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Management Control for Market-Driven Innovations: The Role of Calculative Practices in a Stage-Gate Development Process

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Abstract

The perception of how to use management control for innovation has shifted over time, from first being seen as detrimental, to researchers recognising its facilitative potential (Ylinen & Gullkvist, 2014; Chenhall & Moers, 2015). Previous research has investigated the role of calculative practices in an innovation setting, finding that also formal calculative controls can be enabling (Mouritsen, Hansen, & Hansen, 2009; Revellino & Mouritsen, 2015). Furthermore, previous studies have shown how a stage-gate model can provide enabling control in the innovation process (Jørgensen & Messner, 2009). This study contributes to the earlier literature by investigating the role of calculative practices within a stage-gate product development process, thereby synthesising the two concepts. Using a case-study of a highly innovative and successful industrial company, InduCorp, this study investigates the issue in a context of a purely market-driven business using the concepts of bottom-up and top-down management to understand why and how the calculative practices functioned in the development process. This study provides three distinct contributions. First, we show that a calculative practice can assume different roles in different phases of the development process; shifting shapes according to organisational needs. Second, we argue that the structure of the project team is able to impact the role and function of the stage-gate as a control tool. Third, we provide empirical evidence on how management control and calculative controls work in the specific context of market-driven innovations.

Keywords: Management control, management control systems, calculative practices, management accounting calculations, stage-gate, innovation, market-driven innovation
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1. Introduction

In a fast-changing world, innovation has for long been considered a critical determinant of long-term performance in business and organisations and how to manage innovation has been, and is still today, of utmost interest to understand. During a long period of time, management control was seen as being detrimental for innovations (Bisbe & Otley, 2004; Kanter, 2001; Ylinen & Gullkvist, 2014). With the introduction of Simons' LOC-framework (1995) and subsequent research in the end of the 1990s the literature shifted perspective towards seeing management control also being able to facilitate innovation (Chenhall & Moers, 2015; Nixon, 1998; Revellino & Mouritsen, 2015; R. Simons, 1995).

While the research paradigm following Simons' ground-breaking discovery on management control for innovation has largely been focused on the issue of *if* formal controls can enable innovation, the relevant literature of today instead put its focus on *why, where* and *how* management control can enable innovation (Bedford, 2015; Mouritsen, Hansen, & Hansen, 2009; Revellino & Mouritsen, 2015).

Among formal controls for innovation two well-known concepts that have been investigated, but in a limited way, are the role of calculative practices (Revellino & Mouritsen, 2015) in controlling innovation, and the role of using a stage-gate model (Cooper, 1990; Jørgensen & Messner, 2009) to structure the development process and gain control.

However, no research has explicitly looked into the role of calculative practices within the stage-gate model, and which different roles it plays through the different stages of the process. The stage-gate model is a well-known innovation management tool (Cooper, 1990) focusing on structure and formal gates that need to be passed in order to proceed with the project. Still, the role of calculative practices within this process is unclear. Being two systems used in trying to create a productive development process, the way that they interact with each other is of high practical relevance to organisations pursuing effective and efficient product development.

Furthermore, the previous literature on innovation and calculative accounting practices with regards to how accounting can facilitate innovation remains underdeveloped. Consequently, how the same type of calculative practice work in different situations of innovation is in need of further research.

While Mouritsen et al. (2009) and Revellino and Mouritsen (2015) addresses innovation and calculative practices, and Jørgensen and Messner (2009) investigates a stage-gate model and

innovation, the two systems have not yet been studied together. The intersection of the two therefore constitute a gap within the previous literature which this thesis aims to address. Based on this, the study has been directed and driven by trying to answer the following research question: *What is the role of calculative practices in a stage-gate innovation process?*

In order to fill this gap and answer the research question, we conducted a case-study of a highly innovative industrial company with a very clear and outspoken market-driven business orientation. To understand why and how the calculative practices worked in the stage-gate process and in the context of a purely market-driven business orientation, we utilised the management theories for bottom-up versus top-down management. As this dichotomy represents contrasting ways of structuring the innovation process, as well as comes with different strength with regards to ensuring efficiency and effectiveness, it presents an interesting perspective for understanding management control in this particular study.

