them for the good of the project. This code also include understanding and identifying the multiple personalities within a group. Multiple interviewees claimed that knowing your team members enables the leader to communicate goals, objectives and critique in a positive way. Interviewees also stated that they had observed increased innovation and motivation whilst developing a “safe” and positive group dynamic where individuals were encouraged to help each other. A safe group dynamic is built upon trust between all group members including the leader which in turn reduces stress within the group. These findings are supported with the statement that a positive environment supplied by leaders enables employees to engage in innovative ideas rather than worry and doubt themselves (Oke et al., 2009). Time within team management include identifying and recognizing issues “in time”. The interviewees state that many problems manifest in time making them very difficult to tackle the more time that passes. It is up to the leader to identify these problems and deal with them as quickly and efficiently as possible. This issue connects back to what is discussed under 5.1.1 Communication, that having easier and continuous communication makes it possible to identify problems much quicker.

5.1.4 In-between sub-theme

The in-between theme includes all the codes that fell in the middle of sub-themes “Structure” and “Team management”. These codes didn’t quite fit in either category, yet they were most relevant and connected to the two sub-themes, see Figure 5-2. The in-between sub-theme included three codes; (1) Blinded by your own work; (2) Decision making; and (3) Know your position.

![Figure 5-2 In-between sub-theme](image)

Interviewees stated that it can be very destructive when leaders become blinded by the quality of their own work. This can lead to choosing and developing inadequate concepts resulting in wasted time and resources.

It can be difficult for leader to decide whether to Go/Kill a concept. Decision making was identified more as a personal struggle due to the amount of responsibility a project leader possesses in the FFE of an NPD process.
According to the interviewees some leaders find it difficult to lead a team as well as being involved in the project as a team member with a specific task. This can result in the leader becoming more of a “follower” rather than a leader leaving the team with little to no guidance within the project. All of these three codes are listed as main problems within the FFE of portfolio-bloat, the inability to efficiently evaluate concepts, along with having a too broad strategy (Reinertsen, 1994). Being sure of the company’s vision and aims therefore seems imperative for the manager. Unless this is made sure of it will most certainly lead to an ineffective front end.

5.2 Theme no.2 - Process

The second main theme within the analysis, Process, contains all the codes that have focused on the FFE process within the NPD process. The foundation of each sub-themes is based on a managerial perspective seeming all interviewees obtain managerial position within the NPD process. Therefore, the codes within this theme are very much linked to leadership and its position and influence within the FFE.

5.2.1 Project management

The sub-theme Project management concentrates on awareness of the leader within the FFE. The sub-theme also includes control, planning, and communication between the leader and group member within the project team. Four codes within the sub-theme were developed; (1) Limitation; (2) Fluent communication; (3) Awareness; and (4) Process adaption.

It has been brought to our attention that it is of utmost importance for a leader/ project manager to be aware of the project’s limitation in order for him/her to identify and set reachable goals and objectives. Leadership can be regarded as the social process that occurs within a group setting in which the leader influences his/her follower’s actions and performances so that the strive for organizational goals and visions are fulfilled (Oke et al., 2009). Consistent communication is a reoccurring code that has been identified and included in all themes within this thesis. Projects that consist of more than one person always include some form of communication. The multiple interviewees have emphasized the need for coherent communication within the FFE in order to keep all group member informed. Awareness includes the need for team leaders to be aware of limitations, R&D, new technology, and trends within the specific field of the product. The last code within the sub-theme, Process adaption, includes knowing your process. Many companies try to imitate existing processes developed by competitors and/or larger successful companies. An interviewee stated that it is important to alter and modify a “copied” process to fit your teams needs and capabilities. This is to say; you cannot imitate another company’s process without modifying it to fit your requirements.

5.2.2 Organization

The sub-theme Organization includes how a manager obtains and retains control within the FFE of the NPD process. The interviewees revealed multiple methods and techniques used in order to remain organized and in control of the FFE. The literature supports the need for leaders to stay organized, Oke et al. (2009) states that employees are more likely to engage
and work harder to achieve project goals and objectives when being guided and lead by a
driven leader. Three codes were designated the sub-theme organization. These are as
followed; (1) External communication; (2) Checklists; and (3) Agreements.

