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Implementing a new product development process in a large technology company: important parts, challenges and pitfalls

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Wednesday 15th June, 2016

Problem Description

This master thesis investigates the processes used in product development projects at ACME Division (AD). The investigation is done in order to find the crucial parts and deliverable. From this it is further investigated what should be measured, in order to be able to decide, if the project should go to the next phase of development. Additionally, the biggest challenges faced in the implementation of the new Product Development Process (PDP), are identified and discussed. It will present relevant literature within the topics of project portfolio management, project management and New Product Development (NPD) processes. Data will be gathered through semi structured interviews with AD, review of AD project and process documents, and observation in project meetings.

The following questions guided the research:

What are the crucial parts and outputs of ACME Divisions development process, and how should these be measured in order to be able to decide if the project should go to the next phase of development?

What are the biggest challenges when implementing the new Product Development Process in ACME Division?

Preface

This master thesis was carried out during the spring semester of 2016, at the faculty of Industrial economics, Risk management and planning at University of Stavanger (UiS). It marks the end of my masters program started autumn 2014, and ending after two years, spring 2016.

The topics product development process, project management and program management are fields of research that I am inspired by and thoroughly enjoyed studying. From the first course in project management I have developed an extra interest in these subjects and it was with great joy i embarked on the research and writing of this thesis.

I would like to thank my supervisor Eric Christian Brun, at the Department of Industrial Economics, Risk management and planning for excellent guidance, advice and constructive feedback. In addition i would like to thank all of the people at the company that gave me access to their valuable time and knowledge. Lastly to all my classmates at UiS who helped, inspired and made studying fun, Thank you!

Wednesday 15th June, 2016, Stavanger

Truls Riberg Aagaard

Abstract

Purpose: All technology companies today face challenges regarding a constant demand for better efficiency in the development of new products. This is also true for ACME Division (AD), who are implementing a new Product Development Process (PDP) as a measure to improve efficiency. This thesis examines what *parts* and *deliverables* of the PDP are the most important in AD. It also examines how AD should *measure* their PDP. Further it identifies what the biggest challenges are when implementing a new PDP. All established and emerging topics are compared and discussed in relation to relevant literature.

Design/methodology/approach: This thesis is a case study encompassing a survey. The case study design follows methods developed by Eisenhardt (1989). Data was collected through interviews of employees involved with ADs development projects, observation of development project meetings and studying development process documentation. Quality control strategy was adapted from tactics recommended by Yin (2003). Powel-Taylor and Renner (2003) was the basis for the data analysis process.

Findings: Findings from analysis show that both literature and collected data see early phases of a PDP as the most critical parts in AD. Findings on the topics, most important deliverables and how to measure them were inconsistent. Missing consistency is tied to the lack of a proper project evaluation process, and it is recommended that the issue is studied further. Incentives tied to strategic misrepresentation and optimism bias are identified. Solutions to these problems are proposed in addition to a recommendation to further study the issue. It was identified that the difference between the previous and the new PDP was significant. In relation to this several challenges regarding the need for training, identification of roles and resource constraints were identified. A recommendation is given to further study these challenges.

Value: This thesis contributes to ADs understanding of the state of their PDPs. The findings regarding the most important *part* of the PDP can be used to focus resources and improve outcomes of product development. Additionally, challenges linked to the implementation of the new PDP can form a basis for future research identifying solutions. Furthermore, this thesis provides some of the necessary basis for future evaluation of the new PDP

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Acronyms

AD ACME Division.

AG ACME Group.

BCG Boston Consulting Group.

Cit Cited.

DMS Decision-Making Software.

ENPV Expected Net Present Value.

IPR Intellectual Property Rights.

IRR Internal Rate of Return.

MPD MPD-0002.

NPD New Product Development.

NPV Net Present Value.

p Page.

PDMA Product Development & Management Association.

PDP Product Development Process.

pp Pages.

PROC PROC-0002.

R&D Research and Development.

ROI Return On Investment.

Tr Translated.

UiS University of Stavanger.

WBS Work Breakdown Structure.

Chapter 1

Introduction

In order to make development projects more efficient, ACME Division (AD) is introducing a new Product Development Process (PDP). Documentation describing this new process states that it is a major upgrade from the previous PDP. Introduction of a new PDP raises several issues. This thesis endeavours to resolve some of these issues in order to simplify the transition made by this major upgrade of the PDP.

AD is part of an ever changing marketplace with increased competition, mature markets as well as increasing technological possibilities and solutions. The pressure for better innovation has never been higher and is always increasing. In order to try and meet the demand for new products it is not enough to have an idea or proposed solution. To be able to produce a profit this idea must be brought to life in an efficient manner. Ariel in quote 24 expresses how this was also the basis for changing the PDP in AD. Projects have been carried out with a large degree of uncertainty, and subsequent unknown final cost. Further resources have been added to these projects without proper control. This is no longer possible in the current economic conditions. That's why the new PDP aims to introduce a layer of quality and efficiency to development projects.

ACME Group (AG) is an international, knowledge-based group supplying high-technology systems and solutions to customers in several industries. In order to supply high technology AG, needs to be innovative. Constantly innovating and implementing improvements in all parts of the business - from the products, through the processes, to the customers' experiences is a focus. AG aims to be a highly innovative company that is reliable in its execution of that innovation. AD as one of the subsidiaries of AG is tasked with making these core values a reality.

The dramatic drop in oil price that happened between the summer of 2014 and the start of 2016 left it at 25% of what it was (Bertelsen et al., 2016). AD was affected as a supplier to several parts connected to this industry. This effect was offset by a product portfolio less dependent on oil prices. The bottom line was further influenced by a change in project mix towards contracts with lower margins. In summary, there is a constant need in AD to be more efficient in all parts of the organization, including product development.

Krishnan and Ulrich (2001) defines the product development as "the transformation of a market opportunity and a set of assumptions about product technology into a product available for sale". This definition fits well with the product development efforts in AD and will therefore be used throughout this thesis.

The pressure on organizations to develop new products is nothing new. Cooper (1990) describes it as "war" where innovation is the strategic weapon in 1990, and it has most certainly not subsided since then. Booz, Allen, and Hamilton (1982) introduced one of the first development processes in 1982 that is sill in use by organizations today. PDPs have been formalized in several ways in the years since then to help organizations increase success rates. Studies examining failure rates for new product developments in more than 1000 business units, between 1945 and 2004, in over ten industries, found failure rates between 30% an 49% (C. Crawford, 1987; Adams, 2004). Krishnan and Ulrich (2001) provides a structured review of cross-functional product development research citing more than 200 papers. This same paper describes itself as by no means exhaustive, and intended only to serve as a pointer to the vast body of literature on product design and development. In other words, the issue of New Product Development (NPD) has been covered very well in literature (Booz et al., 1982; C. Crawford, 1987; Cooper, 2001). These arguments suggest that—even with a vast body of knowledge surrounding the issue—organizations have a hard time implementing successful PDPs. This thesis attempts to bridge the gap between research and one project organization, by looking at this particular organizations needs and what theories could be applied to improve efficiency and success rates. Topics comprising project management, NPD and portfolio management are all taken into consideration.

The review is primarily intended for two audiences. The first one is the development project organization at AD. It was from this office the assignement was issued. This is also where all of the data was collected and all of the interviews where made with AD employees. That is why both the investigation and results of this thesis is written for the project orga-

nization at that office, and is primarily applicable there. The second audience is the sensor and supervisor reviewing this thesis. Contents and how the thesis is written is dictated by the guideline for writing a master thesis. The fact that the thesis is written for two very different audiences should in no way reduce the quality of the result for either of them. It has however resulted in some sections that are important to one reader, but not that essential to the other.

Before studying for a masters degree, the author of this thesis worked as an engineer. This previous work experience facilitated talks regarding a master thesis collaboration with AD. Possible topics were discussed during the summer months of 2015. Because of the authors particular interest in project management, and several unanswered concerns surrounding the implementation of a new PDP, this topic was chosen. Further meetings were held with the appointed supervisor in AD, before an agreement was reached regarding a research question that both the author and AD deemed to be productive.

The company providing the opportunity for writing this thesis wished to keep its anonymity. All company and informant names written about in this thesis are therefore pseudonyms.

1.1 Research questions and objectives

The aim of this master thesis is to find, understand and suggest solutions for some of the challenges with implementing the new PDP in AD. These challenges emerge because of the differences between the new and previous PDP. Work methods, organizational structure, and knowledge requirements change. These changes create issues that needs to be addressed if the new PDP is to work the way it was designed. After thorough considerations it was decided to focus on three issues:

1. What are the crucial parts of ADs development process?
2. What are the crucial outputs of ADs development process?
3. How should the outputs be measured in order to be able to decide if the project should go to the next phase of development?

These issues where then formulated into the following research question:

> What are the crucial parts and outputs of ACME Divisions development process, and how should these be measured in order to be able to decide if the project should go to the next phase of development?

Data was collected from documentation, observation and interviews. While analysing the interviews it became apparent that issue number 2 and 3 could not be given satisfying answers. The questions designed to collect data on issue 2 and 3 where given inconsistent answers that pointed to other underlying concerns. These concerns—focused on by informants—pointed to challenges that could significantly inhibit the success of the new PDP. On this basis the following additional research question was formulated, after the data was analysed:

> What are the biggest challenges when implementing the new Product Development Process in ACME Division?

Because of the lack of evidence supporting answers to issue 2 and 3, it was decided that the emerged issues would be discussed as well. The evidence collected to answer the original research question will be presented. These answers will be discussed both on the basis of the original research question and the additional one.

Because the new research question was identified after all the data was collected, there was limited time left to study existing literature on the emerged topics. Discussions of these topics are therefore focused on identifying root causes and recommending further investigation on what has been identified.

Chapter 2

Literature Review

This thesis is focusing on ADs development processes. In order to be able to evaluate this process and how it is implemented and executed, it was important to put it in to a real life context. This context is of the development process being executed within the framework of a project. Several of the theories presented in this thesis are therefore from research on project management and project portfolio management as well as NPD.

Throughout the course of data collection, analysis and writing for this thesis, literature was chosen in order to learn as much as possible regarding the emerging topics. The literature review therefore presents the most relevant theories in light of the topics in the Case Description/Analysis. The first topic that will be discussed in this chapter is the Stage-Gate® NPD process. This is done because the Stage-Gate® model is highly renowned in NPD literature and it is the model that most closely resembles the new PDP introduced in AD. The The subsequent subjects presented in this chapter are regarding project portfolio management, Effective Go/No-Go decision making and then a theory on why big projects tend to go over budge and over time. The theories are presented in this order because the the context of one theory is easier to envision it the previous section has been read.

2.1 New product development process

"A Stage-Gate® system is both a conceptual and an operational model for moving a new product from idea to launch" (Cooper, 2011, p. 44). Cooper (1990) states that companies following a multi-stage, disciplined process are more often successful in new-product development. To facilitate innovation, most companies use some sort of Stage-Gate® NPD pro-

cess made up of several stages of activities separated by decision gates (Adams, 2004; Griffin, 1997). During each stage, activities within marketing, technical, and financial are done in parallel to facilitate the discovery and solving of problems. And collect information regarding all the aspects relevant to the project, in order to build the best possible decision basis for senior management tasked with giving the project a Go/No Go at each gate.

In his frequently cited article *Stage-gate system: a new tool for managing new products* Cooper (1990) discusses why NPD projects fail, based on numbers from Cooper and Kleinschmidt (1986). The discussion focuses on three major issues. The first one is the fact that most firms were lacking a quality NPD process. Meaning the process that were present, if any, were incomplete and suffered from sloppy or under-resourced execution. The impact on performance has been found to be that, organizations hawing a detailed and formal NPD process did better, and those organizations having a NPD process in place for the longest time got the best results (Booz et al., 1982). The second issue relating to project success was market study or marketing research. A lack of market assessment was and still is (W. E. Baker & Sinkula, 2005) cited as a fundamental reason for new product failure. The third and most emphasized is that the activities that contributed the greatest towards success or failure where the early activities in the NPD process. Successful projects and quality of execution were strongly linked. The parts of the NPD process that were poorest executed and greatest in need of improvement, were initial screening, the detailed market study, and preliminary market assessment (Cooper, 1990).

Kahn, Castellion, and Griffin (2005) presents the same sentiments, stating that successful firms spend about twice as much time and money on vital front-end activities as unsuccessful firms. Best performers find the appropriate balance between technical tasks and market/business-oriented tasks. The worst performers focus on the technical side and neglect the business and marketing issues in the early phases of the project. A commonly voiced complaint is: “More homework means longer development times.” While this is certainly a valid concern, experience shows that doing the early activities properly pays for itself in improved success rates, and reduced development times (Kahn et al., 2005, p. 11).

Cooper (1990) describes the Stage-Gate® system as a solution to the problems mentioned above for the following reasons. By using quality control check points in the form of gates, the process guides the project leaders and teams towards the gate, ensuring that they know what inputs are required. These deliverables should be carefully scrutinized by the gatekeep-

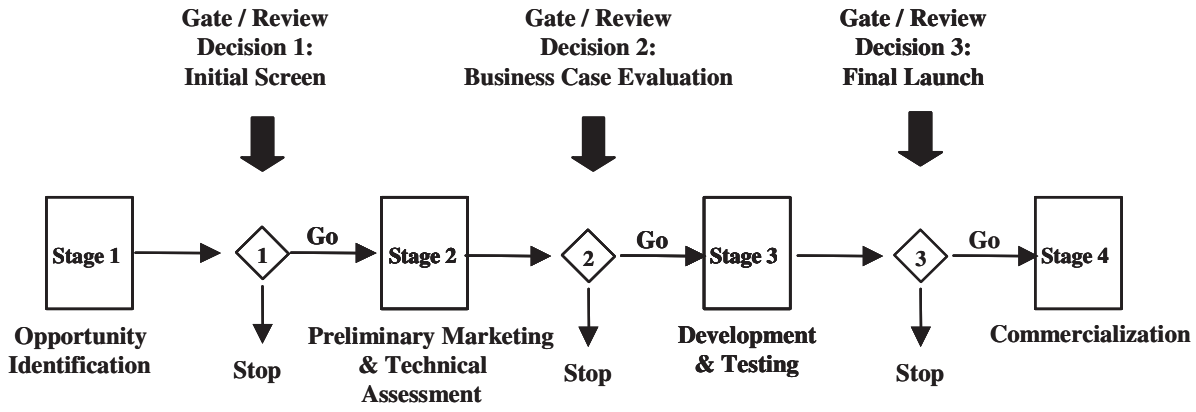

Figure 2.1.1: A typical new product development process adapted from Cooper (1990).

ers, making certain that no critical activities have been omitted or underdeveloped.

Review points, or gates, are put at several points during the project to assess the risk and project management (se example in figure 2.1.1). This subject is introduced here in a NPD process perspective and is described in detail from a portfolio management perspective in section 2.3. Cooper (2001) describes the gates as including three facets

1. *Deliverables*: Information on project progress, impediments such as technical delays, market conditions, and viability, likelihood of success.

2. *Criteria*: hurdles or metrics

3. *Decisions*

The *decisions* are made by a team of senior management from marketing, finance, Research and Development (R&D), or manufacturing. The decision being to go onto the next stage of the process, to stop prior to completion, or to hold it until more information is gathered and a better decision can be made (Cooper, 1990; Schmidt, 2004). From a strategic standpoint the gates also serve a purpose in new product portfolio management where project prioritization and allocation of resources is important (Cooper, 2001). Gates are important to insure effective NPD projects because they deliver a mechanism to control risk, and are how companies can get rid of the weaker NPD projects in order to use those resources on more promising ones. Typically, prespecified criteria are used to assess if tasks are being completed efficiently and effectively, and if projects show strong commercialization potential (Boulding, Morgan, & Staelin, 1997; Hart, Jan Hultink, Tzokas, & Commandeur, 2003). Schmidt (2004) describes this as “high-stakes bets where managers put their money on the NPD projects with the greatest potential payoff.”

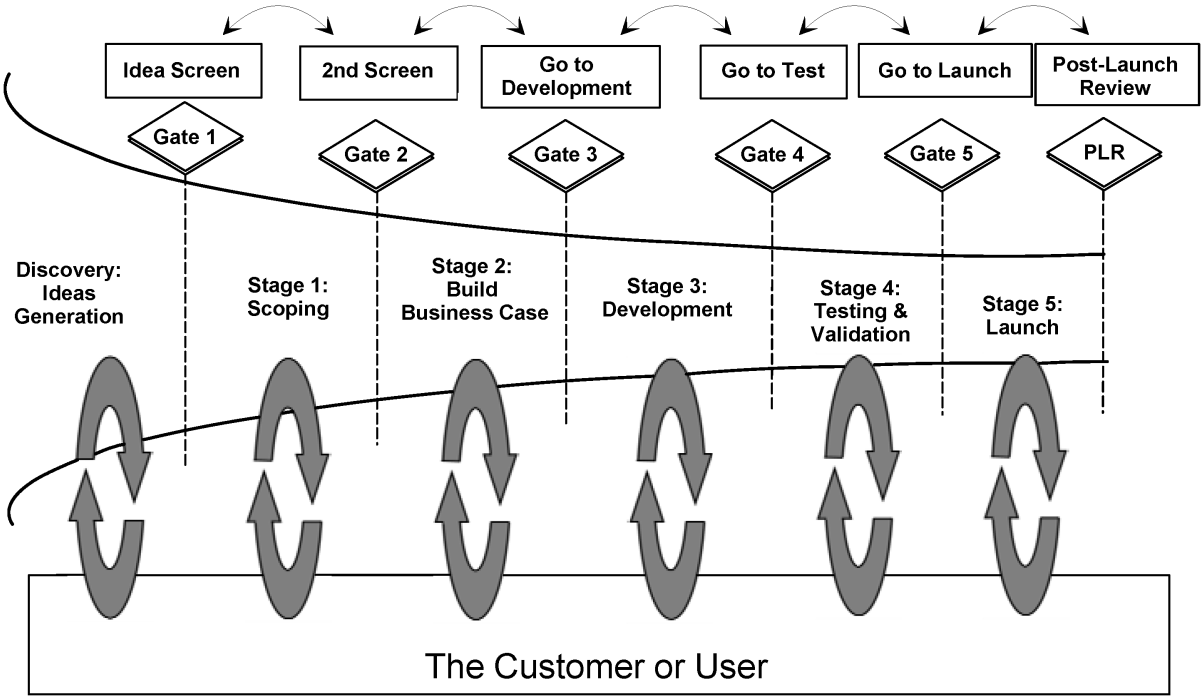

Figure 2.1.2: A spiral stage-gate system for more complex projects. Adapted from Cooper (2011).

One of the major critiques of the Stage-Gate® process is that it applies a linear model to innovation which is defined as an iterative process and is characterized by change and uncertainty, especially in the first stage of the process (MacCormack, Verganti, & Iansiti, 2001; Sætre & Brun, 2012, 2013; Verganti, 1999). In order for the process to be flexible and adaptable, so that it can be adjusted to each project, Cooper (2011) emphasizes that the process must be agile. Cooper (2011) draws attention to this flexibility, which opens for iterations back and forth between stages. This is illustrated in a new version of the Stage-Gate® system in figure 2.1.2. This system also allows execution of simultaneous, overlapping activities within and between stages, considerably reducing the project time (Cooper, 1990). Different types of innovations require different types of Stage-Gate® processes. Linear Stage-Gate® processes might be applied for incremental innovations, while a more non-linear process suits radical innovations (Miller, 2006; Nagji & Tuff, 2012). Beside product development, the Stage-Gate® system is also applicable for business development projects, new process development, and fundamental research (Cooper & Edgett, 2009, pp. 7-26).

The point of the Stage-Gate® system is to build success ingredients into the innovation process by design rather than by chance. It does this by providing an overview of the process, guide the project leader and the team, and give structure for better management and control

at senior level. It also enables efficient use of time by allowing parallel processing, as well as forcing discussions of important issues at the gates, resulting in a better project evaluation. This culminates into "better decisions, more focus, fewer failures, and faster developments" (Cooper, 1990, p. 54).

Stage-Gate® systems tend to lack the prioritizing and resource balancing needed to choose the right portfolio of projects. Organizations in a changing environment need a mix of projects that matches the external opportunities, internal limitations, and future strategy (Wheelwright & Clark, 1992). The Stage-Gate® system focuses only on the individual project and therefore needs to be coupled with portfolio management (Cooper, 2011; Cooper, Edgett, & Kleinschmidt, 2000)

2.2 New product development best practices

"Best practice firms are more likely to drive product development efforts through specific NPD strategies at both the program and project level" (Griffin, 1997, p. 431). Even though the NPD processes are a relatively recent phenomena (Cooper & Kleinschmidt, 1990; Cooper, 1990; Cooper & Kleinschmidt, 1986, 1991), there is wide consensus that it is vital to effective NPD. Since the first NPD process the focus has constantly evolved from defining an appropriate process, to assuring implementation, to more efficiently managing the up-front portion, to improving the measuring of the process, to constantly improving the process (Griffin, 1997). The following are selected from the top of the best practices, found by the Product Development & Management Associations (PDMAs) best practice studies.

There are two consistent organizational themes to the research. Number one is that it is absolutely crucial to effectively implement multi-functional teams for NPD success. Number two is that that studies have not yet been able to determine the organization and infrastructure that most efficiently supports multi-functional teams across projects over time (Henke, Krachenberg, & Lyons, 1993; Griffin, 1997).

To be able to produce successful NPD, studies consistently find that a visible top management support for NPD is vital. Especially when talking about providing enough funding, resources, and explicit consistent strategies. This includes but is not limited to having a rational process for allocating resources across projects and a properly articulated, well described and thought out strategy both for all NPD in the organization and particularity for ongoing

projects (Griffin, 1997). Barczak, Griffin, and Kahn (2009) argues that the best performing organizations have a product line planning activity and from that develop a specific strategy for each initiated project which relates the goals of the projects to the overall strategy for the product line. This also has the effect of more of their idea generation activities being strategy driven to fill specific gaps in the product line or develop it in directions that are strategically sound. NPD is strategically driven and should be so from the project level to the business-unit level to the firm level.