We contribute to the previous academic literature in three distinct ways. First, we demonstrate how one single calculative accounting tool was able to assume multiple roles throughout the product development process in order to address the shifting needs and manners in which the phases were structured with regards to bottom-up versus top-down management. The calculative tool took the roles of idea generation, idea validation, discussion tool and technology-gap highlighter at different stages of the process.

Second, we argue that the structure of the mixed and through the process consistent project team could ensure financial consciousness within the project and thereby replacing one of the functions of the stage-gate model as presented by Jørgensen and Messner (2009). In doing so, we add to the underdeveloped literature targeting the intersection of stage-gate models and its role as a management control tool. By ensuring tensions within the project group between marketing with a financial and profitability focus and R&D with a product quality focus, the stage-gate's role of providing financial consciousness was not essential.

Third, by studying a case organisation that was explicitly market-driven and highly focused on innovations, we also answer the call by Chenhall and Moers (2015) for developing the understanding for the role of management control in innovations that are market-driven in comparison to technology-driven. By providing new empirics from an organisation with an explicit market-driven focus our study contributes with an understanding how the combination and controlling for bottom-up and top-down thinking in different phases, but with one single calculative tool lead to successful and both effective and efficient market-driven innovations.

The remaining part of the thesis will be structured in the following way. Section 2 will provide a thorough theoretical background of earlier research within management control for innovation in general and calculative practices and stage-gate systems in specific. We will motivate our research and present the theoretical framework for studying calculative practices in the stage-gate process. In section 3, further information on the selected research method will be presented and section 4 will present the empirics and data from the conducted field study. In section 5 we analyse the empirics with the theories discussed in section 2, leading up to our final conclusions and contributions presented in section 6. The paper will be ended with a discussion of limitations and provide some topics where we have identified a need for further academic research.

2. Theoretical Development

In the following section, we will provide an overview of the theories used in investigating our research question: *What is the role of calculative practices in a stage-gate innovation process?* The section will begin by examining the existing theories of management control for innovation and motivate our study of the role of calculative practices and a stage-gate development process in the context of a market-driven business. Sequentially, a section concerning the specific management theories for market-driven innovation follows, together with an introduction to the concepts of bottom-up and top-down management. By combining previous research on management control for innovation with the management theories in the market-driven organisation we develop a framework we can use in analysing the role of management control for innovation in our studied case organisation.

2.1. Management Control for Innovation

To provide a thorough background of the theories concerning our research topic, we will present our domain theory of management control for innovation in three different steps. The review starts by emphasising the importance of managing innovation and the evolution of management control for innovation in academia. Second, an overview of the fragmented definitions of management control used in earlier research and a clarification of which perspective we assume for the purpose of this study is presented. As a third step we investigate more specific theories connected to our study of formal management control systems (MCS) in the innovation process. The section is closed by discussing gaps in the current research in general and providing a motivation for our research question in specific.

2.1.1. The Evolution of Management Control for Innovation

The Importance of Managing Innovation

Innovation has for a long period been considered a critical determinant of long-term performance in organisations and businesses (Bisbe & Otley, 2004; Kanter, 2001; Ylinen & Gullkvist, 2014). Today, we are living in a time when economic conditions are changing rapidly and products' life cycles are shortened (Kuecher, 2013; Li, Li, Liu, & Wang, 2005), causing innovation to be critical for organisations' survival. As such, how to structure an organisation in order to facilitate innovation and product development is a crucial issue for today's business environment.

In contrast to the early literature on management control (Anthony, 1965; Merchant, 1985; Ouchi, 1979; Rockness & Shields, 1984), more recent research has provided empirical evidence on the possibility of a facilitative relationship between formal management control and innovation (Bisbe & Otley, 2004; Chenhall & Moers, 2015; Moll, 2015; Nixon, 1998; Revellino & Mouritsen, 2015; R. Simons, 1995). As many companies struggle with innovation in an increasingly fast-changing world, the field of research on management control and innovation has been given more attention in later years (Bedford, 2015; Davila, Foster, & Oyon, 2009; Lövstål & Jontoft, 2017).