The use of checklists was a reoccurring answer form many of the interviewees. The checklists
are used as a tool for managers to keep track of all the tasks that have been performed within
the FFE, as well as highlight and identify the tasks that still need to be completed. The
checklists also aid managers whilst delegating tasks within the project team, as well as
identifying how much time remains. Checklists are living documents and are constantly
changing depending on the type of NPD project. However, it is more common that tasks
are added to the checklists after the projects have been completed. The added tasks include
improvement that will aid up and coming projects. Nevertheless, to establish effective
checklists for the FFE it seems important to always have an analytical mindset on what tasks
have been successfully performed, and what was not successful. Analytical thinking within
the FFE checklists was absent according to some of the interviewees. We believe that in
order to enhance waste reduction it is of utmost importance to implement analytical thinking
to all stages within the NPD process, especially in the FFE.

Agreements, written agreements with external and internal parties, are vital in order for the
project leader to ensure that all team members are aware of their specific tasks and
responsibilities within the project team. Agreements with external parties are viewed more
as safety nets which protect both parties in the case of disagreement.

5.2.3 Process management

Process management includes five codes which represent how the FFE process is managed
according to the interviewees. Process management includes the task and activities that are
performed within the FFE of the NPD process in contrast to organization which includes
how a manager obtains and retains control within the FFE. The five codes within process
management include; (1) Methods; (2) Editing the process; (3) Peer review; (4) Integration;
and (5) Innovation.

Methods includes how a leader chooses to use or combined multiple methods such as
brainstorming and personas within the FFE. Editing the process includes modifying the FFE
process in order to suit and fit the needs of the project. Many interviewees stated that most
of their work is required to be reviewed and double checked by another group member. This
can take time, however, the number of mistakes that are caught often result in saving time
later-on in the NPD process. Most common faults according to the interviewees include
calculations, time estimations and cost approximation. Integration involves inducing early
involvement of other departments within FFE such as engineering, marketing and finance
personnel. The multiple expertise’s often provide the project with skills and knowledge that
can benefit the concept development. Innovation within the sub-theme process management
focuses on the number of people involved within the FFE. The number of individuals
involved within the FFE determine how innovative yet time consuming a project will be.
The smaller the group the less time the FFE usually takes. However, fewer people involved
in the process often result in reduced innovation. The more people involved in the FFE the long the process takes. However, the larger the group is, the more innovative the result are.

5.2.4 Prototypes

The importance of prototype development, i.e. the visualizations of concepts, within the FFE was identified as a repetitive theme amongst the multiple codes. Prototypes enable projects to identify faults and opportunities within a concept well before production and manufacturing is induced. The sub-theme includes both positive and negative aspects that follow prototype development. The codes within the prototype sub-theme include; (1) Identification; (2) Support; (3) Time; and (4) Cost.

Identification includes the ability to identify faults and opportunities within a concept prior to manufacturing. This can result in a company saving huge amounts of money. Support, the prototypes often provide the main prerequisites for why a concept is either developed or killed prior to manufacturing. Negative results of prototype development include the amount of time needed to produce the prototype along with the costs that follow. However, multiple interviewees have stated that these costs (time and money) are often well spent and result in saving huge potential losses. These visualizations also enable the early involvement of users or potential customers to gain their much-needed feedback, hence, making go/kill or improvement decisions more effective. As discussed under section 2.2.4 Agile development, effective and shorter feedback loops are one of the most important factors of the method. Cooper (2016) states that having long loops enable inefficiencies and longer development cycles which is time consuming and potentially costly.

5.3 Theme no.3 - Project scope

Theme no.3, Project scope, includes the groundwork and tasks that are needed prior to embarking the FFE. The information within the project scope provides guidelines which enable the project leader/manager to take efficient and productive decisions within the FFE. The project scope is often constructed together with the client or customer and includes their wants and needs.

5.3.1 Project brief

Interviewees within consulting firms state that the foundation of a project brief is often supplied by their clients. However, many alterations and additions are often made with the help of information gathered from end users. The codes within this sub-theme include; (1) Open description; (2) Restrictions; (3) Background check; and (4) Time.