When a project starts from strategy such that the initiated projects are not cut later, due to not fitting with the organizations goals, then the best organizations build on that by engaging in a substantial amount of qualitative market research. Further they use more engineering design tools such as value analysis, design for X, rapid prototyping, and Six Sigma. Qualitative market research tools allow the organization to properly understand the customers unfulfilled needs, the segmentation in the market, and the permitted price premium of a differentiated product. All these measure at the start of the project helps the organization understand the market place, reducing the probability of having to reposition an already commercialized product. When considering the mentioned highly used engineering design tools, the effect help ensure that sufficient profit for the the price that can be charged, covering the cost to make the product (Barczak et al., 2009).

2.3 Project portfolio management

Portfolio management is a method of putting into action the business strategy of an organization by using a dynamic decision process on a list of active new product and R&D projects in order to have it constantly updated and revised (Cooper, Edgett, & Kleinschmidt, 1999). The portfolio management process reaches the organizations product and technology objectives by selecting projects to invest in that best utilizes its capital and people (Cooper et al., 1999, 2000, 2001). Portfolio management complements the Stage-Gate® process by focusing on all the company's projects. Together with good project execution through a Stage-Gate® process, this enables better project selection decisions thereby increasing the chances of going ahead with the best projects (Cooper et al., 2000). Portfolio management addresses the need to align the project portfolio to the strategic direction by having the right combination of short-term, more certain projects versus long-term and more uncertain projects. It

manages having too many projects for the available resources, and works to overcome the fact that ideas or projects surface unpredictably. Most companies have a tendency to underinvest in the future by not investing in uncertain projects. The overall purpose of portfolio management is to create a portfolio of projects that reflect the strategy of the organisation, while crating the highest possible return and keeping the risk at an acceptable level (Cooper et al., 1999; Cooper, 2001; Nagji & Tuff, 2012; MacMillan & McGrath, 2002).

2.3.1 Project portfolio methods

First a short history lesson. In the 1960s and 1970s, highly mathematical, techniques like dynamic, linear, and integer programming were used in portfolio selection. By maximizing a objective function constrained by resources the aim was to assemble a portfolio of both new and existing projects. This programming approach were complex and uncertain and therefore unappealing to corporate managers (N. R. Baker, 1974). Historically these mathematical portfolio approaches have provided a poor approach in encompassing risk and uncertainty; they fail to take into account interrelationships with respect to payoffs of combined utilization of resources; and they are unable to handle interrelated and multiple criteria. All of these complexities make them unproductive and perceived by managers as too difficult to understand and use (Jackson, 1983).

Today a number of product portfolio methods are in use. Several of these methods use *visual aids* to clarify complex relationships, visualize trends, make forecasts, and provide an overview of business activities through for example colourful graphs or the mapping approaches or bubble diagrams described on page 13. The effects of visual decision aids can have important implications for both decision processes and outcomes (Hutchinson, Alba, & Eisenstein, 2010; Lurie & Mason, 2007; Bettman & Kakkar, 1977). Some of the product portfolio methods are grouped and described briefly below (Cooper et al., 1999):

Financial models and financial indices. From the subject of investment analysis, tools like Net Present Value (NPV), Internal Rate of Return (IRR), payback methods and various financial ratios are used to rank or select projects (Bard, Balachandra, & Kaufmann, 1988; Matheson, Menke, & Derby, 1989) .

Probabilistic financial models. Decision-Making Software (DMS) such as add-on programs to various spreadsheets, like for example *@Risk* and *Crystal Ball* that use the *Monte Carlos Simulation* method. Or *PrecisionTree* that assist in designing decision trees and calculate Expected Net Present Value (ENPV) (Souder & Mandakovic, 1986).

Options pricing theory. This method treats each stage of the NPD like purchasing an option on a future investment (Faulkner, 1996; Luehrman, 1997)

Strategic approaches. In this method the selection of projects to be encompassed into the portfolio is driven by the organizations business strategy. This decides the division of resources between the selection of categories. For example divided into types of projects, markets, or product lines, creating strategic collections (Cooper, Edgett, & Kleinschmidt, 1997). Strategic consideration are the main factors taken into account when deciding to go ahead or stop projects.

Scoring models and checklists. These models rate and score projects on a variety of qualitative questions. The resulting scores can be used as criterion for project prioritization (D. L. Hall & Nauda, 1990; Roussel, Saad, & Erickson, 1991; Yorke & Droussiotis, 1994). These questions often capture important reasons regarding a new products success. For example product advantage, leverage with core competencies, market attractiveness, familiarity, etc. (Cooper, 1996; Montoya-Weiss & Calantone, 1994)

Analytical hierarchy approaches. By using voting software and hardware in the form of, for example, hand-held wireless voting machines coupled with software and a projector, a management team can quickly and visually use these decision tools. Models such as *Expert choice* gives a team of managers the ability to choose the preferred projects for the portfolio (Zahedi, 1986). The models are based on paired comparisons of both projects and criteria.

Behavioural approaches. Methods such as *Delphi* and *Q-Sort* are tools meant to create a consensus between managers faced with a pool of project where only some can be undertaken (Lilien & Kotler, 1983; Souder & Mandakovic, 1986). These models are especially useful in the early stages of the project where information is scarcely available.

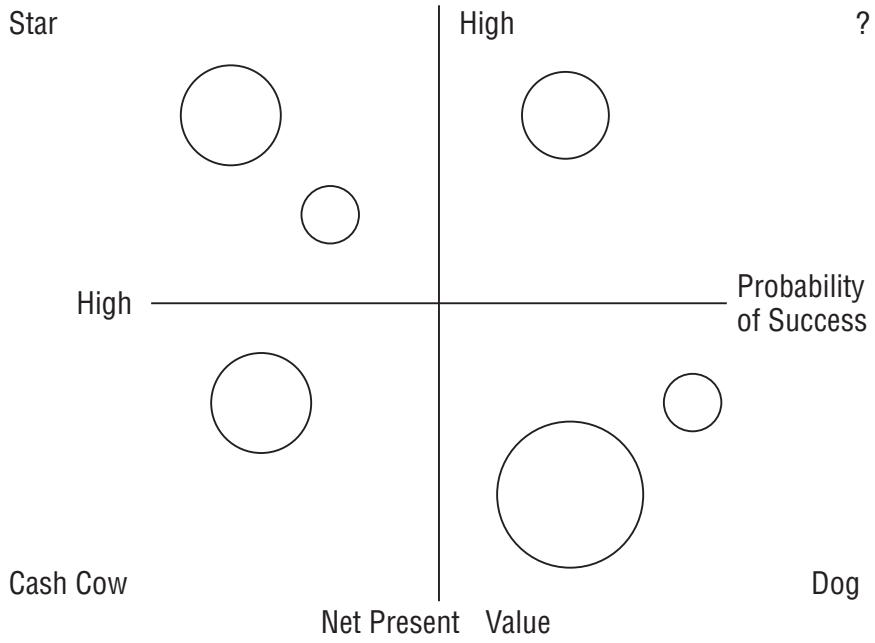

Figure 2.3.1: BCG Products/Services Matrix (Wysocki, 2014, p. 599).

Mapping approaches or bubble diagrams. Originating from the Boston Consulting Group (BCG) portfolio models and the GE/McKinsey model, that were conceived to divide resources between business units in an organization. The new product mapping models are essentially extensions of these. By using the bubble diagram format to plot parameters such as Ease-of-Undertaking versus Project-Attractiveness or Reward versus Probability-of-Success (see example in figure 2.3.1), management can gain a clearer overview of the projects to choose from (Matheson et al., 1989; Roussel et al., 1991).

2.3.2 Best case use of portfolio management

Overall Cooper et al. (1999) found that financial models are used the most overall, but they *do not yield* satisfying results. They choose too many projects for the available resources, produce portfolios with poor-value projects, and congestion in the development pipeline. Next in popularity are the strategic approaches followed by scoring models. These produce much better portfolios in terms of portfolios having good balance of projects, the right number of projects, gridlock, spending reflecting business strategy, high-value portfolio, and alignment with business objectives. The best performing organizations were characterized by a management that viewed portfolio management as *very important* regardless of functional area. They have an *established explicit*, and *formal method* for portfolio management. By

using *well-defined rules* and procedures they achieve procedures for portfolio management that are very clear, and *consistently applied* to all appropriate projects, and they treat *all projects together* as a portfolio. Management also consistently *buy into* the methods. Lastly these best performing organizations tend to use *multiple portfolio methods*. They combine strategic approaches with bubble diagrams; strategic and financial approaches; and financial, scoring models, and strategic tools together. Cooper et al. (1999) also argues that even if top management does not completely buy into the process, the situation still yields relative positive results. "If you have implemented a solid, high-quality portfolio process but continue to see management resistance, do not give up" (Cooper et al., 1999).

2.4 Effective Go/No-go decision making

"If businesses are to survive and prosper, managers must become astute at selecting new product winners, and at effectively managing the process from idea to launch" (Cooper & Kleinschmidt, 1987). This quote outlines the significance of knowledge regarding the pool of criteria used by management to safeguard the success of NPD projects. In this section the three most commonly used criteria separated by six evaluation gates are discussed. Then the criterion are pooled into evaluation dimensions in order to evaluate if some dimensions are preferred at different gates over others.

In a study by Hart et al. (2003), seven models of the NPD process were compared (Booz et al., 1982; Cooper, 1990; Cooper & Kleinschmidt, 1986; C. M. Crawford, 1980; Hultink & Robben, 1995; Narver John & Slater Stanley, 1990; Takeuchi & Nonaka, 1986) resulting in the selection of six distinct evaluation gates. The following is what Hart et al. (2003) found to be the three most commonly used criteria at the different gates.

Idea screening. Because of the large uncertainties and missing relevant or valid information at this point in the project, intuition is one of the most frequently used criterion for idea screening. While the most frequently used criterion for screening purposes is technical feasibility. Additionally, market potential and product uniqueness are looked into. This indicates a balanced approach by most firms at this early stage, since both market and technical parts of the new idea is evaluated.

Concept screening. At this gate the most frequently used criterion are customer acceptance, product performance, and technical feasibility. While some organizations test the market potential, very few use any of the financial criteria in any of the first two gates.

Business analysis. After this point in the NPD process, large investments are needed ot go on with the project. This leads to the need for a forecast of the sales and profit levels for the proposed new product. Sales criteria, for example sales in units, are therefore used instead of product-level criteria. Market potential is also investigated heavily, because of the link between sales and market potential. Some organizations also evaluated the product's margin.

Product testing. To prevent products that do not perform in a technical sense as expected, it is critical to check if the new product meets its technical objectives. The most used criteria at this point in the development are therefore concerned with product performance and quality. Additionally the expenses are looked into, to measure whether the development is within the constraints of the budget at this gate.

Analyze test market results. After this stage in the process, most organizations measure the performance and quality of the new product again. Customer reactions to the new producted are also collected and evaluated. The comparison between technical aspects and customer acceptance and satisfaction produces checks to see if the number of potential customers who might buy and use the product was overestimated. In other words, there simply was not a widespread need for the product.

Post-launch evaluation. The criteria measured at this gate are customer acceptance, customer satisfaction, and sales levels. These are chosen because this first gate where it becomes clear whether the new product becomes a success or a failure. The sales numbers will show if the investment will make a profit. At this stage it will also be clear if the new product will get a positive or negative reputation based on customer satisfaction.

In summary, the technical feasibility, intuition and market potential criteria are focused on at the earliest stages of the NPD process, and the product performance, quality, and staying within the development budget criteria are considered important when the product development is finished. The focus after the market launch was considerations regarding cus-

Market Acceptance	**Financial Performance**
Customer acceptance	Break-even time
Customer satisfaction	Attain margin goals
Met revenue goals	Attain profitability goals
Revenue growth	IRR/ROI
Met market share goals	
Met unit sales goals	
Product performance	**Additional criteria**
Development cost	Product uniqueness
Launched on time	Market potential
Product performance	Marketing chanceevel
Met quality guideline	Technical feasibilitys
Speed to market	Intuition

Table 2.4.1: Gate evaluation criteria dimensions

tomer acceptance and satisfaction as well as unit sales. Lastly, the market acceptance dimension permeates the whole NPD process, only to get more focus after the launch of the product.

To show that some kinds of criteria are preferred at different gates over others, the criteria are split into four dimensions and displayed in table 2.4.1. The first three are defined by Griffin and Page (1993), while the last is defined by Hart et al. (2003) researching Balachandra (1984), Craig and Hart (1992), Feldman and Page (1984), Kotler (1991), Rochford and Rudelius (1992)

Hart et al. (2003) found that the market acceptance dimension is used throughout the NPD process in addition to being prioritized even more towards the end of the process (as seen in figure 2.4.1). Carbonell-Foulquié, Munuera-Alemán, and Rodrıguez-Escudero (2004) get the same result claiming that this also accounts for the high level of success in the projects from that study. Since research by Henard and Szymanski (2001) on success factors contends that a strong customer orientation and a superior new product are highly correlated with the success of new products. Schmidt, Sarangee, and Montoya (2009) also concurs, finding that proficiency of utilizing marketing criteria was associated with product performance. This is also in consensus with marketing theory witch always has advocated in favour of a focus on the customers needs (Moenaert & Souder, 1990). Hart et al. (2003) also claims that since the market acceptance dimension permeates the entire NPD process, this indicates that organizations attempt to take advantage of the information given by customer and market orien-

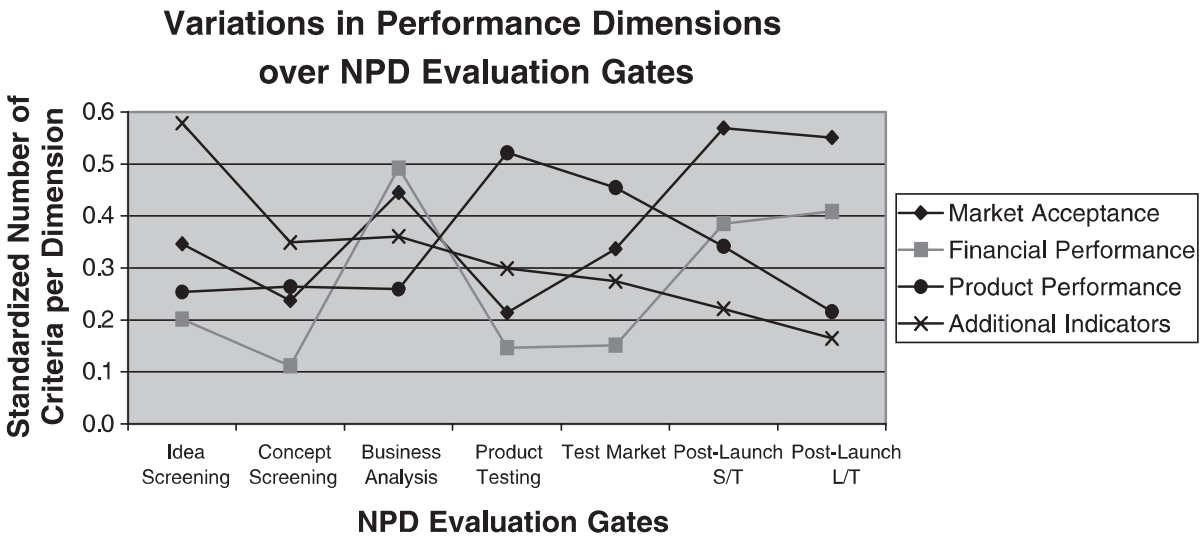

Figure 2.4.1: Relative use of evaluative dimensions over NPD gates (Hart, Jan Hultink, Tzokas, & Commandeur, 2003, p. 33).

tation.

Figure 2.4.1 from Hart et al. (2003) also show the financial dimension emerging in the business analysis gate and the post-launch gates. Carbonell-Foulquié et al. (2004) agreas, stating that financial performance increases in importance at the latter stages of the NPD process. Hart et al. (2003) claims that the use of these criteria may assist management in assessing efficiency and effectiveness in the organizations projects. And help in identifying if extra capital, additional support or a strategy where discontinuing to release resources in favour of other NPD projects may be the correct choice of action.

The product performance evaluative dimension is mostly used in the product and market testing gates (Hart et al., 2003; Carbonell-Foulquié et al., 2004; Ronkainen, 1985). This Hart et al. (2003) suggests is a reflection of managements attempt to avoid wrongly givning the green light to the launch of products that are destined to not perform in a technical sense as expected, or products that don't have an overestimated potential number of customers.

The additional criteria from Hart et al. (2003) were found to be especially used in the idea-screening gate. Hart et al. (2003) argues that the consideration of product uniqueness, market potential, and technical feasibility early in the NPD project represents an inclination towards following a balanced yet interconnected approach to NPD projects.

2.4.1 Project termination

One of the most serious decisions managers and their teams have to make are project terminations (Balachandra, Brockhoff, & Pearson, 1996). Managers who sincerely believed or still believe that the project could still end up producing good result, get frustrated. This frustration, psychological commitment and investment in a losing course of action they chose produces a reluctance to terminate underperforming NPD projects (Brockner & Rubin, 1985; Staw, 1976; Teger, 1980). In the perspective of NPD, this phenomenon has been named *escalation bias* and described extensively in several studies (Biyalogorsky, Boulding, & Staelin, 2006; Boulding et al., 1997; Schmidt & Calantone, 1998). Although several efforts to provide managers with tools to intervene and prevent escalation bias (Heath, 1995; Simonson & Staw, 1992; Staw, 1976), escalation remains a big problem and cost for individuals (Murnighan, 2002), and organizations (Hietala, Kaplan, & Robinson, 2003).

To reduce managers' escalation of commitment in an NPD setting Biyalogorsky et al. (2006) suggests altering the organizational structure in such a way that go/no-go decisions are made by someone that does not have prior experience with the project. Behrens and Ernst (2014) agrees and adds that obtaining advice from an external consultant that can act as someone that has not been involved in the project development, might be an effective approach to lover the chances of managers committing to a project destined to fail (Kadous & Sedor, 2004; Perkmann & Walsh, 2008). In fact, Behrens and Ernst (2014) study showed that managers were the most inclined to terminate an NPD project that was underperforming if both *visual aids* and consultants advise was used simultaneously (all else being equal). And had strong indicators that these aids were most effective in reducing escalation bias when used before the NPD project was commercialized.

Another way to reduce the probability of escalation bias comes from Ku (2008). This study found that getting decisionmakers to experience post-escalation regret might work as an decision-making intervention. Even more effect was found in participants who experienced two escalation situations, making it possible that this could provide plenty of regret that decisionmakers could learn from. The problem with this solution is that, actually escalating and then experiencing regret could potentially be both dangerous and costly. Luckily Ku (2008) also found that "imagining escalation-related regret shortly before a critical decision" might reduce the probability of decision bias.

2.5 Over budget, over time, over and over again

Several surveys done between 1987 and 2008 found that major projects had cost overruns nine out of ten times. Within these, cost overruns of 50% to 100% were common, and overruns of more than 100% were not uncommon. Looking at the demand and benefit side of the projects showed that estimates were typically off by 20% to 70% when comparing to actual developments (Altshuler & Luberoff, 2003; Flyvbjerg, Bruzelius, & Rothengatter, 2003; Morris & Hough, 1987; Priemus, Flyvbjerg, & van Wee, 2008).

The major projects talked about in this section are characterised by being inherently risky because of complex interfaces and long planning horizons. There are multiple management, decision makers and planners involved with conflicting interests. Technology and designs involved in the projects are often non-standard. The projects often overcommit to a certain concept early, leaving alternate analysis weak or absent. Principal-agent problems are common do to the large sums of money involved. Scope or ambition level in these projects typically change a lot over time. These changes are often not accounted for in time and budget contingencies. Misinformation about costs, schedules, benefits, and risks is therefore seen as the norm within project development and decision-making. Ultimately these characteristics culminate in cost overruns and benefit shortfalls that undermine the projects viability (Flyvbjerg, 2011).

2.5.1 Distinguishing between causes and root causes

Flyvbjerg (2011) distinguishes between causes and root causes when explaining the cost overruns, benefit shortfalls, and delays in major projects. Root causes are identified as the fact that in these projects, the people articulationg the plan tend to systematically underestimate and even ignore risks of complexity, scope changes, etc. (Flyvbjerg, Garbuio, & Lovallo, 2009). Flyvbjerg (2011) identifies these specific underperformance issues as results of optimism on the part of the planer. Similarly Staw and Ross (1978) argue that escalated commitment and lock in are not root causes, even though they are listed as causes of underperformance in many projects. The risk of these phenomena in major projects is so big that according to Flyvbjerg (2011), they should always be considered when planing the project, and the real root cause of underperformance is that these phenomena are ignored.

Flyvbjerg et al. (2009) groups the underlying causes of project underperformance into

three categories: (1) bad luck or error; (2) optimism bias; and (3) strategic misrepresentation. The first of these explanations in terms of bad luck or error is disregarded because, according to Flyvbjerg, Holm, and Buhl (2002, 2004) the explanation did not fit the data.

> It is not so-called estimation "errors" or their causes that need explaining. It is the fact that, deliberately or not, in the vast majority of projects, risks of scope changes, high complexity, unexpected geological features, etc. are systematically underestimated during project preparation, resulting in underestimated costs and overestimated benefits (Flyvbjerg, 2011, p. 324).

Flyvbjerg (2011) agrees with proponents of conventional explanations that argue the impossibility of predicting exactly which scope change or complexity will happen, but emphasizes that it is possible to predict the risk. And that this risk should be accounted for in estimating costs, but are typically overlooked.

Optimism bias is the second underlying cause of project underperformance. This cause is due to managers falling victim to the "planning fallacy" (Buehler, Griffin, & Ross, 1994). When this happens, managers base their decisions on delusional optimism in stead of rational weighting of gains, losses, and probabilities. They underestimate cost and time as well as overestimating benefits. They overlook the potential for miscalculations and mistakes and involuntarily focus only on success scenarios. The end results are initiatives that most likely will not deliver on budget or time as well as expected return. The inside view in planning is often the end result of these biases (Kahneman & Lovallo, 1993). When taking the inside view, managers focus closely on the particular task, by extrapolating current trends, by constructing scenarios of future progress, and by considering the plan and the obstacles to its completion. The two cognitive delusions, planning fallacy and anchoring are facilitated by the inside view. Managers are often victims of the planning fallacy when estimating the outcomes of risky projects. This is defined in psychology as the tendency to under estimate task completion times and costs, even when knowing that the vast majority of similar tasks have gone over budget and run late (Kahneman & Tversky, 1979; Lovallo & Kahneman, 2003).