The Evolution of Management Control for Innovation

Over the last 40 years MCSs have developed from being relatively simple methods of control based on cybernetic[1] processes in formal closed systems, to becoming more complex and open controls (Chenhall & Moers, 2015). Simple controls in this setting is exemplified with budgeting focusing on cost deviations and described as being focused on internal operations monitoring deviations and enforcing corrective action, most often within a context of high certainty (Chenhall & Moers, 2015). Complex controls on the other hand could include budgets for new product development or be constituted by several simple controls being linked together, thereby creating a complex MCS. This evolution towards complex control has been driven by organisations' needs to manage increasing uncertainty and challenging settings as well as increased pressure to innovate and develop new products (R. Simons, 1995).

Early empirical research focused on established companies and their management of repetitive processes (Chenhall, 2003; Davila, Foster, & Oyon, 2009). The controls were mainly calculative or diagnostic (R. Simons, 1995) designed to keep the organisation within clear guidelines with deviations being seen as negative events. A well designed MCS would keep the deviations to a minimum, and in cases of unexpected events, quickly bring back the organisation to the predetermined path. Management accounting techniques such as budgeting and standard costs were used to implement strategies, and with regards to innovation, they were used for implementation but not to create ideas (Chenhall & Moers, 2015).

Empirical evidence has also been provided to show that formal management control actually could be detrimental for innovation (Damanpour, 1991). Studying the perception of financial

[1] Cybernetics is a concept for controls where a monitor compares what is happening at different sampling times, with some predefined standards of what should be happening, and based on this a controller adjusts the system's behaviour accordingly.

measures among R&D managers, Hayes (1977) found that the R&D managers considered financial measures (diagnostic controls) to be less effective in controlling R&D than in controlling other organisational domains such as marketing and production. Instead, the idea of informal, organic and cultural controls being important for innovation was widely accepted (Ouchi, 1979; Tushman, 1997).

Earlier research within management control theory was of the opinion that formal, diagnostic and calculative financial control tools (such as budgets), did not work in innovative settings where creativity was needed, and high uncertainty existed (Chenhall & Moers, 2015). In these settings more informal organic approaches to control was believed to be more suitable.

In introducing the LOC-framework based on his previous empirical findings, Simons (1987, 1991, 1994, 1995) broke new ground in arguing that formal controls not only could be used to constrain innovation, but also to facilitate it. The framework introduced four levers that Simons argued could be used to exercise organisational control; *belief systems, boundary systems, diagnostic systems* and *interactive systems.* While diagnostic systems adhere to the traditional view of management control in monitoring deviations and issuing corrective action, the notion of such formal controls being used interactively between different hierarchical levels was a key contribution to previous literature. Simons argued that interactive systems were to be used in the organisation to direct attention to strategic uncertainties, strategic renewal and innovation thereby stimulating dialogue within the organisation. Due to the looseness of interactive controls in comparison to the traditional diagnostic view on management control, the idea of using formal controls interactively resulted in a vast stream of research examining the relationship between interactive control systems and innovation (Bisbe & Otley, 2004; Chenhall & Moers, 2015; Davila, Foster, & Oyon, 2009; R. Simons, 1995).

Studies following closely after Simons (1995) provided evidence that was consistent with the underlying assumptions of MCS being relevant in uncertain environments and that the role of MCS (including interactive control systems) was different from the role described in the traditional paradigm (Bisbe & Otley, 2004; Bisbe & Malagueño, 2009; Nixon, 1998). Nixon (1998) contributed with the second ground breaking research within the subject in describing a facilitative relationship between a team working with product development and formal accounting and calculative controls. While this relationship previously had been found to be adversarial rather than facilitative, the view that broadly-based MCS is suitable in innovation settings was further investigated by other scholars (Bouwens & Abernethy, 2000; Guilding,

1999). Nixon (1998) concluded that innovation and cost consciousness was becoming more intertwined due to an increasing focus on customer needs.

With Simons (1995) and Nixon (1998) the opinion of the impact from formal controls in an innovative setting changed from only being detrimental to potentially being facilitative. Simons (1995) and Nixon (1998) showed that formal management control actually could enable innovation, however the question how (design), when, and where this would work remained unanswered.