According to the interviewees, the original project brief is often very broad and abstract generally. This document is often full of opportunities and seeks innovative ideas and solutions. This means very little restrictions are placed on the project brief in order to induce creativity. Extensive background checks regarding the current market, competition, and user analysis are some of the fewer things that are concrete within the project brief. Time estimations regarding the length of the project are developed and included in the project brief. However, many interviewees have stated that it is very difficult to estimate the time
needed to execute the whole NPD process. Therefore, the term estimation is highlighted, and customers are notified that this cannot be guaranteed in many cases. Chong et al. (2005) states that time pressure and the management of time is important for the FFE since it is the foundation of the NPD process.

5.3.2 Market

The sub-theme Market includes the codes that were more detailed and precise regarding extensive background knowledge and research. It is imperative to obtain this information prior to embarking the FFE in order to ensure that the needs and wants of the end users are incorporated into the product. The sub-theme includes six codes; (1) Need; (2) Customer behavior; (3) Trends; (4) Competition; (5) Statistics; and (6) Pattern recognition.

According to the interviewees all of these codes are connected to each other and make up the market analysis. The first step includes identifying a need on the market. This can be done by analyzing and researching customer behaviors, identifying upcoming and existing trends as well as evaluating and studying the competition. Sale statistics are also used to support the Go/Kill stage of concept development within the FFE. Sales statistics enable companies and development teams to estimate the successes of a new product with the help of documented transactions. These actions help managers reduce the uncertainty that is notoriously present within the FFE. These tasks also enable managers to base their decisions and future actions on customer needs and statistics.

5.4 Theme no.4 - Concept Development

Concept development is the foundation on which the FFE is built upon. In theory, the FFE is dedicated to concept development and idea generation within the NPD process. The FFE is the most creative and innovative stage within the NPD process making it the most difficult stage to control. With the support of encouraging leaders, a team is more likely to engage in beneficial and innovative activities which is often very important for the success of the FFE (Oke et al., 2009). The main theme, Concept development, includes two sub-themes; (1) Innovation; and (2) Idea generation.

5.4.1 Innovation

Most firms strive to be as innovative and original as possible with their products. Therefore, many codes within this sub-theme included “how” managers can increase and encourage innovation within the FFE of the NPD process. With the support of encouraging leaders, a team is more likely to engage in beneficial and innovative activities (Oke et al., 2009). The sub-theme includes four codes; (1) External input; (2) Designers; (3) Perspectives; and (4) Inspiration.

External input sessions can enable the brainstorming session to include multiple perspectives and opinions as well as expertise. This can result in both induced innovation as well as a positive contribution of facts and knowledge. Including multiple perspectives and seeking inspiration from external sources can aid the idea generation by stimulating the number of concepts developed. According to the interviewees that manage the FFE within companies
that develop their own products, the designers within the project team are often in charge of brainstorming and concept development in the early stages of the FFE. As stated in 2.3.2 Leadership within the FFE, we believe that a transformational leader would induce innovation and creativity within the FFE of the NPD process. The interviewees within this study have supported the thought of induced innovation with help of a motivating and inspirational leader.

5.4.2 Idea generation

The idea generation varies depending on the project, product, and firm. There were many mixed and almost contradicting codes within this sub-theme due to the variety of firms interviewed for this project. The idea generation sub-theme includes three codes that were most reoccurring within the open coding session; (1) Individual vs group; (2) Price orientated; and (3) Diversity.

Individual vs group involvement within the idea generation phase of a project has previously been discussed in 5.2.3 Process management. The interviewees have stated that larger groups induce innovation, however, they are very time consuming. The opposite applies for smaller groups or individual idea generation. However, not all projects require high innovation which reduces the need for larger groups. According to the interviewees, many consulting firms are pressured to concentrate much of their efforts to fit a budget set by the client. This can be time consuming and risky seeming mistakes and complications are often enviable within the NPD process. Group diversity has also been mentioned several times within the multiple sub-theme and is most commonly connected to stimulating innovation within a group. According to Bstieler and Hemmert (2010) external influences enhances diversity and maximize the chance of meeting customer needs and wants as well as reducing development time. This contradicts the information provided by the interviewees whom insist that larger groups are far more time consuming.

5.5 Theme no.5 - Time

Time management and time pressure are reoccurring codes within the analysis, as well as one of the main pillars within this study. Many of the codes lean towards similar issues and difficulties regarding time within the FFE of the NPD process. Time pressure is becoming progressively obvious within NPD teams and has proven to affect many aspects within the process such as communication and performance (Chong et al., 2005). The main theme has been separated into two sub-themes; (1) Pressure i.e. time pressure within the FFE; and (2) Time management i.e. how leader manage and use time as efficiently as possible.