Another consequence of the inside view is anchoring and adjustment, which in turn leads to optimistic forecasts (Tversky & Kahneman, 1974). Anchoring on plans is considered one of the most sturdy judgement biases. It is characterised by the "anchor", which serves as the first number that is considered as a possible answer. The anchor in major projects is the plan. This plan is almost always considered to be a "realistic" case, developed based on

the principle that everything goes according to plan. Events often contribute to unforeseen costs beyond the this plan. Executives know this and generally attempt to build a contingency fund that compliments the size of the project. Comparing these contingency funds to actual cost overruns shows that the adjustments are significantly inadequate. These initial estimates also serve as an anchor for estimates in later stages, further inhibiting sufficient adjustments to the projects real performance (Flyvbjerg et al., 2003).

Flyvbjerg (2011) argues that, because the persons who estimate cost and benefits are often experienced professionals who would have had to do the same mistakes for decade after decade without learning, optimism bias is not the complete answer. Strategic misrepresentation represents the second explanatory model for underperformance in projects. This accounts for political pressures and agency issues. Focusing on political pressures Flyvbjerg (2011) describes strategic misrepresentation as the second root cause of project underperformance, accounting for what optimism bias could not.

Flyvbjerg et al. (2002, 2005) and Wachs (1989, 1990) set forth a model where, planners, politicians, or project champions strategically and deliberately underestimate costs and overestimate benefits in order to increase the probability of their projects gaining funding and approval over their competitions. This involves purposely making scenarios of success while hiding the potential for failure. This inevitable leads to managers proposing projects the cant possibly reach budget, time and benefit goals. Strategic misrepresentation's are a product of political and organizational pressures, for example jockeying for position and competition for scarce resources. This kind of behaviour can therefore be seen as very rational. Wachs (1986, 1990) found that in order to gain funding and approval for projects, forecasters and promoter use the following formula:

$$\text{Underestimated costs} + \text{Overestimated benefits} = \text{Project approval}$$

This formula leads to implementation of the projects that have been made to look best on paper, not the projects that should have been implemented.

2.5.2 How to avoid optimism bias

To solve the problem of optimism bias and strategic misrepresentation Flyvbjerg (2011) first distinguishes between: project managers that would like to get estimates correct and project

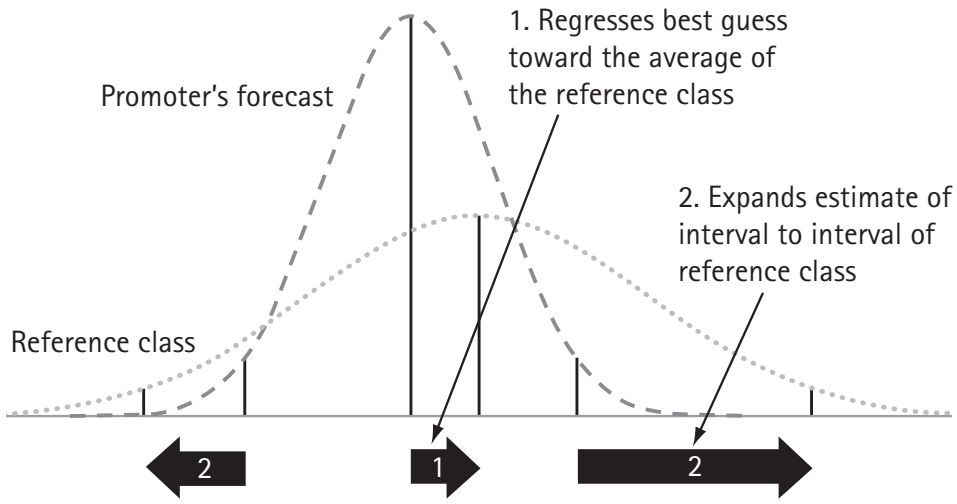

Figure 2.5.1: What reference class forecasting does, in statisticians language (Flyvbjerg, 2011, p. 332).

managers that de-prioritize correct estimates as a means to start the project.

In the situation where the project mangers prioretizes getting the estimates correct, Kahneman (1994), Kahneman and Tversky (1979)has developed a model called “reference class forecasting” based on the “outside view” of the forecasted project. The outside view locates the project in a probability distribution based on outcomes from similar projects. The following steps are required when doing reference class forecasting of a project: (1) Identifying relevant past projects. These projects must form a class that is narrow enough to be comparable with the project in mind, but still broad enough to be statistically meaningful. (2) Establishing a probability distribution based on the selected reference class. Credible empirical data is required from enough projects from the reference class to draw meaningful conclusion. (3) The most likely outcome for the project can then be established by comparing the project with the reference class distribution. What reference class forecasting does is illustrated in figure 2.5.1. The first thing that is done in reference class forecasting is to regress the promoter’s (indicated by the dashed curve) forecast towards the average of the reference class (indicated by the dotted curve). The second thing done by reference class forecasting is to expand the estimate of the interval in the promoter’s forecast to that of the reference class (Flyvbjerg, 2011).

The biggest advantage of the outside view is when planning a project that has not been attempted before by the project manager and mangers involved. A good example of this kind of project is launching a completely new product to the market. These kind of projects

carry very large uncertainties which further increases the likelihood of optimism biases and strategic misrepresentation. By using a reference class forecast, managers and clients will be shown the common situation of how the project will perform if it performs like the reference class projects. This outcome may not be good enough for stakeholders. In this case the task becomes to devise a strategy to prevent the same shortfalls of reference class projects from happening again, as well as providing contingencies for delays, cost overruns, and benefit shortfalls (Flyvbjerg, 2011).

2.5.3 How to avoid strategic misrepresentation

In this section the situation where the project managers de-prioritize correct estimates as a means to start the project. Priorities are put towards getting the projects funded. In this situation an accurate estimation of the projects cost, time and benefits may not be the most effective means of achieving the objective. Biased forecasts might be the most effective way of competing for funds and approvals, while accurate forecasts might be counterproductive (Wachs, 1989).

In this situation Flyvbjerg (2011) argues that the way to reduce inaccuracy and risk in forecasting is a matter of imposing checks and balances on project managers, meant to give them the incentive to start producing unbiased forecasts. This can be done by changing the power relations that govern forecasting and project development. Focusing on institutional and organizational change, and instituting transparency and accountability is important. Appealing to ethics and suggesting better forecasting techniques will not solve this situation.

Chapter 3

Methodology

This chapter endeavours to describe the plan and strategies followed throughout this study. The research plan in table 3.0.2 is based on recommendations from Eisenhardt (1989), Yin (2003) and is comprised of the overall activities conducted throughout, displayed in chronological order. Table 3.0.1 is a summary of the strategies and designs used to form this thesis. The contents of this table is explained and justified throughout the following chapter in an attempt to maximize the validity and reproducibility of the research (Yin, 2003).

3.1 Research strategy

The most important part of a research study is defining the research question. When choosing a research strategy the most important aspect is to identify the type of research question that is being asked (Yin, 2003). According to Yin (2003), the choice of research strategy depends on three conditions:

1. The type of research question.
2. The control an investiagator has over actual behavioral events.
3. The focus on contemporary as opposed to historical phenomena.

The research question posed for this thesis is:

> *What are the crucial parts and outputs of ACME Divisions development process, and how should these be measured in order to be able to decide if the project should go to the next phase of development?*

Section		Research methods
3.1	Research strategy	– Case study encompassing a survey as recommended by Yin (2003)
3.2	Research design	– Case study design adaptation of Eisenhardt (1989)
3.4	Data collection procedure	– Interviews, observation and studying documents
3.5	Quality control strategy	– Case study tactics adapted from Yin (2003)
3.6	Analytic strategy	– Data analysis process adapted from Powel-Taylor and Renner (2003)
3.7	Write up strategy	– Write up priorities adapted from Drisko (2005)

Table 3.0.1: Methods applied in this master thesis

Steps	Activities		
1	Defining the research question		
2	Literature review	Write up	
3			Defining methodology
4			Gathering data
5			Data analysis

Table 3.0.2: Research plan

This research question is made up of three parts:

1. What are the crucial parts of ADs development process?
2. What are the crucial outputs of ADs development process?
3. How should the outputs be measured in order to be able to decide if the project should go to the next phase of development?

The second research question posed as a result of the analysis is:

> *What are the biggest challenges when implementing the new Product Development Process in ACME Division?*

Using table 3.1.1 a strategy can be identified from these three questions. The two first parts are "what" questions trying to explain contemporary and historical events, that the author does not have any control over. These questions seek to identify the crucial parts and outputs that will lead to a greater number of successful projects. This is identified from the experience of AD employees as well as from existing literature. Yin (2003) argues that this type of question likely favours a survey or archival analysis. The last part of the research question is a "how" question that tries to identify the methods from existing literature that best suites ADs development projects. This is then a "how" question studying contemporary events that the author has no control over. Yin (2003) discusses that in general, a case study design is the preferred strategy for such a "explanatory" kind of question. The case study method is also unique in that it is able to deal with evidence from documents, interviews, and observations. The

The boundaries between the strategies in table 3.1.1 are largely overlapped, even though the strategies have their own distinct characteristics. When choosing a strategy the aim is therefore to avoid huge misfits where another strategy is more advantageous than the one used (Yin, 2003).

Based on the arguments above, the chosen research strategy became a case study encompassing a survey. The template for the case study design followed throughout this thesis was that of Eisenhardt (1989). This design describes how to induct theory using case studies, all the way from specifying the research question to reaching closure.

The research question identified during the analysis is also a "what" question. This question endeavours to identify and describe the biggest challenges surrounding the implementation of a new PDP. Growing out of the analysis of the interviews this question answers for

Strategy	Form of research question	Requires control of behavioral events?	Focuses on contemporary events?
Experiment	How, why?	Yes	Yes
Survey	Who, what, where, how many, how much?	No	Yes
Archival analysis	Who, what, where, how many, how much?	No	Yes/No
History	How, why?	No	No
Case study	How, why?	No	Yes

Table 3.1.1: Relevant situations for different research strategies (Yin, 2003, p. 5).

this question are based on the same interviews and complemented by theory. The type of question made it natural to continue with the original research strategy and research design.

3.2 Research design

The purpose of the Eisenhardt (1989) case design is to guide the user in developing theory from case study research. Eisenhardt (1989) claims that research done using this case design is likely to have important strengths like novelty, testability, and empirical validity, which arise from the intimate linkage with empirical evidence. While retaining most of it, the design was adapted to the specifications of this study and described in table 3.1.2.

The Eisenhardt (1989) case study design is highly iterative and tightly linked to data. It is this link that permits the development of a testable, relevant, and valid theory. Specifically this design starts by defining the research question in “broad terms”. This is done to focus the research and avoid being overwhelmed by huge volumes of data. The definition of a research question also permits the selection of data sources as well as what kind of data that should be gathered. In this thesis, the research question guided the choice of data sources towards people in ADs organization that had prior knowledge about product development processes. When the data was acquired, the research question helped sift out relevant information. The design also recognizes that the research question is tentative. Throughout the course of this study the research question has shifted in parallel with discovering new information (Eisenhardt, 1989).

Step	Activity	Reason
Getting Started	Definition of research question Possibly a priori constructs	– Focus efforts – Provides better grounding of construct measures
Selecting Cases	Neither theory nor hypotheses Specified population Theoretical, not random sampling	– Retains theoretical flexibility – Constrains extraneous variation and sharpens external validity – Focuses efforts on theoretically useful cases i.e., those that replicate or extend theory by filling conceptual categories
Crafting Instruments and Protocols	Multiple data collection methods Qualitative data from multiple sources	– Strengthens grounding of theory by triangulation of evidence – Synergistic view of evidence
Entering the Field	Overlap data collection and analysis including field notes Flexible and opportunistic data collection methods	– Speeds analyses and reveals helpful adjustments to data collection – Allows investigators to take advantage of emergent themes and unique case features
Analyzing Data	Within-case analysis Cross-case pattern search using divergent techniques	– Gains familiarity with data and preliminary theory generation – Forces investigators to look beyond initial impressions and see evidence thru multiple lenses
Shaping Hypotheses	Iterative tabulation of evidence for each construct Replication, not sampling, logic across cases Search evidence for "why" behind relationships	– Sharpens construct definition, validity, and measurability – Confirms, extends, and sharpens theory – Builds internal validity
Enfolding Literature	Comparison with conflicting literature Comparison with similar literature	– Builds internal validity, raises theoretical level, and sharpens construct definitions – Sharpens generalisability, improves construct definition and raises theoretical level
Reaching Closure	Theoretical saturation when possible	– Ends process when marginal improvement becomes small

Table 3.1.2: Process of building theory from case study research, adapted from Eisenhardt (1989) by removing "multiple investigators" to adapt the model to this study.

Eisenhardt (1989, p. 537) argues that the "selection of an appropriate population controls extraneous variation and helps to define the limits for generalizing the findings". This kind of research relies on cases that are chosen for theoretical reasons to fill theoretical categories, as well as provide examples of polar types. Pettigrew (1990, p. 275) gives the rule, "go for extreme situations, critical incidents and social dramas". Thus the goal of data collection for this thesis became to choose a population within AD that was familiar or responsible for, a part of a development process. More on how the data collection was done is described in section 3.4.

The central idea in shaping hypotheses throughout this highly iterative process is that the researcher constantly compares theory and data. Throughout this comparison, sharpening hypotheses is a two-part process:

1. Refining the definition of the construct.

2. Building evidence which measures the construct in each case.

The second step when shaping hypotheses is verifying that the relationships that are emerging between constructs correspond with the evidence collected from each case. Hypotheses in this thesis were either confirmed by the evidence, or dis-confirmed and discarded because of the evidence. It is important to note that each hypothesis is examined for each case. This replication logic enhances confidence in the validity of the relationships in the cases that confirm. Cases often provide a understanding of the underlying questions of "why" it is happening. In cases where the relationships are dis-confirmed, an opportunity is presented to extend and refine the theory (Eisenhardt, 1989).

Linking results to the literature is particularly crucial because findings rest on a limited number of cases. Considering a broad rang of literature is an important part of the process. Conflicting literature must be addressed in order to uphold confidence in the findings. The opportunity to gain deeper insight by this conflict must be utilized. Comparison to literature with similar findings can create links to other phenomena, and enhance the validity, generalizability, and theoretical level of the emerging theory (Eisenhardt, 1989).

Reaching closure in research consists of two important issues. The first one is when to stop adding cases. This should ideally happen when theoretical saturation is reached. The second issue is when to stop comparing theory and data. The iteration process should stop when minimal improvement can be further made to the theory. In practice as well as for this thesis, both of these issues are dictated by time and money (Eisenhardt, 1989).

3.3 Literature review

"Budding investigators think that the purpose of a literature review is to determine the answers about what is known on a topic; in contrast, experienced investigators review previous research to develop sharper and more insightful questions about the topic" (Yin, 2003, p. 9). The majority of the literature search was guided by the initial research question and the collected data. Linking the findings to existing literature improves the validity and generalizability of case study research (Eisenhardt, 1989). Starting on Google scholar with the topics: *crucial parts of NPD*, *measuring NPD processes* and *Go/no-go decision making in NPD*, gave a general overview and a feeling for the amount of publications available. These topics lead to well cited publications that further gave insights into which author were the leading researchers in the respective fields. From this search literature that gave the impression of being relevant from reading the title and abstract where further scanned by reading the introduction and conclusion. The most relevant articles have been read through while taking notes, writing summaries or noted in mindmaps.

In searching for specific literature, the university library at UiS both on campus and online was very useful. In particular, academic databases such as business source complete. Relevant books and articles have also been suggested by other students as well as academic supervisors.

Eisenhardt (1989) states that "the accumulation of knowledge involves a continual cycling between theory and data." The literature review for this thesis has been conducted in parallel with all the other parts of the work. This resulted in both similar and conflicting literature being researched. Eisenhardt (1989, p. 544) claims that: "The juxtaposition of conflicting results forces researchers into a more creative, frame-breaking mode of thinking than they might otherwise be able to achieve". By focusing on "keeping an open mind", the literature search for this thesis gained a wider understanding of the relevant topics.

A very important part of theory building is comparing the emerging concepts with a broad range of the existent literature (Eisenhardt, 1989). The theory in this thesis has mainly been taken from research on NPD processes and portfolio management methods. Both of these fields are well researched, resulting in a broad range of articles to choose from, thus at a given point it was necessary to limit the search. These limits were restricted the research question and time to submission running out.

3.4 Data collection

Of the six sources of evidence, most common in case study research (Yin, 2003), three are used in the data collection for this thesis. The main data source being interviews supported by documentation and participant-observation. E-mails and phone calls have also been used to clarify interviews, and ask follow up questions.

Van Maanen (1988) describes field notes as "an ongoing stream-of-consciousness commentary about what is happening in the research, involving both observation and analysis". In order to capture all relevant observations from project meetings, more notes were taken than seemed relevant at the time. During this note taking a special effort was taken to reflect on why this note was relevant to solving the research question (Eisenhardt, 1989). All the notes from meetings during the data collection for this thesis were done using a mindmap tool. This tool allowed for several easy ways to rearrange, cluster, annotate and highlight notes after meetings. During the analysis this made for a much easier recollection off the important points from that meeting, while still being able to find the notes that were not thought to be important at the time.

Eisenhardt (1989) describes "flexible data collection" as a "feature of theory building case research" because it gives the research the freedom to adjust the data collection process by adding cases as they emerge. All of the data collection for this thesis was done at ADs offices. This gave the opportunity to join project meetings and ask questions as opportunities arose. While a considerable time was spent in that office, it was limited by other matters needing the authors attention. Several of the meetings that could have been attended for data collection was therefore missed. Because of this, special care was taken to get as much data from the interviews as possible.

3.4.1 Interviews

"If all the problems of question wording could be traced to a single source, their common origin would probably prove to be in taking too much for granted" (Stanley, 1951, p. 16). All of the 7 interviews were arranged and conducted by the author during the month of April 2016, at ADs offices. Detailed field notes were written during the interviews, using software that records and keeps track of what notes were taken at what time during the recording. This made it possible to replay the interviews, and see the notes being taken unfold throughout

the recording. All of the interviews where conducted in Norwegian. To ensure as much relevant data as possible, the interview subjects were chosen among ADs project owners, project leaders as well as other employees with knowledge or experience with ADs past and current NPD process.

As described in section 3.6 Data analysis, part of the research strategy was to search for patterns within the case and use triangulation to increase the validity of the study. One step towards this goal was to ensure that all the interviews where conducted in the same format. To ensure this an interview guide was created as a template.

The interview guide included in appendix A (in Norwegian), ensures that the interview objective is properly identified, and understands the conditions and frames within which the interview will be held. It includes the research question and an description of the purpose of the thesis, as well as who commissioned it. This was done to insure that both the interviewer and the interviewee had the same understanding of why the interview was conducted.

The interview guide further includes a guarantee of anonymity, to give the interviewees the freedom to answer without any thought of future effect. Because of the small number of people interviewed, special measures were taken to uphold that anonymity. There has not been included a listing of interviewees with their attached competencies and involvements. The quotations both in the Case Description/Analysis and the Empiri appendix have been transcribed to remove dialects and personal expression while still staying true to the original meaning.

Lastly the interview guide contains the questions that each interviewee was asked. To allow for a semi-structured interview, the questions are structured into three open questions rooted directly in the research questions. These questions where meant to cover the survey part of the research strategy. Each of these three main questions include several follow-up questions to uncover underlying causes and guide the answers towards relevant topics. But as far as possible it was emphasized that the interviewee should be allowed to answer freely. This method opens up for taking advantage of the unpredictable opportunities of the interview, in order to follow the opportunities as they present themselves (McCracken, 1988).

Fontana and Frey (1994) describes the importance of understanding the language and culture of the respondents. The author of this thesis has experience working with AD, and has a good understanding of the company culture and technical language in AD. The former affiliation with AD was also important in gaining access to the relevant interview objects, as

these could be ensured that the author had a baseline understanding of the business and marked situation AD is in. However, this same line of arguments can also be interpreted as a bias, which is discussed in section 3.5.4.

3.4.2 Observations

A limited but great supplement to the other data was collected while observing in project meetings. This activity was limited by the amount of time the author could spend at the AD office. Particularly meetings concerning the implementation of a NPD project. The data collection had to be opportunistic because project meetings could not be scheduled to the authors convenience. Eisenhardt (1989) argues that since the goal of the research is to gain an understanding of the subject matter. It makes sense to take advantage of opportunities as they arise, if that opportunity contains data that might better ground the theory or provide further insight. Together with the interviews, and the documentation, these observations also provided the ability to triangulate on some of the topics (Yin, 2003).

3.4.3 Documentation

The documentation used in this study was sourced from ADs databases and public website. Accsess was given to all relevant documentation regarding previous and current projects as well as current and older processes. This documentation was used to apply multiple sources, enabling more evidence to establish validity (Eisenhardt, 1989).

3.5 Quality control

Yin (2003) describes four tests to judge the quality of any given research design, according to a certain logic, and mentions that, an important part of dealing with these tests, is that they should be applied throughout the case study. Table 3.5.1 lists these four tests as well as tactics that can be applied, and when they should be applied. The tactics that were used while working on this thesis have been checked off.

Tests	Case study tactic	Phase of research in which tactic occurs
Construct validity	☑ Use multiple sources of evidence ☑ Establish chain of evidence ☑ Have key informants review draft case study report	data collection composition
Internal validity	☑ Do pattern-matching ☑ Do explanation-building ☑ Address rival explanations ☑ Use logic models	data analysis
External validity	☑ Use theory in single-case studies ☐ Use replication logic in multiple-case studies	research design
Reliablity	☑ Use case study protocol ☑ Develop ease study data base	data collection

Table 3.5.1: Case study tactics for four design tests. Adapted from Yin (2003, p. 33)

3.5.1 Construct Validity

In case study research, this first test is very challenging. Critics focus on the fact that researchers fail to develop a functioning set of operational measures and that the data collection is based on "subjective" judgements (Yin, 2003). In order to justify the criteria of construct validity, Yin (2003) suggests two steps:

1. Select the specific types of changes that are to be studied (and relate them to the original objectives of the study) and,

2. Demonstrate that the selected measures of these changes do indeed reflect the specific types of change that have been selected.