Following the work of Simons (1995), other scholars have approached the intersection of innovation and management control with the ambition of examining the relationship between innovation and control using the LOC-framework, but also other theories. A common focus in the empirical studies on control and innovation has been the concept of interactive control systems and studies covering the topic have relied on the traditional cross-sectional survey research design grounded on contingency theory (Chenhall, 2003; Davila, Foster, & Oyon, 2009).

However, the research that followed has both been investigating formal and informal controls, often in an inconsistent manner. Also, the results of these studies have been fragmented with both positive and negative effects with regards to formal controls. For example, Bisbe and Otley (2004) were not able to identify any correlation between the use of budgeting, balanced scorecard (Kaplan & Norton, 1996; Kaplan & Norton, 2000), or project management with the innovativeness of a firm. On the other side Davila (2000) found a positive relationship between formal controls in the form of non-financial measures related to cost and design and product development. While the role of formal controls in innovation settings has been shown to have both positive and negative effects, a large amount of research has investigated the combination of formal and informal control with consistently positive results (Ahrens & Chapman, 2004; Chenhall, Kallunki, & Silvola, 2011; Merchant, 1985; Mundy, 2010; R. Simons, 1995; Ylinen & Gullkvist, 2014).

The research that has followed Simons (1995) and Nixon (1998) has investigated different topics, but the combination of formal and informal types of control has made the area rather fragmented why a clarification for this thesis is needed before moving forward.

2.1.2. Defining Management Control and Defining Innovation

Malmi and Brown (2008) describe how the lack of clarity, wide variation and inconsistencies in how management control is conceptualized have created a number of problems in analysing earlier research within management control. This is also the case in the literature targeting management control for innovation.

The different views on what is defined as management control could easily create confusion. For example, Chenhall (2003) as well as Bisbe and Otley (2004) take a broad perspective on management control. Bisbe and Otley define it as follows:

"The term Management Control Systems (MCS) refers to the set of procedures and processes that managers and other organizational participants use in order to help ensure the achievement of their goals and the goals of their organizations, and it encompasses formal control systems as well as informal personal and social controls." (p. 709)

This 'including almost everything' definition, should be compared to the narrower definition by Simons (1995):

"…formal, information-based routines and procedures managers use to maintain or alter patterns in organizational activities" (p. 5)

Since we aim to study management control and the initiatives managers can implement to impact the organisation, we are going to stick to Simons' definition of formal routines and procedures, thereby excluding informal controls. To achieve consistency with the earlier researchers in the domain that according to us have had most sincere impact, we define MCS in line with Davila, Foster, and Oyon (2009), which means formal processes and routines in line with Simons, but since we study MCS in the specific process of product development, MCS speaks to the systems that are used within this process. This means formal, both financial and non-financial practices and controls, including project milestones, reports comparing actual progress to plan, budget for development projects, project selection processes, calculative planning, stage-gate models, innovation policies etc. (Davila, Foster, & Li, 2009). (See also Jørgensen & Messner, (2009) and Carlsson-Wall and Kraus (2015) for similar definitions.)

After a clear definition of what MCS is, it is also important to clarify the second important concept in this research area – innovation. Innovation has in general terms been defined as the adoption of an idea pertaining to a product, service, device, system, policy or programme that

is new to the adopting organization (Danampour & Gopalakrishnan, 2001). An important distinction between creativity and innovation is important to understand as they are different but clearly linked concepts. Creativity is the creation and production of novel ideas, while innovation is the selection and implementation of these creative ideas into a finished product or service (Chenhall & Moers, 2015). We adopt the same view as earlier researchers have taken: "innovation is the creation and implementation of new products, services, and processes which result in significant improvement in outcomes" (Chenhall & Moers, 2015, p. 2). Creativity forms the starting point for innovation, but a successful innovation depends on more factors as well, including functions and processes for implementation.

The Current State on Formal Controls for Management of Innovation

Davila (2009) claims that in the new paradigm, formal control systems have taken the form of "flexible and dynamic frames adapting and evolving to the unpredictability of innovation, but stable to frame cognitive models, communication patterns and actions" (p. 327). This means technology road-maps, policies, advanced planning and calculations, stage-gate models etc. The purpose of these controls is to ensure confidence in taking projects from ideas to market launch and to continuously create profitable innovations, basically assisting in creating an efficient innovation process.