5.5.1 Pressure

Pressure, foremost time pressure, can be felt by both team members as well as leaders. The codes reveal the difficulties regarding time and pressure along with the negative effects that follow time pressure within the FFE. The codes are as followed; (1) Rushing a project; (2) Stress; (3) Lack of time; (4) Sizes of groups; and (5) Reflection.
According to the interviewees rushing a project is never good. Rushing a project can result in many costly and time-consuming problems that usually arise in the later stages within the NPD process. Therefore, it is always better to take your time and do things right from the beginning in the FFE. Depending on your client or manager, the FFE can be very stressful. People often feel insecure due to the time pressure resulting in less innovative and “safer” concept development. As mentioned in 5.4.2 Idea generation and 5.2.3 Process management, innovation suffers from smaller groups. However, much more time is needed the larger the project group is. The interviewees state that this is a difficult task to juggle. Depending on the time restrictions, managers must be able to reduce the sizes of groups without negatively effecting innovative and creative brainstorming sessions. Hence, know what competences to include and when to include them. Lastly, time needs to be dedicated to reflection, see 5.2.4 Prototypes. Reflection is necessary for leaders and project managers to take a closer look at the suggested concepts and used to avoid making costly mistakes.

5.5.2 Time management

It is of utmost important for firms to be as effective and quick as possible whilst developing and introducing new products to the market. Time management is therefore a key player and theme amongst the collected data. What has been found as something to improve effectiveness, both in literature and through the analysis of our empirical data, is using processes where there is an early and simultaneous integration of all competences within the process. The sub-theme time management includes the following codes; (1) Availability; (2) Communication; (3) Planning; and (4) Delays.

The time that is available needs to be utilized as effectively as possible, hence it is not good to spend unnecessary time on administration. Therefore, effective communication and documentation is important, which can be aided through the use of e.g. effective IT/EDI (electronic data interchange) systems. The interviewees have made it clear that time awareness, time limits, is important for managers. It is central to have some plan of different stages within the FFE to provide structure and to meet set deadlines. It is also important to know that unknown or unexpected problems most certainly will arise during the project and needs to be scheduled for.

5.6 Conclusions

The aim with this thesis was to explore two principal focal areas; (1) The effects of leadership and management on time efficiency within the FFE; and (2) The effects of uncertainty on project managers within the FFE.

Research Question 1- How can various management- and leadership styles improve time efficacy without impairing the successes of the FFE of the NPD process?

Time is scarce within the FFE of the NPD process. The interviewees have expressed the need to use time efficiently as the most difficult and challenging task compared to the theoretic discussion regarding the lack of time provided/ need for more time within the FFE. Multiple management- and leadership styles were revealed within the initial data collection which
identified three main techniques to improve time efficacy without impairing the successes of the FFE of the NPD process. (1) Invest the time needed in the FFE in order to reduce and eliminate the risk of exceeding time limitation within later stages of the NPD process. This can be accomplished by developing prototypes in order to identify opportunities and faults within the concept early on in the process; (2) Don’t rush the FFE process. Rushed processes often result in costly and time-consuming activities. To avoid this, many project managers have implemented checklists into the FFE process. The checklists enable all team members to stay informed and up-to-date regarding the progress of the project. An additional technique implemented by the project managers includes peer-review. This method allows team members to share responsibility as well as induce communication amongst group members; and (3) Identifying a favorable group diversity and size within idea generation and concept development. The size and level of diversity within a project group often is the main element that dictates how much time is needed within the FFE. Managers- and leaders must identify the requirements within the project scope to estimate the amount of innovation and time the project allows. Thereafter, the number of individuals can be invited and included in the idea generation and brainstorming process within the FFE. In addition to this, we have discovered that it seems like it is of utmost importance for a leader to possess the traits of a transformational leader in order to aid and induce innovation. This include creating a “safe” and open space for team members to share thoughts and ideas.

The main findings regarding Research Question 1 include utilizing time efficiently rather than reducing the amount of time needed. This is to say managers- and leaders are constantly seeking to enhance the quality of tasks and activities performed within the FFE to insure high quality outcomes later-on in the process.

Research Question 2- How can/does the uncertainty within the FFE affect project managers within the NPD process?