Table 3.5.1 shows the three tactics that are available to increase construct validity according to Yin (2003). **Multiple sources of evidence** was used in this thesis to increase construct validity by the means of triangulation. Specifically triangulation of data sources. Data was collected in the form of observations, interviews and documents. All of these data sources would then be used to corroborate evidence and thereby increase the confidence in the findings (Eisenhardt, 1989). The next tactic is to maintain a **chain of evidence**. In practice this means to let the reader of the thesis follow the derivation of any evidence, from research

question to conclusion. This was done by describing the research methods in detail and correctly citing sources. Lastly, the draft of the thesis was **reviewed by key informants**. Any and all of the resulting comments where then addressed before turning in the finished report (Yin, 2003).

3.5.2 Internal validity

Yin (2003) focuses on two concerns for internal validity. The first one is the dangers of concluding on the basis of incorrect causal relationships. The second is concerned with the problem of making inferences. Both of these concerns are to do with not seeing the complete picture and reaching conclusions without thinking of every possible option. Table 3.5.1 lists a set of tactics, that are built into the data analysis process to deal with the problem of internal validity (Yin, 2003).

3.5.3 External validity

External validity deals with the generalizability of the findings beyond this thesis (Yin, 2003). The data in this case, was collected within ADs office, and is therefore only of interest to the people working in the project organization there. The findings are not generalizable to other organizations, but could be of interest to other project organizations within AD, that are instituting the same NPD processes. To make the thesis as externally valid as possible, theory from existing literature was tied to the findings (Eisenhardt, 1989).

3.5.4 Reliability

When establishing reliability the objective is to make sure that the case study can be replicated, using the same procedures described in this chapter, and that the replicated case study would reveal the same results (Yin, 2003). The measures that have been taken to assure reproducibility are listed and checked off in table 3.5.1. The methods used throughout the process has been thoroughly described and followed. A easy to use, and organized database was constructed to house the thesis data. This database was connected to the thesis by including original material as appendices and linking these to the arguments in the text. How this was done is further described in section 3.7. Although these measures where taken, this thesis was largely based on interviews and observations. These social situations are hard to

#	Step
1	Get to know your data
2	Focus the analysis
3	Categorize information
4	Identify patterns and connections within and between categories
5	Interpretation

Table 3.6.1: Analytic strategy steps, adapted from Powel-Taylor and Renner (2003)

replicate when the researcher changes.

Eisenhardt (1989) argues that the most important part of theory building research is starting the research with the ideal of "no theory under consideration and no hypotheses to test". This ideal calls for the author to start the process without thinking about variables and theories as much as possible (Eisenhardt, 1989). The author of this thesis has previous affiliations with AD. Potential biases because of this background, was a concern that demanded particular attention throughout the process. Yin (2003) argues that the general way of reducing biases, is to "conduct research as if someone were always looking over your shoulder". This strategy was a main focus throughout the thesis work.

3.6 Data analysis

"Just because you have data does not mean those are quality data. Sometimes, information provided does not add meaning or value. Or it may have been collected in a biased way" (Powel-Taylor & Renner, 2003, p. 2). Eisenhardt (1989) describes that there are probably as many approaches to data analysis as there are researchers, and argues that the overall idea is to become intimately familiar with the data. This thesis is based on a single case, with several sources of data. Each of these sets of data where approached with different tools, while still following the strategy in table 3.6.1.

For the documentation provided by AD this meant writing a summary, focusing by rereading while highlighting and categorizing important information. In the case of the observations, the notes where taken using mindmap software. This allowed for easy rearanging, addition of thoughts and adding links. The interviews where transcribed and sent back to the informant for confirmation. Then they were listened to several times while taking notes, and highlighting important quotes. The most relevant quotes were numbered and organized into

appendices. From there the quotes that became part of the discussion were translated from Norwegian to English and added to the case description under headlines indicating what had been found. The numbers each quote had been given in the appendix followed the translation and could therefore be used in the discussion to cite that particular quote together with the pseudonym. This makes it easy to find both the translated quote and the original quote to verify the meaning. Traceability and translation bias, have been prioritized throughout the writing of the thesis, and this method helped particularly in that respect (Powel-Taylor & Renner, 2003).

All of the data was further categorised by the research questions, in order to find emerging relationships through triangulation. Eisenhardt (1989) suggests this as a tactic which enables a look at "within-group similarities coupled with intergroup differences", that in turn could counteract the tendency to reach premature and even false conclusions. Lastly the relationships and important or recurring themes were listed and interpreted as a basis for the write up.

3.7 Write up

"The qualitative research report must always tell the story of the project, richly convey the views of others, and detail implications" (Drisko, 2005). In order to achieve a thesis of such quality, the writing of the thesis was started as soon as the research question was clearly stated. The research question then acted as a guide and constraint to the research and write up of the literature review and method. This in turn gave the knowledge of existing theory and methods needed for data collection and analysis as well as the write up of these sections. Overlapping the writing with data collection and analysis, enabled flexible data collection and clarified ambiguity inherent in the data (Eisenhardt, 1989).

Write up of the different chapters were guided by different priorities. The Introduction prioritized a clear statement of the research question and the topic of focus. Attention was also paid to the chosen epistemology orienting of the study as well as what the thesis seeks to accomplish.

The Literature Review was written with the focus of helping the reader understand the main theories and empirical foundations of the research.

To inform the reader of the methods identified and consistently applied throughout the

study, the Methodology chapter focuses on describing the combination on the applied methods, as well as stating the rational behind selecting each component. It seeks to provide a description for the readers, regarding how the data was collected and analysed as well as improving the credibility of the research.

The Case Description/Analysis includes a short description of AG and what part of the organization that was studied. Further this part of the organization is described in the context of a global, challenging marked. This is done to give the necessary context that this thesis is placed in. A description of the previous, current and new development processes is given. Then the results of the data collection and analysis is detailed.

The Discussion chapter focuses on presenting relevant findings, comparing them to theory and stating inconsistencies, while being careful not to generalize or claim unfounded transferability. In order to remind the readers of any care that should be taken in implementing the recommendations of the study, focus was also put onto the limitations of the research.

Conclusion is the final chapter of the thesis describing conclusions, recommendations for practise, and where the results of the thesis would be best targeted, as well as a section on what topics could be studied further, to gain a deeper understanding of the situation (Drisko, 2005).

Chapter 4

Case Description/Analysis

Together with the rest of the industry, AG is also pressured by significant cost challenges. These challenges are due to the recent dramatic fall in oil prices as well as a continuing increase in costs (Bertelsen et al., 2016). “The important thing for us now is that we develop products smarter, faster, and more efficiently” (Ariel - quote 21). One of the initiatives that is meant to facilitate this, is the development of a new PDP.

The two divisions that were studied, both sell products that are installed all around the world. This escalates the negative effects of not finishing the projects in time, because a installation may depend on that project. In these cases the service engineer in charge of the installation is forced to leave without finishing. Only to return when the project finishes, to install the remaining parts (Gaspée - quote 22). “The cost of sending an engineer back like this is covered by us. Such a trip is a significant cost, which goes straight to the bottom line. But it is not that visible unfortunately” (Gaspée - quote 23).

4.1 ACME Divisions development processes

AD is in the process of developing and implementing a new PDP. The new PDP has been released and is being tested in some projects. In this section the MPD-0002 (MPD) is described first, in order to get a perspective on how the project organisation is accustomed to working.

4.1.1 MPD-0002

The previous PDP called MPD-0002 (MPD) detailed in figure 4.1.1, consists of the five main activities: requirements analysis, architectural design, implementation, integration and ver-

ification. It takes as input the phase II report that includes a definition of the scope, stakeholders requirements and the budget. Starting the PDP requires a handover of the phase II report from product manager based on a Go/No-go decision taken by management. When establishing the project, the project manager and product manager update and detail the budget, plan, risk analysis, Return On Investment (ROI), resource plan, project organisation and product specification. Project manager also initiates the Intellectual Property Rights (IPR) if applicable. Then a new Go/No-godecision is made by the Steering committee based on the likelihood of project success given available technology, project personnel, timeframe and funding (MPD-0002, 2010).

The phase I and phase II reports exist as templates in the AD Quality Management System (QMS). Included in the report templates are guidelines for what is to be included. In the phase I report these guidelines describe that the report should include the results of a feasibility study of the idea as well as risks and opportunities inherent to its further elaboration. The phase II report takes as input the considerations and conclusions from the phase I report and defines the product requirements in detail. Results of a analysis of the necessary hardware and software development are required. And plans as well as a budget for phase III of the project should be made and included (TMPL-2001, 2013; TMPL-2003, 2014).

Throughout the duration of the project it is controlled by the project manager, steering committee and reference group. They control based on progress on technical activities and economical status. Iterations are controlled by the reference group, project team and product manager based on test reports who give a Go/No-go for validation or a new iteration. Go/No-go decision number 4 is done by the steering committee after validation based on the validation test report. If the product is not sent back to development or terminated, it is handed over to product manager together with a phase III report (MPD-0002, 2010).

The project organisation illustrated in figure 4.1.2 carries the following responsibilities. Project Owner is appointed by the line organisation. The project owner carries the overall responsibility for the project on behalf of the line organization. The Steering Committee is designated by the Project Owner. The Project Owner and the Steering Committee are responsible for the project being implemented in accordance with the Phase II report. Steering Committee approves changes in scope and budget. Project Manager shall be represented. Project Manager carries the operative, day-to-day responsibility for the progress, resources, and end product of the project. The project manager's main task is to implement the project

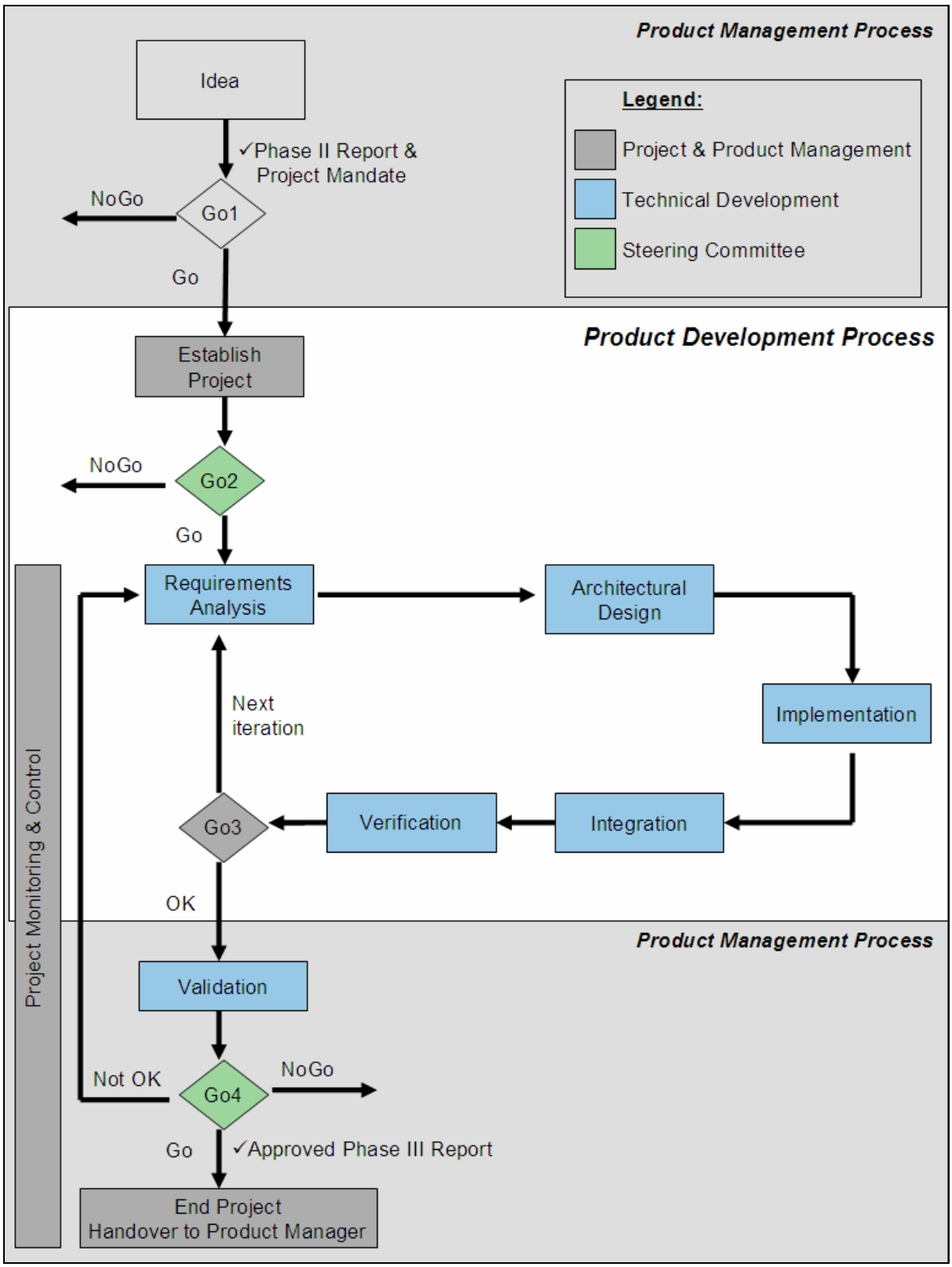

Figure 4.1.1: MPD Product development process (MPD-0002, 2010, p. 9).

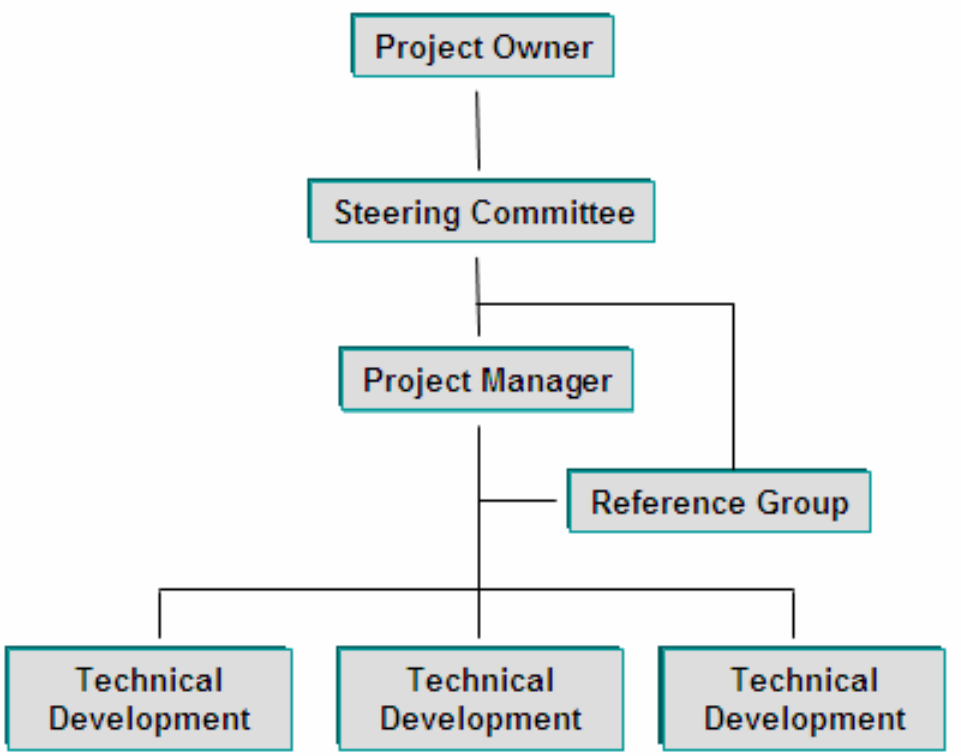

Figure 4.1.2: Project organisation (MPD-0002, 2010, p. 14).

according to the approved Phase II report. Reference Group is appointed by the Steering committee. The reference group has no formal authority, but gives comments and recommendations on relevant project issues regarding technical aspects (MPD-0002, 2010).

4.1.2 PROC-0002

The new PDP that was released during the course of this thesis is called PROC-0002 (PROC), and is described as a major upgrade from the MPD.

To start phase 1 feasibility study of this process a approved mandate is required from the product management process. This mandate includes relevant information from an idea proposal or product change proposal. As seen in figure 4.1.3 the process organizes five parallel sub processes through its three phases. The sub processes are devided into business case development, stakeholder analysis and validation, product engineering, product industrialization and project planning. These 5 sub processes all run in parallel through all of the 3 phases with varying degree of intensity (illustrated in figure 4.1.4). And each of the phases are run as a separate project using the project management process. All the different sub processes require input from risk management, configuration management, change management, requirement management, IPR management, release management and docu-

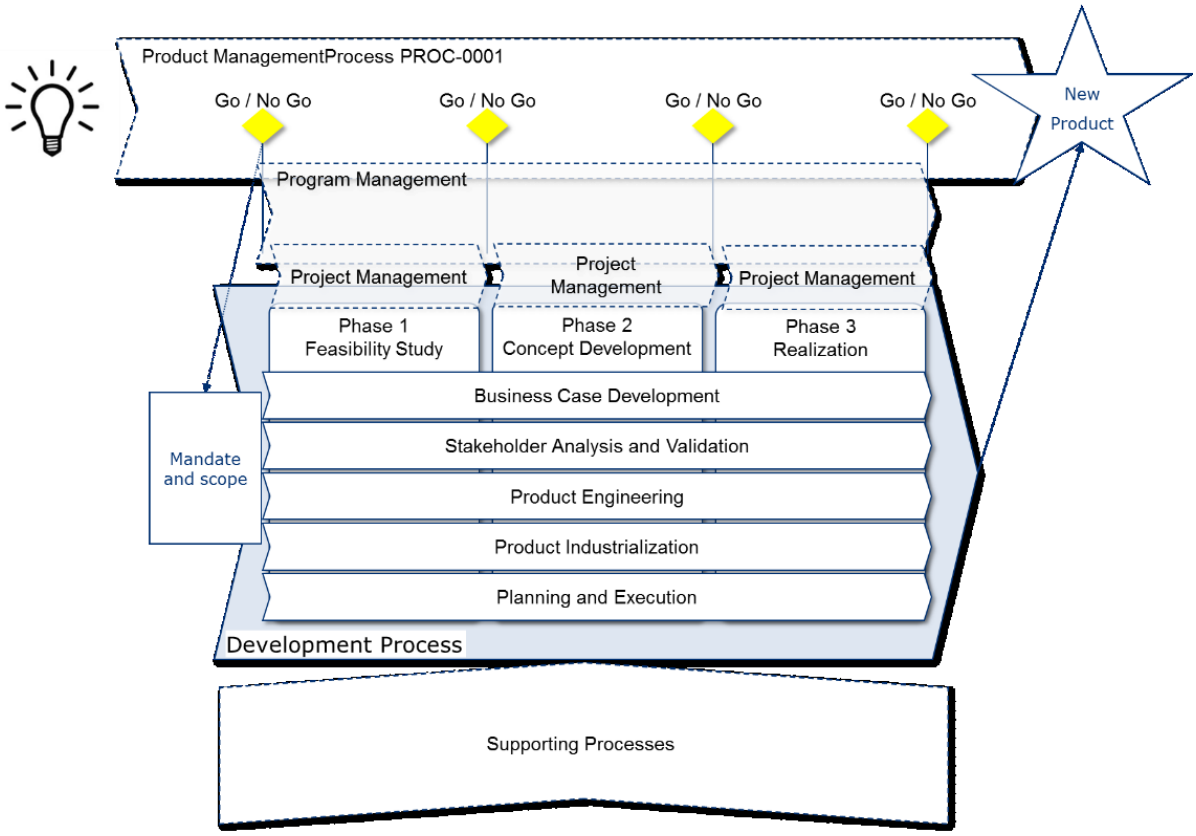

Figure 4.1.3: PROC-0002 Development Process Context (PROC-0002, 2015, p. 9).

ment management. Risk mitigation is done by continuously refining all information through defined activities. The uncertainty level is reduced through activities in the sub processes present in all 3 phases (PROC-0002, 2015).

Phase 1 evaluates the ideas attractiveness and feasibility from a technical, commercial, competence and capability perspective. Alternatives for potential solutions are outlined from a commercial, industrial and technical perspective. For further investment decisions and future input to the product's life cycle management, a business case for the product is formed (PROC-0002, 2015).

In phase 2 the ideas and outlines from phase 1 are further built on and clarified to minimize the uncertainty and risk. This is done by evaluating solution alternatives. As well as formalising a clear concept for the product and solution for commercialization and industrialization. A plan is formalized for the execution of phase 3, and the business case is detailed further to support the decision to start phase 3 (PROC-0002, 2015).

During phase 3 all the components, systems and processes required to sell, market, produce, deliver and support the new product or modification is specified, developed and verified (PROC-0002, 2015).

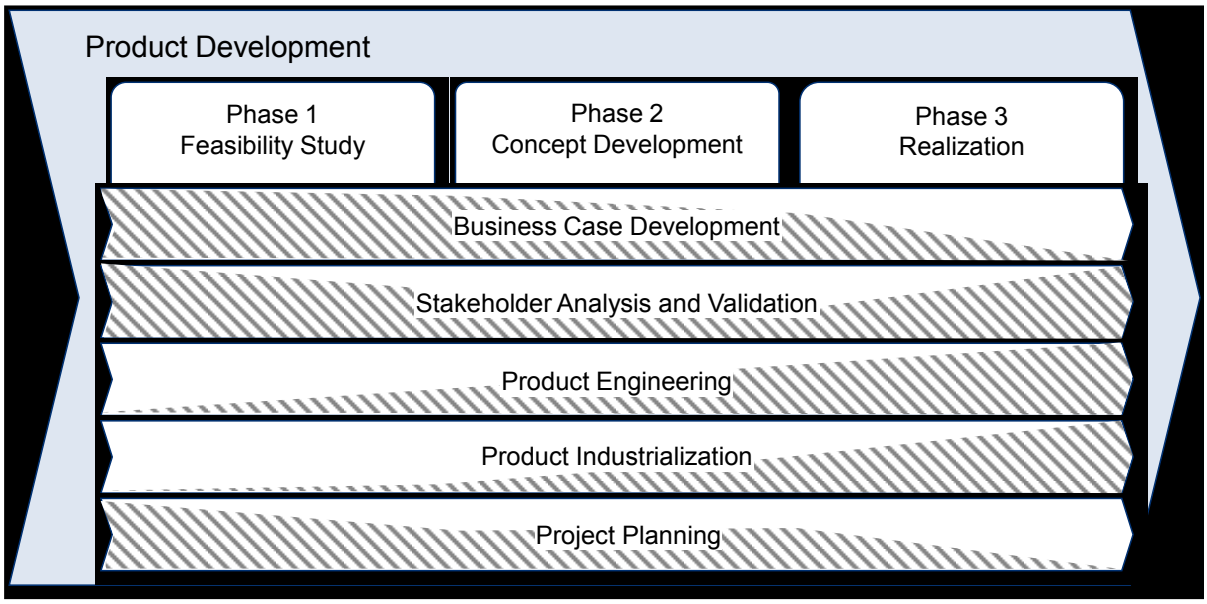

Figure 4.1.4: PROC-0002 Varying sub process intensity (PROC-0002, 2015, p. 12).