For this thesis we are going to put specific focus on two different but interrelated formal management control tools: calculative practices and stage-gate models.

2.1.3. Calculative Practices

Calculative practices, also referred to as management accounting calculations or accounting calculations, is a broad definition of calculations, including budgets, standard cost calculations, profitability calculations, gross margins, contribution margins, ABC-calculations, target costing etc. (Mouritsen et al., 2009; Revellino & Mouritsen, 2015).

In 1992, Robson argued that accounting calculations developed visibility and could create organizational time and space, meaning that accounting could form the managers' and the organization's perception of the world. The management accounting calculations often provide a large deal of the knowledge available for the management and help identify objects and objectives to be managed.

However, only recently researchers have started to show specific interest in the role of accounting calculations in relation to the product development process. Mouritsen et al. (2009)

argued that accounting calculations are not only mobilised by others as earlier perceived, instead the calculations themselves could mobilise others. They argue that this means that accounting also could mobilise for innovation. The management accounting calculations primary focus is not to describe or represent innovations in any detail but instead add perspective to the innovations and relate the innovations to the firm.

Using a case study, Mouritsen et al. (2009) show how management calculations in the form of sales performance, contribution margin and ABC margin were mobilised in relation to innovation. They suggested that these calculations through short translations, entailing a single calculation, either dismissed or approved the quality of a certain innovation while long translations entailed multiple calculations and was used to problematise innovation as a strategic issue and create debate. As such, the calculations functioned as mediating tools between innovation concerns and firm concerns.

Following Mouritsen et al. (2009), Revellino and Mouritsen (2015) continued to investigate the role of calculative controls in innovation and found that accounting calculations can create knowledge, in turn functioning as an *engine* (MacKenzie, 2006) for innovation. Rather than only describing the world, accounting calculations actually help to change it. When working as engines the calculations lure people into doing new things and inspire them to ask new questions and see new opportunities. As engines, the calculations could trigger a mobilisation of knowledge and insight which lead to more innovation. The new innovation leaves traces that can create new calculative practices, and because of this there is a dynamic relation between the innovation process and the calculative practices. The calculations work as engines and accelerates the innovations by working as recreating loops.

Calculative practices' role related to innovations is not only to make them visible as earlier thought by Robson, (1992). Calculative practices could mobilise innovation by working as mediating tools (Mouritsen et al., 2009), and it could accelerate innovation by creating knowledge and insight working as an engine and develop further innovation (Revellino & Mouritsen, 2015).

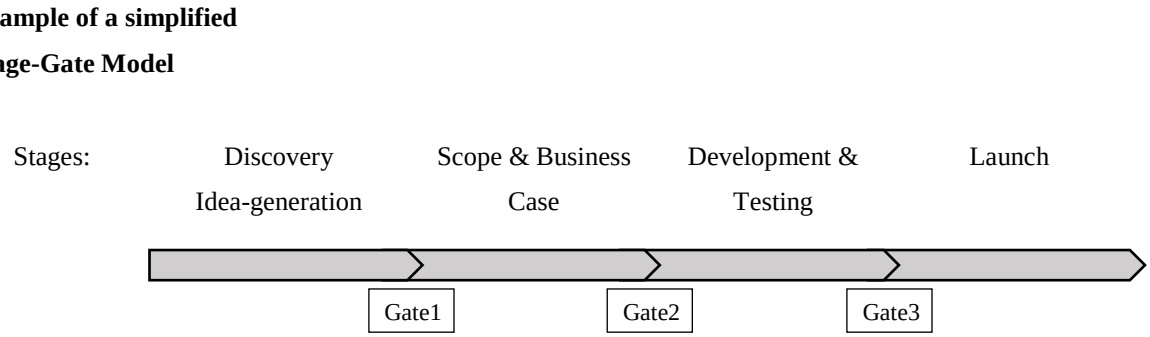
2.1.4. Stage-Gate Models

The stage-gate model has long been a well-known phenomenon within product development and is a process that was discovered and published 1985 by Dr. R.G. Cooper. Within the field

of management control and innovation, it has been classified as an important tool for managing the product development process (Cooper, 1999; Jørgensen & Messner, 2009).