The second research question aims more towards identifying what pressures project managers face during the execution of the FFE. According to the interviewees the pressures within the FFE vary depending on the type of firm i.e. consulting firms’ vs firms whom develop their own products. However, common ground was found between both types of firms regarding the negative effect of uncertainty and time pressure on innovation.

Personal pressure applied to project managers within the FFE includes the weight of the position, see Figure 5-3. Project managers within the FFE carry the responsibility of insuring the development of quality concepts and results for both client companies and end users. Project managers also have an obligation to their group, team members’, regarding transparency and guidance. The main task applied to a project manager includes leading their team in a positive and constructive way to best obtain beneficial and favorable results.
The main findings regarding the effect of uncertainty within the FFE on project managers includes internal and external pressures applied to these individuals. Despite the pressure, the interviews have not referred to these pressures being specifically negative, rather an organizational matter that should be tackled accordingly.

5.6.1 Updated research model

Figure 5-4 is an updated and modified version of the original research model, Figure 2-8 Visualization of the relationship between the FFE and the Project manager. The new model highlights the most critical findings within the project according to the two research questions. The darker shaded boxes represent what effects the FFE have on project managers whom lead the front end of the NPD process. According to the findings within this thesis, pressure both from internal and external parties, are the main effects the FFE have on project managers. As previously stated in 5.6 Conclusion, the interviews have not referred to these pressures being specifically negative, rather a result of a managerial position. The lighter shaded boxes include how various management- and leadership styles improve time efficacy without impairing the successes of the FFE of the NPD process. The lighter boxes contain the five main themes identified in chapter 5 Analysis. Each theme includes multiple methods and techniques that can be used on a daily basis by numerous mangers in order to use the time provided as efficiently as possible. These methods are not used to reduce the amount of time needed within the FFE, rather how to obtain maximum result in a resourceful manner within the time limits.
Figure 5-4 New updated research model
6 Discussion

In this last chapter we discuss the relevance and validity of our findings, managerial implications, as well as limitations and suggestions for further research.

6.1 Relevance and validation of the study

As previously mentioned in 1.2 Problem, Kim and Wilemon (2002) have suggested that more research is needed in order to gain a greater understating of how managers are to tackle the FFE of the NPD process as efficiently as possible. This includes methods that can, and have been implemented, to accelerate the FFE process along with leadership styles used to benefit the challenging task of perusing acceleration. Multiple authors within this thesis have touched upon the subject regarding the uncertainty and lack of information of “how to manage” the FFE. Due to the statements provided by multiple authors regarding the need for further studies, we believe that this thesis has provided a small contribution regarding management- and leadership methods and techniques that have aided Swedish companies. The conclusions within this study have been based on the information obtained in the initial data collection making it original and unique.

We believe that the most significant and relevant information that we have discovered within our study is connected to Research Question 1- How can various management- and leadership styles improve time efficacy without impairing the successes of the FFE of the NPD process? The empirical data revealed that the goal is not to eliminate any stages within the FFE, rather conduct them as efficiently as possible. When related to time, previous studies and theories have concentrated on decreasing the amount of time needed within the FFE of the NPD process. However, we discovered that in reality, this is not the main objective. Increasing efficiency includes mastering the process and continuously adapting new improvements to increase efficacy within the FFE in order for firms to develop high quality products. Reducing time is often seen as a positive result of mastering the process, however, as previously mentioned this is not the goal according to our study.

6.2 Managerial implications

As mentioned in 6.1 Relevance and validation of this study the most important discovery that we have found is that it isn’t always about reducing time, it is more about making sure that the time spent is spent wisely in order for the process to add value. It is not about reducing activities to save time, it is to know the value of each activity and to make those efficient, i.e. a manager needs to “own and know his/her process”. A lot of information and background to the study provided support that the time needed to be reduced within the FFE and that there is a need to accelerate it. However, our findings support that it is more applicable to reduce wastes, not time, just like in Lean thinking. If time within the FFE is only spent on activities that have a meaningful purpose, the outcomes will add value. Therefore, it can be said that the Lean thinking of reducing waste within the process is the main objective.
This perspective on management is something that can be applied to other contexts outside of the purpose of this study. It is important for all managers to reduce uncertainty within their processes even if they might not be as uncertain as the FFE process. However, the importance for a manager to know what adds value puts a different perspective on the problem of reducing time. Instead of having the main-focus on hurrying up processes or accelerating the work, redundancies within the process can be removed. Knowing what adds value reduces uncertainty and can potentially reduce the time needed. This perspective of thinking is therefore applicable for all types of managers.