The control, execution and monitoring of the product development process is planned to be done by the product management process. Each phase and the release of the product requires a Go/No-go decision stated in a mandate from the product management process. As decision support a continuation proposal from the previous phase is typically made up of business case including resource capability, phase result summary, next step recommendations, estimate and high level plan for completing development, risk (technical, commercial, industrial and project) summary, product roadmap and project portfolio impact, proposed mandate and project plan for subsequent phase (PROC-0002, 2015). Because each of the phases in the process is run as a separate project a clear distinction is made between continuous project controle for each phase, and the Go/No-go between phases, which concerns the control of the process as a whole. As of the writing of this thesis the product management process is still in development.

The new process defines that “the decomposition from stakeholder needs to requirements, design solutions, test and test results shall be traceable”. The degree to which traceability is to be required may vary between projects depending on stakeholder analysis. It is up to every project to define the degree in the project plan.

4.2 Historical use of MPD-0002

When studying the MPD and the PROC it is clear that the MPD focused on the implementation phase of product development, with the earlier activities that should be included in product development handled by phase reports. The following quotes are descriptions of the mindset prevalent in project initiations, as well as a description of how the phase reports are used.

"The common mindset, that has been here all these years has been that, now we have an idea, let's create the product. Then you make the product" (Discovery - quote 27).

"What often happens is that we sell something. The seller says: 'I have made a sale.' or they ask: 'Should we make this?' At this point, Product hasn't necessarily made a good enough plan for what the strategy is. Then they say: 'Sure, go ahead'. or management says: 'We need to sell a certain number of hours this year, or we will need to let someone go.' and then of course say 'sell, sell, sell'. For that is the reality, we constantly have customers and deliveries we constantly have to deal with. That's how the picture becomes more complicated" (Gaspée - quote 25).

"It's very important that the projects fit into the strategy. How well this has been carried out that's... You see a need and you need it now. Then you don't need to look at strategy. I'll need to sell this product now, so i need it before the market disappears. In some cases you have sold it too. It varies from project to project" (Bismarck - quote 34).

"Historically, little time has been used on phase 1 and 2 in order to jump straight into phase 3, where to much time has been spent" (Fram - quote 28).

4.2.1 Phase reports

"*Question: Since there has been phase reports covering Phase 1 and 2. What do the reports contain?* Different things, but usually it is defined very short which product to produce. There could also be a part looking at the market conditions. There may be something regarding some calculations on estimates of how big the task is. Development. Which external demands there are. Partners. Sometimes the cost if it is a product we are producing. Most

things you need to make a decision on whether to go ahead or not. I've probably forgotten something, just sitting her reciting. There may be some technical guidelines as well, if a technical investigation has been conducted. But there is a very large variation on whether that is done or not" (Bismarck - quote 29).

"Phase 1 and Phase 2 has been very focused on what the report should be. The report should be approve. Without looking at the deliverables from the basic activities" (Ariel - quote 32).

"Based on experience, if you ask what the success or failure criteria are. That would be that we see that very quickly the product department starts struggling. Then the project gets established based on a headline. This is what we want produced, it should be done this way. Then someone has guessed, and said that this takes a certain amount of time and will cost this much. But if you look a little closer, it is not based on much more than the business case. There are relatively large uncertainty's associated with this. That's what we give over to the development department. Then the development department asks what is this, and follows up with a lot of questions. Product has a tendency to say that now they have to do something else. They do not have time to help" (Gaspée - quote 33).

"Previously there was only focus on phase 3, the first two phases were often not phases, other than what was written in reports. A form of phase reports. A lot of the same activities were probably done, but they were not done as projects. With relatively high focus on the project and the resources and expertise that should be added. Different skills are needed to produce a business case, then is needed for implementation of hardware or software functionality" (Ariel - quote 30).

"It has mostly been the product managers job to do phase 1 and phase 2. This has lead to a focus on the technical issues. Little focus on the commercial aspect. Do we have the expertise, do we have the money. In other words the return on investment issues" (Ariel - quote 31).

"*Question: Since there hasn't been done a full project for the reports, in the way it is planned for phase 1 and 2. Haw the same activities been the basis for the report?* Not to the same extent. And not with the same detail as in the new process. This is one of the reasons why the new process was created the way it is" (Ariel - quote 35).

4.3 What are the crucial parts of ACME Divisions development process?

The following quotations are findings related to the question: *What are the crucial parts of ADs development process?*. Findings point to the early phases of PDPs being the most important. Some of the quotations also depict the current situation and how the early stages of the PDP in some ways are neglected.

“In the earliest phase it’s about the business case and the rational behind why the idea should be developed into a product. The business case studies all the things which are related to resources. Do we have the resources, both competences and financial sustainability. Cannibalism must also be taken into account” (Ariel - quote 1).

“phase 1 is the most important one” (Ariel - quote 4).

“What i have seen is that the job you do to understand what you should create. In other words, what is the goal of the project. The initial phase. That you properly define whats the purpose of the project and expectations of the stakeholders. I have experienced leading projects where the expectations have been clarified well and where i thought they had been clarified well. In the latter case you get a project tale that demands that you change things either when you deliver the project, or underway. This makes a lot of noise and the later you realize it the worse it becomes. If you can get a good overview of the task. Doing a good estimation of finance and time is important” (Bismarck - quote 5).

“It is the groundwork that must be in place and that we have the right stakeholders. That we manage to choose the right people. We get to select the appropriate project manager” (Carpathia - quote 7).

“The most important thing to me. The first two parts. The feasibility and concept phases. That’s where most of the work must and should be done” (Discovery - quote 8).

“The main thing in feasability and concept. Once you have an idea, is to find out if it is something you can make a living on in the future. You need to lay down some good groundwork. If you do not, and just start the implementation, then you may end up loosing millions in

development or implementation of a product only to come to the end, and see that there is no market for it. Because you have not done the preliminary work" (Discovery - quote 9).

"I would say the first phases are the most important. Because that's when you insert the intellectual backbone into the product. What do you want, why and is it feasible" (Emma - quote 10).

"To focused on the early stages. Knowing that the requirements are correct compared to what it costs and all possible consequences. If you don't have control over this. Then you jump into it blind. This can make the project a little to technology driven" (Emma - quote 12).

"What is often being done however, is that you jump too quickly into the detailing and implementation, and off it goes. Then one discovers that it is wrong, and then you have to roll back. I've seen examples of projects that are running here in AD even now, that have been running for several years. And are now using many months to test for errors. There has never been a test plan or any testers. I would almost say that it is disastrous that in 2016, such gross errors are made. So I think that there is an incredible amount of gain to be had from such a gated model, and the greatest value is in the early stages. This is where can I probably imagine some individuals disagreeing with me" (Emma - quote 11).

"historically we have often failed because things have taken too long. And why has it taken to long, you may then ask. There are several reasons. In a couple of cases it's because of the lack of clear requirements. There has been a thought that this is what we should do, because that's a good idea. And then one thinks about the business case a little less than one should have. Suddenly the development is initiated by rather elegantly bypassing the first phases in a project, almost strait into phase 3. There may be that there has been something underlying that has been called phase 1 or 2, but it has been taken forward in a simple way. So you've had a bit of a foggy trail and a little unclear expectations. There might not have been a clear picture of who the stakeholders are, what the important criteria are, risk management handling in the project. It has also been about the competencies that have been put into the project. Now projects are run by project managers who are schooled through a 'metier' program. This raises the quality of course, by bringing in expertise" (Fram - quote 13).

“The most important criteria in a good process. To secure the project, is a clear order, and a clarification of expectations” (Fram - quote 14).

“The most important thing now is to spend enough time planning. Enduring a slower start. That one focuses on the critical elements, without dragging it out into a big bureaucratic process that impedes progress. It’s about finding a middle ground. Having a good balance in the time perspective. More time should be used in my opinion—if this works well—on phase 1 and 2. And less time on phase 3. So that when a development is initialized, there is a possibility of hitting that which is time to market” (Fram - quote 15).

“The times the product department actually have looked at the specifications and thought them through. The product department may not necessarily have written a specification, but they must know what they want. Then it’s R&Ds job to make sure they understand what the product department wants. How the product owner communicates this is not relevant, but he must know what he wants. Otherwise, what often happens is—and this also happens here—that R&D does not have enough information. Then they start as best they can, and when they come back with something, the product department looks at it and says ‘thats not what we wanted’. This way a lot of extra work is added that escalates cost and time” (Gaspée - quote 16).

4.4 What are the crucial outputs of ACME Divisions development process? And how should these be measured

Findings regarding the crucial outputs came from two sources. The first source was the description of the PROC with its supporting documents and spreadsheets. This process describes what to focus on in the different phases, and it can from there be derived what outputs the designers of the process think are crucial. Because the process is designed for a big array of different kind of developments, critical outputs from the process will differ between projects. Description of the PROC does not describe how to measure the PDP, leaving this up to another process, that is in development.

The second source of data describing crucial outputs and how they should be measured are the answers from interviews. In analysing these answers (attached in appendix B and B) it was not possible to find any coherent crucial outputs or methods of measuring. This result

however, is treated as a finding in and of itself. The answers also pointed to findings that are detailed further below.

4.5 Dokumenting

The following quotes are findings related to documentation of early phase activities and how this was done. There is also a mention regarding creating commitment through signatures.

“To have it documented is where I feel the greatest flaw is today, on those involved in product development. They have no evidence. It is just assumptions in a few slides and some meetings and that’s it. It’s not good enough” (Emma - quote 17).

“There must be a comprehensive set of requirements. There must be design documents that describe how you intend to build it. There must be a plan that documents an execution model, a Work Breakdown Structure (WBS), cost estimate, time estimate, risk analysis, resource needs. All this must be documented” (Emma - quote 18).

“I think that the main thing you do is totally banal, that one actually does the analyses and document the results. That its based on facts and not just something that’s a guess or a thought” (Emma - quote 19).

“I think that it could have been made clearer. Who will be involved and how to document the Go/No-go decisions through the various phases. How is it organized? Who will participate in the meetings. Establishing a signature so that they feel a little more committed to it and realize that if you say yes to go ahead with something, it involves a certain cost, and uses resources that could be used for something else” (Bismarck - quote 20).

4.6 Project types and project termination

This collection of quotes depict the framework in which projects are started and run. In relation to this several quotes mention how projects are never terminated, because so much has been invested into it that it “can’t all be for nothing”.

“Everything has a tendency to be dominated by obligations to customers. The customer is

the one who pays, which leads to the product departments strategic wishes and developments desires to finish, being pushed to the back seat. This is the classic scenario where we accumulate a technical debt in the product" (Gaspée - quote 26).

"Once it is started, it must be finished. This is how it has been done, and that is what we want to move away from" (Fram - quote 36).

"The way it has been is that the people who think the project should be done are the same people who are doing it. You may also find cases where the project owner doesn't know why the project is being conducted. Also one thinks that one must finish what one has started. You cant just say it was all for nothing. This is a very relevant topic for us" (Fram - quote 37).

"It depends on what part of the development you are in. If you develop a lot in Phase 1 and Phase 2, you have not spent a lot of money on developing hardware for examples" (Discovery - quote 38).

"Projects have almost never been stopped. Because when one has gone as far as stage 3, where you really begin to implement, and start realization, then all the gates that could have interfered. they are not there" (Ariel - quote 40).

"Only a few projects have ever been stopped. Because when you have come so far that you need a new product, or a new version, it stumbles out of control. What initially would have been a small project costing 1 to 1.5 million could soon develop and end up costing from 5 to 10 million" (Ariel - quote 41).

"The sooner you can stop a project the cheaper it is. ... If you compare the number of projects in terms of where the job has been done. In other words, in what phases have most of the work been done in ADs history. That means that, there are almost no projects were feasibility has been done. One has jumped straight to the realization. If you then stop a project in phase 3, it becomes very expensive. Or you see that have spent to much money. It is expensive to stop it now, so we have to finished it. But if it is the other way around, if you run many projects through feasibility and concept first and then stop them there. Then the cost is small when comparing it to stopping the project during implementation" (Discovery - quote 42).

4.7 Optimistic estimates

These two quotes relate to finding regarding incentives to underestimate cost and time estimates, while overestimating benefits in projects.

“We might be too optimistic. We disregard all the uncertainties that we in turn do not account for, and if we had taken them into account, management is not accustomed to it being accounted for. That means that when they compare with other projects they are accustomed to the optimistic estimates, and make decisions on the basis that this is the norm. If you take into account the uncertainties that are appropriate in relation to the risks that are identified, it may be difficult to gain acceptance for the project. In the end, the numbers are adjusted to become positive. This is a bad practice” (Bismarck - quote 43).

“Were we very often fall short, if I phrase it like that. Is on time, how long the project will take. This of course affects the return on investment” (Bismarck - quote 44).

4.8 Concerns regarding implementation of the new product development process

The following quotes describe concerns regarding barriers for the new PDP. Training is mentioned as a challenge because of the amount of people that should be involved from different departments. Several quotes describe the importance of the roles in the process being understood, and in particular the importance of a strong owner.

“Because we have a new PDP, and this is the first time its used by the project managers, it becomes a process to learn how to follow the instructions. A lot of good comes from following the process. Of course the beginning of the process is slow, but as you get into it, you have a project that accounts for everything. There is very little that is left out. There is very little that gets forgotten because the process governs in such a detailed manner. The process makes us look into things. We have to study things. We must take a firmer stance on the questions the process asks. Whether it’s relevant or not” (Carpathia - quote 45).

“A change is often difficult. It can often hurt a little” (Emma - quote 50).

"The challenge is the implementation of this PROC. Simply because it involves so many people" (Discovery - quote 46).

"PROC goes even wider than that. It does not only involve the R&D department. It includes the product group. It includes the leadership. The entire organization is included. Because you are developing a business, business case and business model, while also developing a product. You have to think about both activities simultaneously" (Discovery - quote 47).

"The second thing is the fact that one must organize training. It is important that you regularly evaluate if things are working. That one has a continuous improvement process, and that you have management focus on the process being an important tool for success" (Emma - quote 48).

"The new process requires a lot more craftsmanship. In other words, more skills than has been emphasized up until now. Competences in making choices on the basis of risk or other criteria, but It's the same elements. The business case has always been as a backdrop at every gate, because it has to be rooted in the strategy" (Ariel - quote 51).

"You also need to have coaching of individuals, groups and departments to get it to work. Being able to execute a new process with new procedures. It is one thing to define it on paper, but it is something else to actually start doing it" (Emma - quote 49).

"I think that it is important that the organization understands the responsibilities of the various roles in the process. That the gates of the process are organized in a good way. That those included in Go/No-go meetings etcetera, realize what their role is. Why they are there. That it does not become a discussion of technical details, because there were a bunch of engineers gathered in a meeting room" (Bismarck - quote 52).

"*Question: What do you see as the most important parts (tasks in the early phase, intermediate phase and final phase) of a development process?* It is to see a total. You have both individuals and management and everything from the individual developer to leadership that understands what the process is and where in the process you are. One should not necessarily have detailed knowledge about every level, but one needs to be able to understand where you are going and what kind of expectations that are given" (Fram - quote 53).

"What's happening is that our product department has gone from being a couple of heads doing sales support. Till now having to be heavy contributors, product owners in daily close interaction with project managers and developers. It's not like product and R&D is separated. We have projects where resources from producers and R&D work together to build backlog, requirements, design, to implement, test and deliver. This shift here, from being a small sale support department to being a critical product department. There you have a very large anomaly, and I think that we really haven't seen that that's what is actually needed. There is a need to establish a product department, product ownership with completely different types of resources that has the competence to work with development. And that is a whole different world. And I think that has not been identified" (Emma - quote 54).

"What I miss is stronger ownership, in other words someone who owns the project. If I flag issues, challenges. That there is someone who can help to give the projects a framework that allows you to succeed. You can be a very good project manager, but if you have a bad project owner, then you fail" (Emma - quote 55).

"So this means that when a project is initiated, that it has a clear owner. This is perhaps the most critical issue. A clear owner who actually wants the product developed. That is a driving force in the process. Sets requirements and summon to meetings, and requests status updates. Does not only say that 'I wish this to be developed'. Then the project runs. Then only to come in once in a while to be disappointed that the project has not progressed further. It's about a clear product owner as well. A project owner who actually does the owner role according to the project poster" (Fram - quote 56).

"*Question: How do we avoid having projects that go over time and budget?* The times we manage to avoid this is when the product department sits in the middle and demands a certain release process that is very rigid and repeats this until they get what they want. This has a tendency to slip. Historically we have let R&D take responsebility for the release process and taken that lightly. This shapes the result. In the latest release we have even taken ownership of it and run it ourselves. We go over budget and we spend more time, but we manage to get more control over what we deliver" (Gaspée - quote 57).

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Chapter 5

Discussion

This chapter references the quotes that are translated in the Case Description/Analysis chapter. To make it easier to find the translated quote, the "List of Translated Quotes" is printed on page 55. There the interviewee pseudonyms with quote numbers are listed alphabetically with corresponding page number where the quote is translated. Furthermore, the numbers correspond to the original quote in Norwegian. All the original quotes are organized numerically in the Empiri appendix.

In the analysis it was revealed that sufficient findings were only collected to properly answer the first of the three parts of the research question. Findings for the second two parts where few and ambiguous. The people that were interviewed tended to revert the question back onto a topic they thought of as important. This tendency is thought of as a finding within itself. These answers had a tendency to be skewed towards a lack of early process activities, recurring budget and time overruns, lack of the opportunity to "kill" projects, as well as the challenge surrounding implementation of the new process. Because of these answers it became clear that these topics needed to be addressed before the questions from the interview guide (see appendix A) would be relevant.In this chapter the findings regarding crucial parts of the PDP will be discussed first, followed by the the emerged topics. Focus is put on tying or comparing findings to relevant literature.

5.1 The most crucial part of the development process

"Historically, little time has been used on phase 1 and 2 in order to jump straight into phase 3, where too much time has been spent" (Fram - quote 28). In contrast, the analysis on

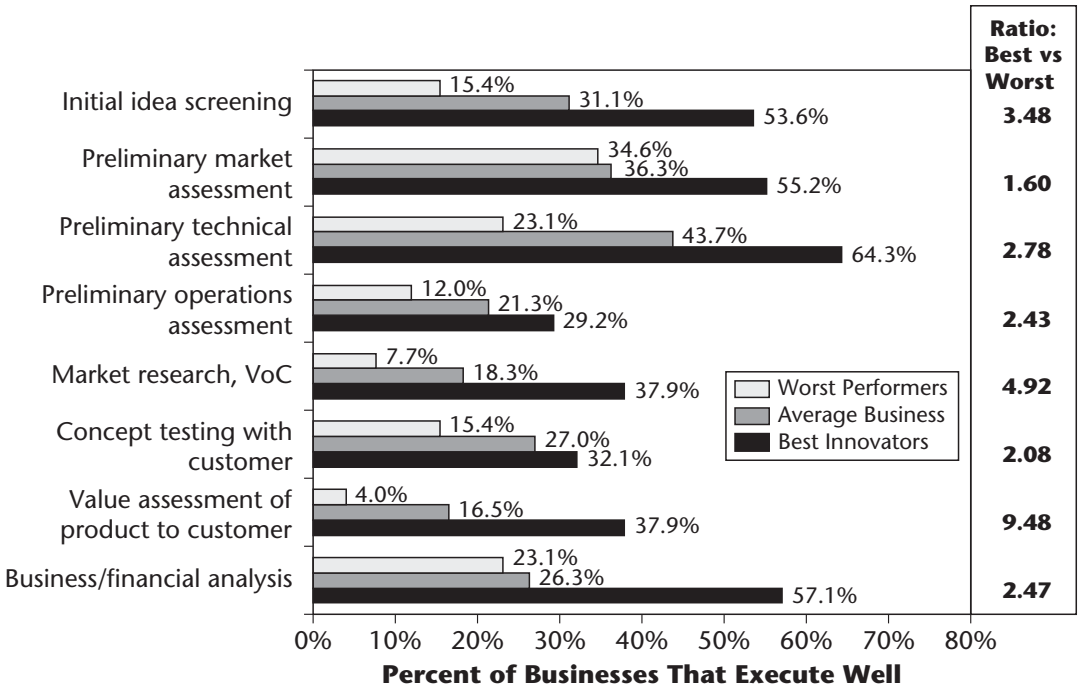

Figure 5.1.1: Quality of execution in the fuzzy front end impacts strongly on new product success (Kahn, Castellion, & Griffin, 2005, p. 11).

this topic found that 5 out of the 7 interviewed employees thought that the first, or the first two phases—feasibility study and concept development—of the PDP where most crucial. The last two expressed the need for further emphasis on the activities that the new PDP places in the first two phases.

Evidence from documentation also emphasises how AD is looking to prioritize the first phases of the PDP. The MPD described in section 4.1.1, emphasizes the implementation. In this process the feasibility study and concept development is done as a report by the project owner (or someone appointed by the project owner). In the PROC described in section 4.1.2 these tasks have been expanded to become separated projects lead by a project manager who divides the tasks between resources from several departments. Such an expansion of the scope regarding feasibility and concept development suggests that AD is endeavouring to emphasise these parts of the PDP.

The views found in interviews and documents are consistent with the literature on the topic. Cooper (1990) states that the activities that contribute the greatest towards success or failure are the early activities. Quality of execution in the early activities were found to be strongly linked to project success or failure. Initial screening, the detailed market study, and preliminary market assessment are found to be the early activities that in general are poorly

executed and in greatest need of improvement. Figure 5.1.1 shows how quality of execution in the fuzzy front end impacts the success of the product. Kahn et al. (2005, p. 11) further explains how the likelihood of product failure is much higher if the early phase activities are omitted. A better project definition—from sound early phase activities—results in speeding up the development process. “The seeds of success or failure are sown in the first few steps of the process: the predevelopment or ‘homework’ stages” (Cooper, 1990, p. 48).

Let us have a look at the realities of the project execution in AD. Section 4.2 paints a picture of how previous and current projects de-prioritize the early activities in the PDP. Collected data points to two influences. Number one is the MPD which is the PDP used up until now. This process focuses mostly on the implementation phase. The feasability study/business case and concept development is handled by the phase I and II reports. These reports are based on a templates with notes on what to include (MPD-0002, 2010; Cooper, 1990). Gaspée in quote 33 describes the phase report as something based on a weak business case. Ariel in quote 30, 31, 32 and 35 describes a phase report that goes into feasibility study and concept development to a much lesser extent than is planned for the PROC, and that the reports tend to focus disproportionately on technical issues, with little focus on the commercial aspect. Bismarck in quote 29 conveys that the reports include most of the content you need to make a decision on whether to go ahead or not. The prevalent experience among interviewees seem to be that the MPD focuses on the technical implementation of the product. Further there is a sense that the phase report, varies in its focus on the business case, and highly reflects the background of the person tasked with writing it.

The second influence is the basis for the initiating product development. Two main types of projects came up during the interviews. The first kind of project was started because someone from the sales department wanted to sell a function or addition that had not been developed yet. Gaspée in quote 25 describes how projects often starts with a sale of a product or future that needs to be developed. Further Gaspée describes how these projects often are rushed into development because AD—as every other business—needs to make sales, to be able to pay employees. In other cases a need in the market is identified, and a product needs to be developed before this market is saturated. In these cases, Bismarck expresses that the need to consider the strategy is gone (Bismarck - quote 34). In both project types it is easy to understand the urge to rush the product into the implementation phase. The need for the product is already well established and sometimes contractual obligations to customers are

already present.

One more characteristic of projects run in AD, is that they are almost never terminated. “Once it is started, it must be finished. This is how it has been done, and that is what we want to move away from” (Fram - quote 36). Fram in quote 37 goes on to describe how the projects normally are run by the people who think it should be, and that in some cases, the project owner doesn't know why the project is being conducted. This illustrates an imbalance between the wish to finish a product and the need for profitability. Gaspée in quote 26 discribes how everything has a tendency to be dominated by obligations to the customer. The product departments strategic wishes and the development departments wish to finish the product, are pushed aside in favour of delivering on time. Gaspée calls this “accumulating technical debt in the product”. Discovery in quote 38 clarifies that these things are dependent on how far in the process the development has come. “If you develop a lot in Phase 1 and Phase 2, you have not spent a lot of money on developing hardware for example”. This statement aligns with the theory presented in section 2.4.1. The further into development the projects go, the harder it becomes to terminate them.

Another important discovery done during the interviews, is the opinions regarding the specification of what is to be made. Fram in quote 14 points out that the clarification of expectations are very important to secure the project. Gaspée in quote 16 states that a signature of a successful development is the quality of the specifications and that the development department makes sure they understand them correctly. Otherwise there is the clear risk of developing the wrong thing. It was not clear from the interviews if this was a recurring problem across AD, but it was mentioned by a majority.

Studies consistently find that the best performing companies have a detailed and formal NPD process, with the best of the best having this process in place for the longest time (Booz et al., 1982). Emma in quote 11 strongly agrees with this kind of theory, stating that AD could have a lot to gain from a more formal and gated process. Forcing the development process through a feasibility study and concept development that produces quality deliverables, creates an opportunity. This opportunity gives gatekeepers a space to scrutinize the deliverables, and if appropriate cut the project at an early stage, before too much money has been spent.

One of the bigger changes happening when the PROC is replacing the MPD is the responsibility for executing the feasibility study and concept development phases (from phase

report I and II in MPD). This responsibility is moved from being in the hands of one person, to a project manager leaning on the expertise from several departments (PROC-0002, 2015; MPD-0002, 2010). Introducing big changes in work practices can be a hazard in and of itself (discussed further in section5.3). In the following paragraphs, potential positive effects will be discussed.

Carpathia in quote 45 describes the effect of the new process by pointing out that,

> ... a lot of good comes from following the process. Of course the beginning of the process is slow, but as you get into it, you have a project that accounts for everything. There is very little that is left out. There is very little that gets forgotten because the process governs in such a detailed manner. The process makes us look into things. We have to study things. We must take a firmer stance on the questions the process asks. Whether it is relevant or not.

Carpathia here clarifies an important part of the process, which is to make the user do the things that has been proven to be valuable down the line. Figure 5.1.2 illustrates the normal situation in a project. In the start of a project the uncertainty is high, and cost of corrective actions are low. The opposite is true at the end of a project. Lowering uncertainties at the start has a clear benefit in low cost corrective actions. While it is easier to wait until later in the project to find out about constraints and opportunities, this carries a penalty in big costs for corrective actions. Properly prioritizing the early phases could lead to a better clarification of expectations through the obligatory activities defined in the PROC. The same obligatory activities can be forced on projects that would normally skip them to be fast tracked in to implementation. Projects where the product has already been sold or is seen to be a “must have” before the market is saturated. In these cases the process serves to uncover risks that are often overlooked in the rush to implementation. Risks of forgetting the testing part, like the ones mentioned by Emma in quote 11, or the reasons for the cost and time overruns constantly happening according to Bismarck in quote 44.

The focus on gates may seem superfluous to some, but its introduction creates a tool for management, that can be used to make certain no critical activities have been omitted or underdeveloped (Cooper, 1990). Discovery in quote 42 describes how running more projects through the early stages could make it possible to stop projects before they go over budget and time. This could be the basis of a culture where more innovative projects are started. The projects that are assessed to be unfit for implementation could still be learned from,

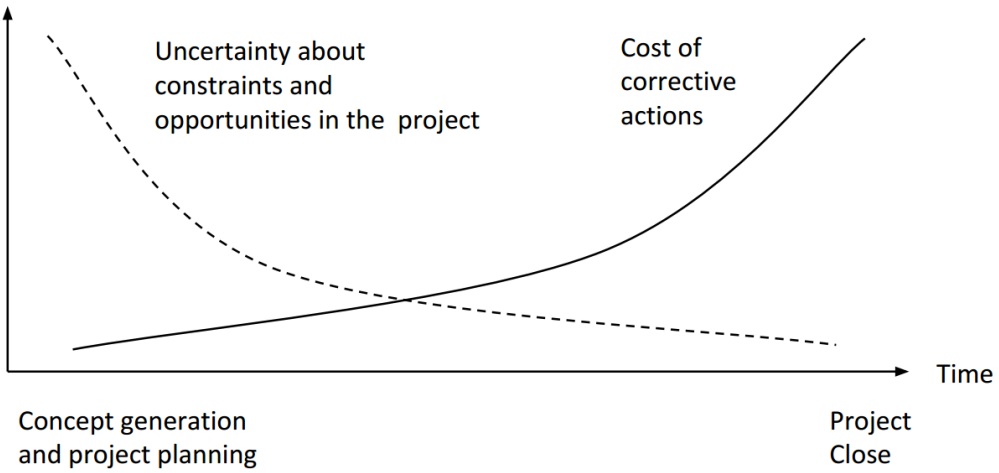

Figure 5.1.2: Uncertainty and cost versus time in a project

and therefore be seen as more successful. In turn this makes the projects that were cut more valuable, and terminating projects easier (D. Hall, 2007).

PROC could be the process that helps to improve the reoccurring complications in past projects. If this is not the case, it still has several similarities to processes derived from research. This means that affiliated research together with experience can be used to further develop the process.

5.2 Over time and over budget

One of the reoccurring statements in the interviews is regarding the development projects tendency to breach time and budget estimates. Bismarck in quote 44 states that projects often "fall short" on finishing within the planned time. Gaspée in quote 16 discribes that often a lot of extra work is added at the end of the project because of poor communication at the start, and that this in turn escalates time and cost. Emma in quote 11 characterise how recent projects suffer from the lack of a test plan and end up going over time and budget because of extra testing and verification. Fram in quote 13 portray that historically, projects often failed because things took too long because of the lack of clear requirements. Ariel in quote 41 depicts the situation where the time overrun has come so fare that a new product is needed no matter what. This situation stumbles out of control and a small project costing 1 to 1.5 million could soon end up costing from 5 to 10 million.

The reoccurring theme in all of these statements is strikingly similar to what Flyvbjerg

Similarities	Differences
Complex interfaces Long planning horizons Conflicting interests from stakeholders Early overcommitment to a concept Scope changes that are not accounted for Misinformation in estimates are the norm Cost overruns Benefit shortfalls	Budget scale

Table 5.2.1: Common similarities and differences between the "majour projects" discussed by Flyvbjerg (2011), and the development projects in AD.

(2011) describes as causes, not root causes. Before discussing this further, it is important to note that the projects studied by Flyvbjerg (2011) are "major projects" whose characteristics have been detailed in section 2.5. The biggest difference between these projects and the ones run in AD, is the scale. All of the other characteristics have been found to be similar. The similarities and differences are listed in table 5.2.1.

5.2.1 Optimism bias

Now that we have established relevance between the study by Flyvbjerg (2011) and projects run in AD it is time to look at the difference between causes and root causes. Flyvbjerg (2011) argues that phenomena such as; "scope changes", "escalated commitment" and "lock in" are not root causes. The commonality of these phenomena is so big that the root cause of underperformance is overlooking them.

Of the 2 relevant root causes mentioned in section 2.5.1, optimism bias will be discussed first. All of the quotes[1] at the start of this section could be interpreted as signs of optimism bias. Sentiments such as "historically" and "were we very often fall short" are reoccurring in the interviews. These quotes point to a common phenomena. Which is to thinking that the next attempt at a project will be different, avoiding the bad luck and errors of the past (Staw & Ross, 1978).

Earlier in this chapter it was argued that the early phases of the PDP was the most import ones. Based on this argument it is further proposed that the lack of a strong early phase and the accompanying project uncertainty's exacerbates optimism bias. The action of "rather elegantly bypassing the first phases in a project"(Fram - quote 13) is in itself evidence of

[1] Bismarck in quote 44, Gaspée in quote 16, Emma in quote 11, Fram in quote 13, and Ariel in quote 41

optimism biases. In other words, this is the same as saying that the probability of further risks to the project are negligible, and no attempts should be made to reveal them. Decreasing the amount of early activities also increases optimism bias because you have less evidence to base decisions on. In other words, decisions based on delusional optimisms are more likely than decisions based on rational weighting of gains. Similarly, the effect of what Tversky and Kahneman (1974) calls "anchoring" (se section 2.5.1) could also be increased. When the "anchor" is based on a "weak business case" (Gaspée - quote 33), the potential remifications of anchoring increase.

The proposed solution to avoid optimism bias explained in section 2.5.2 is not one that is likely to satisfy stakeholders. On the other hand it might be necessary to establish what common project performance is, if it performs like previous projects. This as an established starting point might trigger efforts to prevent the same shortfalls from previous projects. The "common situation" should also argue for adequate contingencies for delays, cost overruns, and benefit shortfalls (Flyvbjerg, 2011).

5.2.2 Strategic misrepresentation

The second relevant root cause mentioned in section 2.5.1 is strategic misrepresentation. Bismarck in quote 43 states the following:

> We might be too optimistic. We disregard all the uncertainties that we in turn do not account for, and if we had taken them into account, management is not accustomed to it being accounted for. That means that when they compare with other projects they are accustomed to the optimistic estimates, and make decisions on the basis that this is the norm. If you take into account the uncertainties that are appropriate in relation to the risks that are identified, it may be difficult to gain acceptance for the project. In the end, the numbers are adjusted to become positive. This is a bad practice.

Bismarck here describes a state where project managers that would like to make correct estimates are clearly incentivised to underestimate costs and overestimate benefits. While this clearly fits with the description of strategic misrepresentation, it is important to note one distinction. Flyvbjerg et al. (2002, 2005) and Wachs (1989, 1990) describe strategic misrepresentation in a model where project managers deliberately underestimate and overestimate

benefits in order to increase the probability of their projects gaining approval. The difference between the model and the state described by Bismarck is that the project manager would like to make correct estimates. This points to a state where the project manager is not in competition with other project managers who are also misrepresenting. The only reason to misrepresent is because the estimates are compared to previous projects that have gone over on budget and time, but this is the norm.

The data directly pointing towards strategic misrepresentation is in this case only a single statement. However when looking into the proposed solution for avoiding strategic misrepresentation, one finds several statements relating to missing incentives, that would have worked against strategic misrepresentation. Emma in quote 17, 18 and 19 calls for proper documentation of design, execution model, WBS, cost estimate, time estimate, risk analysis, resource needs. Saying that this is where the greatest flaw is today and that the most banal thing is to actually do the analysis and document it. Continuing to state that decisions should be based on facts and not guesses. Bismarck in quote 20 mentions that, those who will be involved in Go/No-go decisions should be clarified, and a signature should be introduced to create accountability behind the decision.

The comments made here by Emma and Bismarck correspond to the solution that Flyvbjerg (2011) proposes for reducing inaccuracy and risk in forecasting (se section 2.5.3). They also highlight that incentives to avoid strategic misrepresentation are missing. Flyvbjerg (2011) further suggests focusing on institutional and organizational change, and states that suggesting better forecasting and improving ethics does not solve this situation.

5.3 Implementing the new product development process

The next recurring statement throughout the interviews were regarding the challenge in implementing the PROC. The PROC represents a change that encompasses several departments and levels in AD. Worded by Emma in quote 50, “change is often difficult. It can often hurt a little”.

The biggest change identified between the PROC and MPD is that responsibility for phase 1 and 2 is moved from the project owner to a appointed project manager. The project manager in turn is supposed to assign the tasks to people with appropriate skills. These people will generally come from several different departments (MPD-0002, 2010; PROC-0002, 2015).

Discovery in quote 46 and 47 point to this as a challenge in the implementation of the PROC, because of the amount of people and departments involved that were not involved before. Challenges due to the change from MPD to PROC will involve both training and resource management. Newly involved people are—after all—assumed to already have full schedules.

Emma in quote 48 raises focus around training, regular evaluation of the process and visible top management support for the process. Further Emma in quote 49 suggests coaching for individual, groups and departments in order to get the process to work. Adding that "It is one thing to define it on paper, but it is something else to actually start doing it". Carpathia in quote 45 also mentions that it will be a process to learn how to use the PROC. Cooper et al. (1999) argues for the importance of top management support for the PDP. The best performing organizations were characterized by a management that valued portfolio management as very important. This thesis will not go into ways of implementing a process or the theory around change management. These are very wide topics deserving of their own studies.

An important part of learning to use a new process is getting to know what is the role of each individual. Ariel in quote 51 points out that the PROC requires more competences in making choices on the basis of risk and other criteria. Bismarck in quote 52 discusses the importance of the people in Go/No-go meetings, realizing their role in the process. Further emphasizing the concern that these meetings become a discussion on technical details because there were a bunch of engineers gathered in a meeting room. Fram in quote 53 also focuses on the importance of project stakeholders understanding what the process is, and how far it has come in a project. It is not necessary for everyone to know about every detail on every level, but it is important to understand where the project is going and what is expected from each stakeholder. Emma in quote 54 explains how the product department has gone from being "sales support", to having to be project owners. The role of being a product owner being very different, in that it requires heavy contributions and daily interaction with R&D. Emma continues to state that this change has created a anomaly where the product owner role, has not been established. The product owner role requiring different competences, to work with development. Fram in quote 56 discusses that a clear owner might be the most critical part of a development project. Continuing to describe how it is important that the project owner is a driving force in the process. Gaspée in quote 57 depicted how not to go over time and over budget. The times when this succeeded were when the product department sat itself in the middle of the project, and demanded a very rigid process until

what they wanted, was made. The project still went over budget and over time, but the product department regained control over what was delivered. All of the concerns and opinions depicted here point to the importance of proper training. If the people involved in the development process do not know how it works, there is little chance of it being executed the way it was designed, and risk increases.

While analysing the collected material in order to find answers to the two last parts of the original research question, it was discovered that no clear answer could be found. In the discussion regarding training, the same data becomes relevant. Proliferation in answers, to questions regarding the measuring of projects, emphasizes the lack of a process for measuring project performance (se table B.0.3 in appendix B). Ariel in quote 51 points out that the new process requires more competence in making choices based on risk or other criteria. Cooper (1990) emphasises the importance of carefully scrutinizing the deliverables at the gates, making certain that no critical activities have been omitted or underdeveloped. This is critical to insure effective projects. Using gates correctly means controlling risk. Gates give the opportunity to stop underperforming projects and transfer resources to more promising ones (Boulding et al., 1997; Hart et al., 2003). To achieve these effects the best performing organizations have an established explicit, and formal portfolio management method. This method uses well-defined rules and procedures that are consistently applied, to all appropriate projects. The procedures in question use multiple portfolio methods (Cooper et al., 1999).

Chapter 6

Conclusion

This thesis started out seeking answers to a three part research question:

> What are the crucial parts and outputs of ACME Divisions development process, and how should these be measured in order to be able to decide if the project should go to the next phase of development?

Throughout the collection of data and analysis, it was discovered that only the first part of the research question could be answered properly:

> What are the crucial parts of ADs development process?

In addition to answering this, the analysis found answers to a second research question:

> What are the biggest challenges when implementing the new Product Development Process in ACME Division?

Regarding the first part of the original research question, the analysis has shown that the feasibility study and concept development phases of the PDP are the most critical.

All of the informants point to activities in these early phases as the most critical. The PROC is designed to emphasize the early phases. The literature also points to the early phases as the most critical. Informants point to ongoing and past projects that have suffered from poor early phase executions and follow up. Descriptions of how development projects typically are initialized, serve as a reason behind the rushed execution of early phase activities. From this it is derived that—on the basis of experience—the majority of informants wish that the early phases were properly executed. The previous process did not, and project team

members were not incentivised to emphasize early activities. The PROC might change these incentives, but how this process works in practice has not been focused on in this thesis.

Another outcome, resulting from de-prioritizing the early phases is that project termination is more difficult. The results of the analysis found this to be a recurring problem, because development entered the expensive implementation phase prematurely. The literature is very clear on the importance of evaluating the activities from early phases. Literature here points to a formal process using multiple methods as the best tool in order to ensure that the activities have been developed sufficiently. Again, the PROC could help this situation by implementing its clear boundaries between phases and gates.

The second research question focusing on challenges when implementing the PROC, lead to two distinct findings. The first finding is that development projects, too often go over budget and time. This was linked to what Flyvbjerg (2011) describes as "optimism bias" and "strategic misrepresentation". Flyvbjerg (2011) also discusses a solution to these issues. While these findings were not as prevalent as the findings regarding the critical phases, they certainly warrant further investigation. Especially as they would still be a hinder in the new PDP.

The second finding is related to the significant change between MPD and PROC. The new PDP moves the responsibility of the early phases from the project owner to an appointed project manager. The previous phase reports would be done by more or less a single person. In the PROC the project manager is meant to delegate activities to specialists in different departments who already have full schedules. For these people and all the others involved, the PROC also requires training. An important part of the success of the process is hinged on all of the roles being understood. Such a big change requires resources and management "buying into" the process. These findings mostly represent informed concerns from informants coupled with comparing the two PDPs. Therefore this thesis suggests further investigation into subjects regarding "change management" and "cross-functional teams". There is no guarantee that the PROC will work. On the other hand if it is not implemented properly it is guaranteed not to work. The upside of implementing it properly even if it does not work is that there will be a basis on which to improve. The downside of not implementing it properly is a guarantee of projects being run with more risk than necessary.

This thesis contributes to ADs understanding of the state of their PDPs. The important parts of the PDP have been identified along with inconsistencies between process and exe-

cution. Further they can help in making sure that problems afflicting the previous PDP does not inhibit the new one. Several challenges linked to the implementation of the new PDP were identified. These challenges can form the basis for internal or external studies aimed at solving the issues, in order to make the transition as painless as possible. When the new process is implemented and in use, it will need to be evaluated. This thesis provides some of the necessary basis for this future evaluation.

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Appendices

Appendix A

Intervju guide

Intervju guide

InformantID:

Dato for intervju:

Stilling i basisorg.:

Rolle(r) i prosjektorg.:

Avdeling i AD:

Problemstilling

Hva er de viktigste deler og leveranser i ACME Divisions utviklingsprosess. Og hvordan skal disse måles for å kunne avgjøre om prosjektet skal gå til neste fase av utviklingen?

Intervjuprosess

Presentasjon av bakgrunn for intervju

Intervjuene gjennomføres for å kartlegge ACME Divisions (ADs) prosjekt organisasjons nåværende arbeids prosesser og metoder. De skal også kartlegge prosjekt organisasjonens tidligere erfaringer med tidligere prosjekter og hvilke deler av prosessen som ga utslag på prosjektets resultat

Intervju format

Intervjuet vil være semi-strukturert og vare i 60 minutter. Samtalen vil bli tatt opp. Intervjuobjektet vil i etterkant ha full mulighet til å redigere eget intervju.

Anonymitet

Garanterer full anonymitet av organisasjon og person ved analyse av undersøkelsens resultater.

Forankring i organisasjon

Oppgaven ble gitt undertegnede av leder for Research and Development (R&D).

Undertegnede og oppgavens veileder fra University of Stavanger (UiS) Eric Christian Brun har signert ADs taushets-avtale i tillegg til at oppgaven har blitt båndlagt i 5 år.

Intervjuobjektets bakgrunn og grunnlag

Spørsmål

1. Hva ser du på som de viktigste delene (oppgaver i tidlig fase, mellom fase og siste fase) av en utviklingsprosess?
   (a) Hvordan har prosjekter blitt delt opp? (gates)
   (b) Hvilke oppgaver har blitt gjort i de forskjellige delene? Og hva har blitt ansett som viktigst?
   (c) Hvordan har prosesser blitt utnyttet for å sikre prosjekter?
   (d) Hvordan har det blitt lagt til rette for at utviklningsprosesser kan bli brukt?
   (e) Hvordan har "soft skils" (emphaty, influence, creativity, and group facilitation) blitt brukt og utviklet?
   (f) I hvilken grad har ny teknologi (pc, collaborative workspaces) blitt brukt og hvilken innvirkning har det hatt på prosjekter?
2. Hvordan mener du et prosjekt best måles for å kunne bestemme om prosjektet skal fortsette?
   (a) Hva slags metoder (project portfolio methods) har blitt brukt for å evaluere prosjekter?
   (b) Hvilke prosjekt vurderings metoder (project portfolio methods) har blitt fokusert på i prosjektets forskjellige faser?
   (c) Hva slags *visual aids* har blitt brukt for å gjøre informasjon letter å evaluere?
   (d) Hvem har vært involvert i beslutninger rundt Go/no-Go for prosjekter?
   (e) Hvor viktig syntes du det er at prosjektene reflekterer ADs strategien og evt. hvordan bør man gjøre det?
   (f) Hvordan har forpliktelsen til å fullføre påvirket et prosjekts Go/No-Go beslutning?
3. Hva slags informasjon bør gå fra prosjektledere til prosjekteiere (den som bestemmer at prosjektet skal fortsette) igjennom prosjektet?
   (a) Når i prosjektet har denne informasjonen blitt sendt?
   (b) Hvilke deler av informasjonen har blitt lagt mest vekt på og hvorfor?