6.3 Limitations

This study includes numerous limitations and restrictions. We believe the greatest limitation within this report includes the number of interviews that have been conducted. Although the information obtained within this study has been rich and descriptive, additional interviews and views could have either supported previous statements and claims and/or supplied the study with further information regarding the topic. An additional restriction includes the location of the interviewees. All interviewees were situated in Sweden which resulted in reduced and restricted diversity and inclusion of other cultures and countries. This may affect the relevance and contribution of this study outside of Sweden.

Many of the interviews were conducted either over skype or in person. However, some interviews were conducted over the phone. The interviews that were conducted over the phone were perceived as more difficult and less “open” compared to the face-to-face interviews. We believe these interviews limited both the honesty of the interviewees, as well as made it impossible for us to read their body language. We found that the face-to-face interviews, in person and over skype, made the interviews more personal and induced conversation. We also noticed that the interviewees were more likely to take their time in the face-to-face interviews and became far more interested and involved when they could see us.

6.4 Future research

During the progress of this study many interesting topics and issues concerning the FFE have emerged. However, due to our research questions along with the main objectives and goals with this thesis, not all the information that was obtained was regarded as relevant. Additional aspects that hindered this thesis and the inclusion of certain information and observations can be seen in 6.3 Limitations.

What became apparent during the multiple interviews was how the FFE and the NPD process was conducted varied depending on the firms’ industry along with the size of the company. Due to the variation in trades, the duties and responsibilities of the project managers were also mixed and shifted. This included the number of employees dedicated to each position and/or the different types of projects that were conducted. Therefore, we believe that the following suggestions and/or questions could be relevant and interesting for further research;
1. Conducting a comparison between two industries: What is the difference between managing- and leading the FFE within industry x and industry y?

2. How does the type of product or specific market influence the FFE and the requirements of a productive leader?

3. How does the size of the company affect project management- and leadership within the FFE?

4. How does the FFE differ depending on the life-cycle of the product?

5. Conducting a comparison between consulting companies and non-consulting firms: What is the difference between managing- and leading the FFE within a consulting firm and a non-consulting firm?
References


# Appendix 1 – Interview topic guide

## Opening questions

- Who are you?
- What is your background?
- What is your current position at XXX?

## Questions regarding topics (question areas)

| FFE within the NPD | - Can you describe your general New Product Development process?
| - Who is involved in the process (why & when)?
| - What factors do you find especially important within the process and why?
| - What are your main objectives and focal points as a project manager?
| - What types of difficulties can you face as a Project manager within the process?
| - What types of challenges have you faced before as a leader and how did "you" manage them either successfully or non-successfully?
| - What tips would you give a newly appointed project manager regarding the overall process?
| - Who is involved within the FFE?
| - How do you manage the "fuzzy front end"?
| - Are there any challenges that you previously have faced or heard of?
| - How do you as a manager decide what to focus on?
| - What are some common challenges you face within the Fuzzy Front End? How do you tackle these? |

| Time management | - In general, what are your thoughts regarding time management within the NPD?
| - How do you feel about time management within the FFE? Is it important?
| - How do you manage time efficiently?
| - What does your team do "specifically" in order to reduce the amount of time need in the FFE? |

| Leadership and management | - Do you use any specific leadership styles or techniques?
| - Any common challenges you face as a leader or manager? And how to you tackle them?
| - What qualities or factors have you found effective in leading a project team?
| - How do you as a manager ensure that your project team is producing quality outcomes?
<p>| - How do you affect outcomes of the projects? |</p>
<table>
<thead>
<tr>
<th><strong>Closing questions</strong></th>
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<tbody>
<tr>
<td>- Is there anything regarding the subject that you feel that we've missed asking you?</td>
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<tr>
<td>- Do you have any questions or final thoughts for us?</td>
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<tr>
<td>- Do you have any suggestions regarding other suitable people that we might contact regarding these issues?</td>
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<th><strong>End notes</strong></th>
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<tr>
<td>- Thank the participant for his/her contribution, and that we really appreciate that they've participated.</td>
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