Appendix B

Empiri

Funn som beskriver de viktigste delene i utviklingsprosessen

Kategori: De viktigste delene i utviklingsprosessen

Kilde: Intervju

Beskrivelse av funn

Ønske om bedre forarbeid

"I de første. Eller den tidligste fasen, så er det business case og rationale for hvorfor ideen skal utvikles til et produkt. I business casen ligger alle de tingene som sees på i forhold til ressurser. Har vi ressurser. Både kompetanse og økonomisk bærekraft. Det må sees på kanibalisme på andre produkter osv." (Ariel) (1)

"I den midterste fasen så er det å se på mulige konsepter, altså løsninger og se på produktiviseringen av produktet. Vanskelig å se på det før man begynner å ha koseptene og begynner å ha løsningene. Om det er mulig å produsere. Produserbarheten og hvordan det skal produseres. Også se på make by løsninger." (Ariel) (2)

"Så er det den siste fasen der hvor man realiserer. Da er det stort sett gjort et basisgrunnlag sånn at realisering blir i stor grad implementering av gitte krav." (Ariel) (3)

"fase 1 er den viktigste" (Ariel) (4)

"Det jeg ser er at den jobben du gjør med å forstå hva du skal lage, altså hva er målet ditt med prosjektet. Den initielle fasen. At du får definert godt hva som er formålet med prosjektet og forventningsavklaring i forhold til stakeholdere. Erfaringene herfra. Jeg har kjørt prosjekter der forventningene har vært godt avklart og der jeg trodde de var godt avklart. Da får du en hale etterpå som gjør at du må endre ting. Enten når du har levert prosjektet, eller underveis. Det gir mye støy. Desto senere man skjønner det, desto verre blir det. Får du en god oversikt over oppgaven. Å få gjort en god estimering er viktigt. Estimering av økonomi og tid." (Bismarck) (5)

Ariel	**Bismarck**	**Discovery**	**Emma**	**Carpathia**	**Fram**	**Gaspée**
Buisniss case		Business case	Business case		Business case	Business case
Rationale			Tydlige krav			
	Scope					
	Tidsestimater					
		Stakeholder analyse		Stakeholdere	Stakholdere	
				Resurser		
		Planlegging	Planlegging			
					Risk management	
					Klar eier	Klar eier
					Klar bestilling	Klar bestilling
						Kommunikasjon

Tabell B.0.1: De viktigste aktivitetene i en produktutviklingsprosess ifølge de som ble intervjuet

Informant	Fiktigste del
Ariel	Fase 1
Bismarck	Tidlig fase
Discovery	Først to
Emma	Fase 1
Carpathia	Grunnarbeid
Fram	Fase 1 og 2
Gaspée	Fase 1 og 2 er bare for nyutvikling

Tabell B.0.2: Den viktigste delen i en produktutviklingsprosess ifølge de som ble intervjuet

"Men jeg tror kanskje at hvis vi kan jobbe litt mer strukturert med de fasene før du er i realisering, så kunne jeg sett for meg at vi hadde flere initiativer. I for eksempel fase 1 at du hadde flere initiativer i gang der. Og så var litt tøffere i Go/No-go der på dem. Jeg tror kanskje vi har litt for få av dem i dag. Det skjer en sortering som ikke er helt styrt. Av hvilke prosjekter kan være litt tilfeldig tror jeg." (Bismarck) (6)

"Det er jo grunnarbeidet som må på plass og at vi har de rette stakeholdere. At vi får valgt ut de rette menneskene. Vi får valgt ut den rette prosjektlederen. Som kan kjøre prosessen etter PROCen. Det må være en som kjenner til det vi driver med og en som kjenner til prosessen. Og som har egne meninger og kan guide underveis." (Carpathia) (7)

"Det viktigste i mitt hode. De to første delene. Altså feasability og konsept. Det er der mesteparten av jobben skal og bør gjøres." (Discovery) (8)

"Det viktigste med feasability og konsept. Når du har en ide, for å finne ut om det her er noe du skal leve av i framtiden så må du gjøre et godt grunnarbeid. Om du ikke gjør det og bare starter med implementeringa så kan det være at du svir av millioner av kroner for å utvikle et produkt eller implimentere et produkt, også kommer du på slutten også ser du at vi har jo ikke noe marked for dette her ute. Fordi du har ikke gjort forarbeidet. Og du har kanskje ikke organisasjonen til å støtte den jobben du har gjort." (Discovery) (9)

"Vi har ikke vært så flinke til å følge denne 'gatede' modellen som vi snakker om. Vi har egentlig ikke det. Vi har hoppet fort over de første fasene og rett på realisering uten å helt vite hvor vi skal. Og da kaster du bort utrolig mye penger. Så jeg vil si. Det var et spørsmål her om de viktigste fasene. Jeg vil si de første fasene er de aller viktigste. Fordi det er da du putter det intellektuelle inn i produktet ditt. Hva skal du ha og hvorfor, og er det gjennomførbart." (Emma) (10)

"Det man derimot ofte har gjort er at man hopper for fort inn på detaljering og implimentering og kjører avgårde. Og så oppdager man at det er feil og så må man rulle tilbake. Jeg har jo sett eksempler på prosjekter som går her i AD selv nå som vi har holdt på flere år. Og bruker nå mange måneder på å teste etter feil. Har ikke hatt noen testplan, har ikke hatt noen testere. Jeg vil nesten si at det er katastrofalt at man i 2016 kan gjøre så grove feil. Så jeg tenker at det er utrolig mye å hente på en slik gatet modell og den største verdien ligger i de første fasene. Og der kan jeg nok tenke meg at enkelte er veldig uenig." (Emma) (11)

"Det å ha fokus på de første fasene. Vite at krava er det riktige i forhold til hva det koster og alle mulige konsekvenser. Har du ikke styr på det, da hopper du litt ut i det blinde. Og da blir det litt for mye teknologidrevet. At du tidlig tenker kommersielt. At du ser på hvilken verdi det er for brukere. Hva gjør konkurrentene?. Er det noe i forhold til logistikk og vedlikehold i livssyklusen du må tenke på for å opprettholde produktet effektivt. Hva koster det faktisk å realisere fra det du klarer å vite så tidlig. Har du kompetanse og kapasitet til det. Om en ikke har et bevisst forhold til det kan man gå på en smell. Så denne helhetstenkningen er utrolig viktig fra dag 1. Ikke nødvendigvis gå i detalj på alt, men det kan hende at det å reflektere litt over, for eksempel hva gjør konkurrentene. Kanskje noen allerede har det produktet du prøver å lage. Er kanskje timingen feil. Kanskje det koster 5 ganger det du tror. Skal du da begynne på det? Hvis du ikke har det bevisst i starten så går du fort på tryne. Men det er der man ofte har gjort feil, man har gjort alt for lite av den type vurderinger og hoppet på realisering. Da ender man opp med å gjøre ting både to og tre ganger for å komme i mål. Og det har også ledelsen litt lett for å akseptere. De liker det ikke, men de forstår ikke heller hvorfor det blir sånn. Og det overrasker meg litt. At man ser så lite sammenheng med hvorfor ting tar sånn tid. Og hvorfor man må gjøre ting om igjen. Det tror jeg er fordi man bærer litt preg av den gamle skolen. Bakgårdsdrift, hvor du tenker kreativt og begynner å bygge noe. Så ser man hva det blir til. Det funker ikke i 2016. Noen vil sikkert være uenig i det, men være litt smartere tidligere." (Emma) (12)

"Historisk så har vi feilet ofte på at ting har tatt for lang tid. Og hvorfor har man gjort det, kan man da spørre om. Det er flere grunner. Et par av de er at man ikke har hatt en klar bestilling. Man har hatt en eller annen tanke om at det her skal vi gjøre fordi det er lurt. Også har man et litt lettbeint forhold til et forretningscase. Så igangsetter man en utvikling, egentlig ved å hoppe ganske elegant over de første fasene i et prosjekt og hopper rett inn nesten i et sånt fase 3 løp. Det kan hende at det har vært noe underliggende som har blitt kalt fase 1 eller 2 men det har på en måte vært ganske enkelt tatt frem. Så man har hatt en litt uklar sti og litt uklare forventninger. Også har man kanskje heller ikke hatt et bilde på hvem som er stakeholdere, hva som er viktige kriterier, risk management håndtering i prosjektet. Det har også handlet om kompetansen som har blitt satt inn i prosjektet. Sånn som nå så kjører vi jo med prosjektledere som er skolert igjennom et metier program. Det høyner jo kvaliteten selvfølgelig å få inn kompetanse." (Fram) (13)

"Så er de viktigste kriteriene for at en prosess skal være god. For å sikre et prosjekt, er at man har klar bestilling. Og forventningsavklaring." (Fram) (14)

"Det som er viktig nå er å bruke nok tid på planlegging. Tåle at man har litt treg start. At man får gjort de elementene som er kritisk, men man skal ikke dra det så langt at det blir en stor byråkratisk prosess som gjør at man ikke kommer videre. Det handler om å finne et eller annet i mellom. Ha en god oppdeling i forhold til tidsperspektivet. Det skal brukes mere tid slik jeg tenker det, hvis dette fungerer godt på fase 1 og 2. Og mindre tid på fase tre. Slik at når man igangsetter utviklingen så har man en mulighet til å treffe det som er 'time to' marked. Det handler jo om å dra det opp i risk management og grad av usikkerhet. Avklare usikkerhet underveis slik at man har et så klart scope som mulig." (Fram) (15)

"De gangene der produkt faktisk har vært inne i spesifikasjonen og tenkt seg om. Produkt trenger ikke nødvendigvis å ha skrevet en spesifikasjon, men de må vite hva de vil ha. Så er det utviklings jobb å sørge for at de forstår hva produkt vil ha. Hvordan produkteier kommuniserer, det er ikke relevant, men de må vite hva de skal ha. For ellers så skjer det som ofte skjer—og det skjer også hos oss—at utvikling da ikke har nok informasjon. Så går de igang etter beste evne. Så når de da kommer tilbake med noe så sier produkt at det var jo ikke sånn de skulle ha det. Så blir det en del ekstra arbeid som tilfaller som gjør at det eskalerer i kostnad og tid." (Gaspée) (16)

Dokumentering

"Å det å ha det dokumentert, føler jeg er den største mangelen i dag på de som driver med produktutvikling. De har det ikke dokumentert. Det er synsing på et par slides og noen møte-referater og det er det. Det er alt for dårlig." (Emma) (17)

"Det må være et omfattende kravsett. Det må være designdokumenter som beskriver hvordan du har tenkt til å bygge det. Det må være en plan som dokumenterer en gjennomføringmodell, en WBS, kostnader, tidsbilde, risikoanalyse, resursbehov. Altså det må være dokumentert." (Emma) (18)

"Og jeg tenker at det viktigste man gjør er det helt banale, med at man faktisk gjør analyser og dokumenterer resultatene. At det blir faktabasert og ikke bare noe man gjetter på og synser om." (Emma) (19)

"Jeg tror man kunne gjort det tydeligere. Hvem som skal være med og hvordan du dokumenterer disse Go/No-go igjennom de forskjellige fasene. Hvordan har du organisert det. Hvem som skal være med i møtene. Og få inn en signatur slik at de føler litt mer forpliktelse på det. Og skjønner det at om man sier ja til å gå videre med noe så innebærer det jo denne kostnaden. Og du bruker de resursene som kunne vært brukt til noe annet." (Bismarck) (20)

Funn som beskriver relevant informasjon rundt temaene i problemstillingen

Kategori: Andre relevante funn

Kilde: Intervju

Beskrivelse av funn

ACME Division generelt

Effektivisere prosjekter

"Det som er viktig for oss nå er at vi utvikler produkter. Smartere, raskere og mer effektivt. Med et helt annet fokus enn det vi har hatt tidligere. Det er masse å hente opp i olje fortsatt. Det er bare vi som må gjøre ting smartere. Mer effektivt. billigere produkter og billigere utvikling. Produktet blir jo prisa utifra hva utvikling har kosta." (Ariel) (21)

"*Spørsmål: Du sier at prosjektene hovedsakelig skjer i fase 3. Når kuttes de?* Aldri! Det er en kjempe utfordring, fordi prosjektene slutter aldri. Og grunnen til det er at i den hva fasen så skriver man en del ting. Og når det kommer til stykke så har man gjerne mer med eller mindre detaljgrad en det som er realistisk innenfor kostnadsrammer eller leveringstid. Det vil si at man ofte leverer 80%. Da ligger det igjen 20% da. Og det har vi selvfølgelig intensjoner med. De tar vi neste gang. Og det er en god ide det. Under forutsetning av at det ikke kommer inn et nytt prosjekt som kommer inn og trenger all oppmerksomhet. Som også legger igjen 20%. Derfor blir det fryktelig vanskelig, ofte å klare å fullføre. For oss så er dette veldig tett relatert til at vi reiser ut til en kunde og installerer. Da lager vi en release prosess og vi sørger for at dette vil skje på en sånn måte. Gjerne i siste liten. Sånn at når vi sender en mann ut så får han siste softvareversjon og installerer den." (Gaspée) (22)

"Ja. Den kostnaden med å sende en mann slik må vi betale selv. En sånn tur er en betydelig kost som går rett på bunnlinja. Men det syntes ikke så godt. Dessverre. Også er det slik at når vi sier at vi har levert noe til en kunde. Selv om vi vet at det er 80% så hører salg at det er levert også selger de det en gang til. Eller de selger under forutsetning av at dette har vi gjort så da selger de det med en liten videreutvikling som forutsetter at man bygger videre på det man allerede har gjort. Også tar man prisen for den differansen man da skal levere. Og da viser det seg at for å levere mangler de 20%ene og dermed begynner dette å eskalere. Også må man ta snarveier for å klare det. Så blir det bare flere og flere snarveier." (Gaspée) (23)

"Effektivitet og kvalitetssikring er det som har vært bakgrunn for hele det arbeidet som har blitt gjort med å lage prosessen. Det er jo fordi at det vi ser at vi har hatt så mange prosjekter, der vi har hatt stor grad av usikkerhet. Du vet aldri kostnadene for å bli ferdig. Det har bare vært å (24)
pøse på mer underveis. Og med en drastisk endring i markedet rundt oss, går ikke det lengre." (Ariel)

Historisk gjøremåte

"Det som ofte skjer er at vi får solgt noe. Selgeren sier: 'Jeg har solgt det'. eller de spør: 'Skal vi lage det?' Også har ikke produkt nødvendigvis gjort en god nok plan på hva strategien er. Også sier de: 'Ja det er sikkert fint'. Eller så sier management: 'Vi skal selge et visst antall timer i år, eller så må vi si opp noen', og da sier vi selfølgelig 'selg, selg, selg'. For det er realiteten har vi hele tiden kunder og leveranser vi hele tiden må forholde oss til. Derfor så blir bildet mere komplisert." (Gaspée) (25)

"Alt har en tendens til å bli veldig dominert av forpliktelser til kunden. Den kunden er den som betaler og dermed så kommer ofte strategiske ønsker fra produkt, eller utviklingsønske om å fullføre i baksete. Dette er jo det klassiske med at man pådrar seg teknisk gjeld i produktet." (Gaspée) (26)

"For den vanlige tankegange som har vært her i alle år har vært det at, nå har vi en ide, så da lager vi produkt. Så lager du produkt." (Discovery) (27)

"Historisk sett har det blitt brukt lite tid egentlig tidsmessing på fase 1 og 2 også har man gått rett på fase 3. Også har det gått alt for mye tid der." (Fram) (28)

Fase rapporter

"*Spørsmål: siden det har vært fase rapporter som dekker fase 1 og 2. Hva inneholder de rapportene?* Litt forskjellig, men vanligvis defineres veldig kort hvilket produkt som skal lages. Det kan også være med noe som ser på et markedsforhold. Det kan stå noe om noen beregninger på estimater om hvor stor oppgaven er. Utvikling. Hvilke eksterne krav det er. Partnere. Noen ganger kan det være med kostpris om det er et produkt du skal produsere. De fleste tingene du trenger for å kunne gjøre en beslutning på om du skal kjøre eller ikke. Jeg har sikkert glemt noe her jeg sitter å ramser opp. Det kan være noen tekniske føringer også. Om det er gjort noen tekniske for undersøkelser. Men det er veldig stor variasjon på om det er gjort eller ikke." (Bismarck) (29)

"Tidligere så var det kun fokus på fase 3. De to første fasene var ofte ikke faser annet en det ble skrevet rapporter. En form for faserapporter. Det ble nok gjort en del av de aktivitetene, men de ble ikke gjort som prosjekter. Med forholdsvis høyt fokus på prosjektet og resursene og kompetansen som skulle være i. Det må annen kompetanse til i en business case utredning en i en implementering av en hardware eller software funksjonalitet." (Ariel) (30)

"Det er gjerne produktsjef som har ivaretatt fase 1 og fase 2 delvis. Så det har kun vært fokus på det tekniske i stor grad. Lite fokus på det kommersielle. Altså det med har vi kompetanse har vi penger har vi. Altså return on investment problematikken." (Ariel) (31)

"Fase 1 og fase 2 har vært veldig fokus på at det rapporten skulle være. Man skulle godkjenne rapporten. Ikke se på det som kommer ut ifra de grunnleggende aktivitetene." (Ariel) (32)

"Erfaringsmessig, hvis du spør hva som skal til for å lykkes eller ikke. Det er at vi ser at veldig fort så kommer produkt på bakbeina. Og så etableres prosjektet basert på en headline. Dette er det vi skal ha, det skal gjøres sånn og sånn. Også er det noen som har putta fingeren i været og sagt at det tar så lang tid og koster så mye. Så om du begynner å titte litt under så er det ikke tuftet på så mye mere en business casen. Det er relativt stor usikkerhet knyttet til dette. Det er det vi gir over til utvikling. Så spør utvikling hva dette er og kommer med veldig mange spørsmål. Produkt har en tendens til å si at nå må de gjøre noe annet. De har ikke tid til å hjelpe." (Gaspée) (33)

"Det er jo veldig viktig at prosjektene som kjøres passer inn i strategien. Hvor godt det har vært fundamentert det er... Du ser et behov og du trenger det nå. Da trenger du ikke se på strategien. Jeg skal selge dette produktet og trenger jeg det før markedet forsvinner. I noen tilfeller er det allerede solgt. Det varierer fra prosjekt til prosjekt." (Bismarck) (34)

"*Spørsmål: De rapportene. når de da ikke har blitt gjort en helt prosjekt ut av det. som fase 1 og fase 2. har de samme aktivitetene vært tilstede i selve rapporten?* Ikke i det omfanget, og ikke så spesifikt som det er i den nye prosessen nei. Så det er en av årsakene til at den nye prosessen er laget som den er laget. Og i tillegg til det så var det jo fokus som sagt på rapportene. Og da en rapport ble jo da fort så voldsomt på mange mange sider. Og det å gjøre beslutninger på en haug med sider. Istedenfor en summary." (Ariel) (35)

Prosjekter termineres ikke

"Altså når man har startet det, så skal man levere det. Det er det som har vært historien. Også er det det vi ønsker å gå til livs." (Fram) (36)

"Slik det historisk har vært så er de som er med i prosjektet de som ønsker prosjektet. Og du har kanskje også hatt en eier som egentlig ikke vet hvorfor han skal ha prosjektet. Også tenker man at man må bli ferdig med det man har startet med. Kan jo ikke bare si at det er bortkastet. Den treffer mange ting. Den er veldig aktuell for oss den der altså." (Fram) (37)

"Det kommer litt an på hvilken fase du er i utviklinga. Hvis du utvikler mye i fase 1 og fase 2 så har du ikke brukt masse kostnader på å utvikle hardware for eksempel." (Discovery) (38)

"Vi er veldig dårlig på å drepe prosjekter. Vi har jo to prosjekter i dag som har gått langt over tid, scope, kvalitet og flere ting. Også må man vurdere å lære av det. Hvorfor lar vi de bare fortsette. Det er sånn at du kommer til veikrysset også fortsetter du å gå et lite steg til fordi du tror på at ting skal bli bedre." (Discovery) (39)

"Det har vel nesten ikke vært stoppet et eneste prosjekt, fordi når man har kommet så langt som til fase 3 hvor man egentlig skal begynne å implementere, realisere, så er jo alle de gatene som skulle ha vært foran, de er ikke der." (Ariel) (40)

"Det har vært få prosjekter som har blitt stoppet, fordi at det når du har kommet så langt at du må ha et nytt produkt eller en ny versjon så baller det bare på seg. Så det som i utgangspunktet skulle ha vært småtterier som koster 1 til 1.5 mill kan fort balle på seg til å koste både 5 og 10 millioner." (Ariel) (41)

"Jo tidligere du kan stoppe et prosjekt desto billigere er det. Bare sånn for å visualisere litt. Hvis du tenker deg antall prosjekt i forhold til hvor du har gjort jobben. Altså hvor har det blitt gjort mest jobb i forhold til de fasene i AD sin historie. Det vil si at det er nesten ingen det er gjort 'feasealitity study' på. Men det har hoppet rett på realisering. Så hvis du da skal stoppe et prosjekt i fase 3, så blir det veldig dyrt. Eller du ser at vi har brukt så mye penger. Det blir dyrt å stoppe det nå så da må vi bare kjøre det ferdig. Men om du kan gjøre det motsatt, hvis du kjører mange prosjekt igjennom 'feasability' og konsept først og så stopper dem der. Så er det ingen kostnad mot for å stoppe det når du er i gang med produksjon." (Discovery) (42)

Beslutningstakere er blitt vandt til for optimistiske estimater

"Enten er det fordi vi er for optimistiske, og ser bort ifra alle usikkerhetene som vi da ikke tar høyde for, og om vi hadde tatt høyde for det så er beslutningstakerne ikke vandt med at du tar høyde for det. Det betyr at når de sammenligner med andre prosjekter så er de vandt med de optimistiske estimatene og tar beslutninger på basis av at det er normen. Så om du tar høyde for en del usikkerheter som er hensiktsmessige i forhold til de usikkerhetene man ser, så kan det bli vanskelig å få aksept for det. Da ender det ofte med at man på en måte justerer på tallene slik at det blir positivt. Det er jo en dårlig praksis." (Bismarck) (43)

"Det vi veldig ofte bommer på, om jeg skal si det på den måten. Det er tiden, hvor lang tid prosjektet tar. Det påvirker selvfølgelig return on investment." (Bismarck) (44)

Stor utfordring å implementere PROCen

"I og med at vi har ny PROC og det er første prosjektet for prosjektlederen, så blir det jo en prosess det å lære seg å følge den instruksen også. Det kommer mye godt ut av å kjøre veldig etter instruksen. Det er klart, til å begynne med så går det tregt, men etterhvert som man kommer inn i det så har man da et prosjekt som får med seg alt. Det er svært lite som blir utelatt. Det er svært lite som blir glemt fordi instruksene styrer såpass i detalj. Så den gjør at vi må se på tinga. Vi må sette oss inn i tingene. Vi må ta et større standpunkt til de spørsmålene som er i instruksen der. Enten det er relevant eller ikke." (Carpathia) (45)

"Utfordringa er jo implementeringa av denne PROCen. Rett og slett fordi det involverer så mange." (Discovery) (46)

"PROC0002 går enda videre enn det. Den går jo ikke bare på utviklingsavdelinga. Den tar jo med produktgruppa. Den tar med ledelsen. Den tar med altså hele organisasjonen. Fordi du skal utvikle business og business case, businessmodell. Samtidig som du utvikler et produkt. Du må tenke begge tankene samtidig." (Discovery) (47)

"Det andre er jo det at man må ha opplæring rundt det. Det er viktig at man regelmessig kjører evaluering på om ting fungerer. At man har en kontinuerlig forbedringsprosess. Og at du har ledelsesfokus på at prosess er et viktig verktøy for å lykkes." (Emma) (48)

"Også må du ha coaching av enkeltpersoner, grupper og avdelinger i å få det til å fungere. Klare å utøve en ny prosess, med nye rutiner. Det er en ting å definere det på papiret, men noe helt annet er å faktisk begynne å gjøre det." (Emma) (49)

"En endring er ofte krevende. Det gjør ofte litt vondt." (Emma) (50)

Den nye prosessen krever nye ferdigheter i organisasjonen

"Prosessen krever mye mer håndverk—altså ferdigheter—en det har vært vektlagt til nå. altså kompetanse i forhold til å gjøre de valgene ut ifra risiko eller andre kriterier, men det er de samme elementene. Business casen har alltid ligget som et bakteppe ved hver gate, for den må jo være forankret i strategien." (Ariel) (51)

"Det jeg tror er at det er viktig at organisasjonen forstår ansvarsområdene til de forskjellige rollene i prosessen. Og at de faste punktene i prosessen blir organisert på en god måte. Og de som inngår i for eksempel Go/No-Go møter osv. skjønner hva som er deres rolle. Hvorfor de sitter der. At det på en måte ikke er et teknisk detalj diskusjonsmøte fordi det var en gjeng ingeniører samlet på et møterom." (Bismarck) (52)

"*Spørsmål: Hva ser du på som de viktigste delene (oppgaver i tidlig fase, mellom fase og siste fase) av en utviklingsprosess?* Det er å se en total. Du har både enkeltindividet og ledelse og alt fra den enkelte utvikler til ledelse som forstår hva prosessen er, og hvor i prosessen man er. Man skal ikke nødvendigvis ha detaljkunskap på vært nivå, men man skal kunne forstå hvor man er hen og hva slags forventninger som er gitt." (Fram) (53)

Den nye prosessen krever nye ferdigheter hos stakeholdere

"Så det som skjer er at vår produktavdeling har gått fra å være en par tre hoder/timer til sales support. Til nå å måtte være tunge bidragsytere, produkt eiere i daglig tett interaksjon med prosjektledere og utviklere. Det er ikke sånn at det er produkt også er det R&D. Vi har prosjekter der det er resurser fra produkt og R&D som sammen jobber med å bygge backlogg, krav, design til å implementere, teste og levere. Og dette skiftet her, fra å være en liten salgs support avdeling til å være en kritisk produkt avdeling. Der har du veldig stor anomali og jeg tror nok at man egentlig ikke har sett at det er faktisk det som må til. Det må etableres en produktavdeling, produkteierskap med helt andre typer ressurser som har kompetanse til å jobbe med utvikling. Og det er en helt annen verden. Og tror jeg man faktisk ikke har sett." (Emma) (54)

"Det jeg savner er sterkere eierskap altså noen som eier prosjektet. Hvis jeg rapporterer opp med problemer utfordringer. At det er noen som kan hjelpe til å gi prosjektene rammebetingelser som gjør at man kan lykkes. Du kan være en veldig god prosjektleder, men om du har en dårlig prosjekteier så mislykkes du." (Emma) (55)

"Så det betyr jo det at i det man igangsetter et prosjekt så har man også en klar eier. Det er kanskje det som er mest kritisk. En klar eier som faktisk vil ha produktet utviklet. Som er en pådriver i prosessen. Setter krav og kaller inn til møter. Og ber om status. Ikke bare sier at jeg ønsker dette utviklet. Kjør på. Også går prosjektet. Så kommer man inn en gang iblant og er skuffet over at man ikke har kommet lenger. Det handler om en klar prosjekteier også. En prosjekteier som faktisk utfører eierrollen sin i henhold til prosjektlederplakaten." (Fram) (56)

"*Spørsmål: Når klarer man å unngå at prosjekter går over tid og budsjett?* De gangene vi klarer å unngå dette er når produktet setter seg i midten og avkrever releaseprosess som er veldig rigid. Og terper til de får det de vil ha. Og det har en tendens til å skli. Og sånn historisk sett her sånn, så har vi latt utvikling selv tar ansvar for releaseprosessen. Og trodd at det må jo være fort gjort. Og da blir det deretter også. Nå de siste releasene har vi selv tatt eierskap til det og kjørt. Budsjettene våre sprekker jo og vi bruker mer tid, men vi klarer å få mer kontroll over hva vi leverer." (Gaspée) (57)

Funn som beskriver de viktigste leveransene fra utviklingsprosessen

Kategori: De viktigste leveransene fra utviklingsprosessen

Kilde: Intervju

Beskrivelse av funn

Gate leveranser

"Sjekklista sier noe om hva som er forventet output fra fase 1 uavhengig av type produkt du utvikler, men det er en del aktiviteter som må være gjennomført med en tilhørende output. Da settes det opp parametere og kriterier som baserer seg på strategi (business og produkt). Og på leveranse fra aktivitetene/fasen som skal være kriterier for Go/No-go." (Ariel) (58)

"Det er den samme informasjonen men med ulik grad av modenhet. Det som skal være mest modent i fase 1 er jo business casen. Altså logistikk, eller hva skal jeg si, produktifisering. Å se på det trengs ikke før i fase 2." (Ariel) (59)

"Jeg tror sånn som jeg har lest PROCen at den fordelingen som allerede er laget der... Altså at du gjør mye på business casen og stakeholderanalysen og planlegginga i fase 1. Og så i fase 2 går mere over i produkt engineering jobbing. Så business case, stakeholderanalyse og planlegging. Det er det viktigste fra nummer 1." (Discovery) (60)

"Ja. Altså business casen den skal jo utvikles hele veien, men det blir mindre jobbing på den desto lengre utover du kommer. Stakeholderanalysen gjør du mest i starten så er det ikke så mye i konseptfasen. Men du må kjøre igang igjen her når du realiserer. Engineering er lite i starten men mye på slutten." (Discovery) (61)

Delspørsmål	**Ariel**	**Bismarck**	**Discovery**	**Emma**	**Carpathia**	**Fram**	**Gaspée**
Hvordan måle delene	Metodisk tilnærming	Møte	Basert på strategi og roadmapp	Defineres av eier	God dialog	Faste punkter	Kommunikasjon
Kompetanse (gate)	Businisscase Strategi	Markedsverdi Strategi Kostnad tid risiko Resurser Forpliktelese/ sporbarhet	Samme som starter prosjektet	Scope Kost Tid Marked lisvsyklus Kapasitet strategi Risiko	Styringskomitee	Sporbare besluttninger Ledergruppe Erfarne beslutningstakere Produktsjerer R&D sjef Involverer ledegruppa Definere stopp kriterier	
Kompetanse (Oppfølging)	tid scope budsjett		Økonomi Tid Krav Risk	Fremdrift Scope Tid Risiko Kvalitet Kost	Eier og linjeleder	I forhold til mandat	Fremdrift Scope tid kost Resurser
Hvor viktig er strategien	Veldig viktig	Viktig, men salg er viktigere			Viktig	Kritisk	

Tabell B.0.3: De viktigste aktivitetene i en produktutviklingsprosess ifølge de som ble intervjuet

"Du må jo ha informasjon om hva scopet i prosjektet er, hvilke funksjonalitet eller innholdet prosjektet skal ha. Det kommer gjerne som et resultat av ulike faser, sett av krav, egenskaper til systemet som man mener man trenger. At man er veldig tydelig på det. Hvis ikke så implementerer man jo i hytt og pine. Du må vite hva det kommer til å koste. Du må vite risikoen rundt det. Og du må vite så godt som mulig gjennomføringsplanen. Det er sånne basisparametere som du må ha under hver gate, bare at du blir mer og mer nøyaktig lengre ut i løpet. Det er basisen." (Emma) (62)

"Det som kommer i tillegg det er jo selvfølgelig de vurderinger man gjør i forhold til kunder og markedet. Er det noen som vil kjøpe det?. Volumer, forretningsmuligheter som man typisk detaljerer. Men dette er typisk ting man fokuserer på i tidlige faser. Til vi beslutter at nå skal vi kjøre. Hva gjør konkurrenter? Det må man ha grep på tidlig. Før man bruker penger unødvendig. Livssyklus-parametere. At man får et tidlig bilde av hva som trengs for å drifte og vedlikeholde systemet. At man ikke går seg bort der. Også lønnsomheten i forhold til bedriften. Vi trengte scope, tid, kost og de basistingene som er de øvrige parametrene som du må se på i forhold til om dette er lønnsomt for bedriften. Det er derfor man gjør det. Men i det så er det jo ulike faktorer ikke sant. Om kunder, markedet, konkurrenter, din egen organisasjon. Evner organisasjonen å levere det på kort og lang sikt. Kompetanse, kapasitet. Kanskje må du etablere en helt ny driftsavdeling og vedlikeholdsavdeling." (Emma) (63)

Kontinuerlige leveranser

"Altså prosjekteier i den prosessen som vi har laget nå er oppdragsgiver og får mandat fra prosessen til å starte å eie et prosjekt. Den etablerer da budsjetter og prosjekt i henhold til det mandatet og da blir forholdet mellom prosjekteier og prosjektleder på økonomi og risiko og framdrift." (Ariel) (64)

"Prosjektlederens ansvar er å rapportere inn avvik i forhold til de mandat som er satt ned." (Bismarck) (65)

"Det vanlige når du kjører et prosjekt og du har en prosjekteier og en prosjektleder. Så er det vanlige å rapportere på er økonomi, tid, krav, altså klarer du implimentere kravene eller ikke. Så er det også viktig å rapportere risikobildet." (Discovery) (66)

"En konseptfase for eksempel kan også vare i flere måneder hvor man vil ha oppfølging underveis, men ikke minst i realiseringfasen hvor man kan ha måneder og år med implementering. Og da er det helt avgjørende at du har prosjektdata oppdatert. Kall det prosjektrapporter på fremdrift, teknologiutviklingen, tidsplan, risikoen rundt det hele, kvalitet." (Emma) (67)

"Vi har jo satt opp månedlige rapportering som et tiltak. Også skal du jo også strengt talt som prosjektleder i henhold til et mandat, så skal du jo melde når avvik oppstår. Så i utgangspunktet så skal jo du utføre en bestilling. Utifra et prosjektmandat som du har blitt tildelt og noen milepæler som står på den blokka. Så er det jo ditt ansvar som prosjektleder å melde om det blir avvik på plan. Og det er jo flere måter å gjøre det på. Er det noe som kommer, noe som trenger et umiddelbart tilsvar, så handler det om å melde opp til prosjekteier og han må da ta et valg. Slik blir det jo uansett, men det kan du gjøre der å da. Alternativt er at det ikke er så kritisk slik at du kan vente til rapportering som er en gang i måneden." (Fram) (68)

"Scope, tid, kost er likt igjennom hele. Fordi for meg er dette bare et av mange" (Gaspée) (69)

"Jeg vil ha fortløpende fungerende kode. Jeg vil se. Det er en sånn utfordring vi har her fordi det settes ikke opp demo på testlabbene, det bare sies at vi har gjort det. Det gjør at jeg ikke er komfortable med det. Også vil jeg ha rapporter som en leveranse på fremdrift. Altså økonomi, kost, tid, pris og resurser. Tilstrekkelig informasjon. Jeg er ikke interessert i detaljene. Spesielt ikke hvis vi er på tid. Fordi jeg vil vite så fort som mulig hvis det er en grunn til at vi ikke skal komme i mål med det vi har planlagt" (Gaspée) (70)

Funn som beskriver hvordan utviklingsprosessen bør måles for å avgjøre om prosessen skal gå til neste fase av utviklingen

Kategori: Hvordan utviklingsprosessen bør måles for å avgjøre om prosessen skal gå til neste fase av utviklingen

Kilde: Intervju

Beskrivelse av funn

Ulik kompetanse i gate komite og styringskomité

"Så for å sitte i de gate komiteene så kreves det ulik type kompetanse i forhold til å sitte i prosjekt, rapport og styringskomiteer." (Ariel) (71)

"Fase 1 er et prosjekt som starter og stopper. Outputten fra det prosjektet går inn til en gate i prosessen og de som følger opp prosjektet underveis og sikrer fremdrift og tid kost kvalitet, bør og skal ikke være de samme som sitter i den gaten som beslutter om vi skal fortsette eller ikke. For det er nemlig start stopp av prosess og ikke prosjekt. De må ha en annen forretningskompetanse og strategisk kompetanse enn de som følger opp nede i prosjektene." (Ariel) (72)

Måling ved gate

"Strategi må jo være alpha omega og bakteppe for en hver beslutning i gatene. Hvis man velger å gå bort fra strategien så er jo det en strategi også, men da må jo det være reflektert. Når det er sagt så har vi ikke vært særlig gode på strategi prosesser. På business strategi prosesser har vi vært litt for dårlig." (Ariel) (73)

"Da har du Go/No-Go mellom de fasene. Og det mener jeg skal være et møte, men da må det være definert hva du skal gi som inputt. Og under realisering så har du en styringsgruppe for prosjektet." (Bismarck) (74)

"Om du skal kjøre videre da må du vurdere leveransene fra den fasen du akkurat har vært i. Også må du vurdere om å fortsette dette prosjektet fortsatt gjør nytte. Passer det i strategien. Er det viktig i forhold til pengebruken. Det må stå noe om budsjett og det må stå noe om hva kan det her leverer. Kan det levere mer? Også hvor lang tid vil det ta i forhold til de andre initiativene du har. Risikoen må også vurderes. Det siste elementet er ressursene." (Bismarck) (75)

"Jeg tror fortsatt at eier som skal ta beslutningen, må jo knytte dette opp mot sin overordnede produktstrategi. Så den knyttning må de jo ha. Og de må vite hvilke initiativer de har i gang på de forskjellige stedene i prosessen. Som er viktig for å knytte strategien i forhold til hverandre." (Bismarck) (76)

"Det er jo de samme som starter prosjektet for å si det sånn. De bør jo ha noe å si på om du går videre eller ikke. Uten at jeg sier hvem som er med i starten. Fordi det vet jeg ikke." (Discovery) (77)

"Det er jo kanskje de bitene av utviklingsmodellen vi har kommet kortest på. Altså å definere opp det mer konkret. Det blir opp til de som styrer prosjektene om hvilke kriterier de vil legge til grunn for å sende et prosjekt videre og bruke mere penger. Så det er jo egentlig noe som man kan bestemme litt fra gang til gang." (Emma) (78)

"Kort sagt om det her med måling. Innhold, omfang, altså scopet, hva det koster og hvor lang tid det tar å realisere det. Det er basisen. Kunder, marked, konkurrenter, livs syklus, strategi, risiko. Også har du da tilleggsfaktorer som går på kunder, marked, konkurrenter, livs syklus kost. Også selvfølgelig tilknyttingen til strategien til virksomheten. Det totale risikobildet for å gjøre en totalvurdering av om det er lønnsomt." (Emma) (79)

"Og på kriteriene på å gå videre med et prosjekt så handler det om at det skal muliggjøre en forretning. Det skal på en måte skape en verdi, enten på eksisterende produkt, eller så skal vi dra det vider og det skal være noe nytt." (Fram) (80)

"Så det handler jo om forventnings-avklaringene mellom prosjektleder og prosjekteier. Og når gaten endelig står der så kan jo dette være et større strategisk prosjekt som påvirker flere og da handler det om at en ledergruppe er involvert i å få vite om og eventuelt påvirke den besluttingen." (Fram) (81)

"Altså hvis du tenker et prosjekt som er startet så er det jo den samme gruppa som involveres til endring på bestillingen. Som den som startet prosjektet." (Fram) (82)

Forskjellig fokus for forskjellige gater

"Det blir de samme tingene som må vurderes på hver gate. Det tekniske er på en måte noe underordnet i gaten. I utviklingsprosessen. Det er ikke der den store teknologien skal presenteres. Det er bare de store retningene for businessen, så forretningskompetanse er alpha omega i gatene." (Ariel) (83)

"De samme parameterne vurderer du egentlig igjennom alle gatene. Det er bare at det du har mest fokus på det varierer fra gate til gate." (Emma) (84)

Organisasjonen må forstå ansvarsområdene til de forskjellige rollene i prosessen

"Det jeg tror er at det er viktig at organisasjonen forstår ansvarsområdene til de forskjellige rollene i prosessen. Og at de faste punktene i prosessen blir organisert på en god måte. Og de som inngår i for eksempel Go/No-Go møter osv. skjønner hva som er deres rolle. Hvorfor de sitter der. At det på en måte ikke er et teknisk detaljert diskusjonsmøte, fordi det var en gjeng ingeniører samlet på et møterom." (Bismarck) (85)

Besluttningstakere er vandt med for opptimistiske estimater

"Enten er det fordi vi er for opptimistiske. Og ser bortifra alle usikkerhetene som vi da ikke tar høyde for og om vi hadde tatt høyde for det så er besluttningstakerene ikke vandt med at du tar høyde for det. Det betyr at når de sammenligner med andre prosjekter så er de vandt med de optimistiske estimatene og tar beslutninger på basis av at det er normen. Så om du tar høyde for en del usikkerheter som er hensiktsmessige i forhold til de usikkerhetene man ser, så kan det bli vanskelig å få aksept for det. Da ender det ofte med at man på en måte justerer på tallene slik at det blir positivt." (Bismarck) (86)

Dokumentering og sporbarhet

"Også spore beslutningen. At det er et underlag som kan spores. Slik at vi er litt tro til det. Fordi da kan vi også underveis hvordan påvirker det, kulturen vår, hvordan påvirker det hva vi sitter igjen med i porteføljen. Altså å ta disse beslutningene i henhold til noen utvalgte kriterier." (Fram) (87)

Kontinuerlig måling

"Oppfyller du målet, også er det budsjett, også er det en plan, med leveranse date der du skal være ferdig. Også vil du normalt gjøre en return on investment analyse. Som baserer seg på budsjetter og tidsplan. Og det må du regelmessig vurdere i forhold til." (Bismarck) (88)

"Også må produkt eieren, eieren av selve prosjektet, velge ut de parametrene som betyr mest i denne enkelte casen. Fordi det vil variere. Noen ganger har du på en måte en viss pengesekk og det er det. Da styrer du utifra det. Andre ganger så har du noen andre mål. Også får du tilgang til pengene du trenger. Totalt forskjellige prosjekt. Og det må produkteier være veldig bevist på. Men akkurat dette her med å være tydelig i forhold til gatene er nok der vi er definert minst og kommer kortest på. Og det er der produktutviklingsprosessen treffer produkt management prosessen. Der er det en del ugjort arbeid i forhold til å få modellen til å fly. Der er vi ikke ferdig." (Emma) (89)

"Jeg må ha kontroll over tid og scope. Jeg må kunne være sikker på at når jeg ber utvikling om å gjøre en bestemt rekkefølge oppgaver, så er det den rekkefølgen de gjør. Også må jeg ha en forventning til at hvis de sier at de gjør ting til en viss tid, altså at de forskjellige oppgavene tar forskjellig tid, så må jeg ha tillit til at innenfor en realistisk margin, stemmer det. Selvfølgelig så vet vi at noen ting er letter eller mer komplisert enn det vi trodde og prioritetene stokker seg om hele tiden." (Gaspée) (90)

"En forutsetning for at ting skal gå bra er egentlig at kommunikasjonen mellom produkt og utvikling er god. Og her er det stor variasjon. Man dras mellom veldig mange avdelinger, slik at ofte kan utvikling risikere å ha lite kapasitet hos produkteiere. Det er et problem. Også har du ofte veldig dyktige utviklingsteam, men iboende har de ikke egentlig noen stor interesse for budsjetter eller planer. De finner sin motivasjon i hva de skaper. Så de har en tendens til å kanskje overspekke eller dra avgårde i feil retning. Det er det viktigste produkteieren gjør her er å gå inn å passe på at vi lager det riktige og ikke sporer av. For det finnes veldig mange eksempler på prosjekter som blir teknologidrevet. Så de som fungerer best er der produkteieren er inne hele tiden og er egentlig ganske godt nede i detaljene og jobber sammen med teamet. Du har en aksept om rollefordeling." (Gaspée) (91)

Prosjekter er bare i fase 3

"Erfaringsmessig er vi i fase 3 hele tiden. Alle eksisterende produkter er bare i fase 3 hele tiden. De bare itererer. Så det er fase 3 som er interessant å ha kontroll på." (Gaspée) (92)