A stage-gate model is both a conceptual and an operational system for driving a new product from idea to market launch. It is a framework for managing the product development process aiming to improve both effectiveness and efficiency (Cooper, 1990). Even if companies in practice use customized models, Cooper (1990) argues that most models follow a similar structure. A stage-gate model divides the innovation process into a predetermined set of stages that all have a predetermined set of activities and targets. In order to move to the next stage, the innovation project needs to pass a gate where it must fulfil a predetermined set of criteria and attain a formal go-decision from a higher management to continue to the next stage. In practice, a normal stage-gate process has up to seven stages with gates and sub-gates, but to simplify the process, it could be divided in four different stages. These are Discovery, Scope & Business Case, Development & Testing, and Launch (Cooper, 2014). (See figure 1 for an illustration of a typical stage-gate process according to Cooper.)

Figure 1: Cooper's Stage-Gate Model



Jørgensen and Messner (2009) studied a Danish company switching to a modular product concept and found that the case organisation used a stage-gate model with seven crucial stages for managing the innovation process. In order to pass the gates set up between the different development stages, each project was required to provide financial measurements in the form of contribution ratio and payback ratio above certain levels calculated using a standardised spreadsheet model. When attempting to pass a gate, the current project manager would prepare a report and present the current status of the project, arguing that it was ready for the next stage, with the stage-gate members challenging the project manager with questions in an attempt to assess the quality of his arguments. While the discussion circled around the quantified financial

measures, the discussion itself had a qualitative focus. As such, Jørgensen and Messner (2009) argue that projects in their case organisation was not only governed *by the numbers*, although numbers still held high importance.

In the end, the authors found the stage-gate model's primary function was to remind project managers of the importance of profitability within the project, thereby forcing them to consider accounting numbers in designing the product at hand. Since the project members knew that they would be evaluated by the stage-gate, not only using the absolute financial measures, but always through discussions with a firm foundation in the same, this mind-set became important to the team members. Jørgensen and Messner (2009) conclude that *some* attention to accounting can help controlling such an uncertain process as a product development project.

Stage-gate models discovered by Cooper (1990) and investigated by Jørgensen and Messner (2009) play an important role in managing innovations and as a control tool when the gates helped to remind the project teams to think in a business minded way.

2.1.5. Research gaps and motivation for our study

Previous suggestions for further research

Despite more than twenty years of research that has followed since Simons' (1995) original publishing of the LOC framework and Nixon's (1998) pioneering R&D study, the research on formal management control and innovation is still limited. Researchers agree that formal controls could enable innovation, and that in more uncertain conditions, companies use increasingly more complex management control systems (Chenhall & Moers, 2015). At the same time researchers argue that it is an opportunity to learn more about such basics as how individual practices such as budgeting and costing are implicated in the development process (Moll, 2015). To summarise the situation, it is fair to say that the question *if* management control could enable innovation is answered, but *how*, *where*, and *why* it enables innovation is not yet clarified.

Other researchers have called for more qualitative research on management control and innovation at other organisational levels than the firm level (Bedford, 2015; Bisbe & Malaguenõ, 2015). Ylinen and Gullkvist (2014) argue that a limiting feature of earlier research is that innovation control has been investigated mostly on the organisational level and not on the project level which they investigate in their own study.

While there has been some work on the role of management control in different phases in the innovation process (front-end, new product development, etc.) (Carlsson-Wall & Kraus, 2015; Jørgensen & Messner, 2009), and while recent researchers have started to investigate the behaviour in different types of innovations (e.g. exploratory, exploitative) (Bedford, 2015; Ylinen & Gullkvist, 2014), there are still some very important and interesting contexts that have not been studied and investigated.

Identifying our research gap

While a numbers of research gaps remains to be filled, this study will focus on one research gap on the higher level and two research gaps on the lower level.

On a higher level, as of today, limited research has been focused on the use and design of management control systems in different business strategies. Limited focus has been put on the differences in design between innovations that are market (demand pull) or technology driven (discovery push), or in a firm combining these two. These different innovation strategies take different perspectives on the innovation process and will potentially have different implications for the management control system. Chenhall and Moers (2015) argue that this is something that needs to be investigated further.

On a lower level, there is a gap within the previous literature pertaining to a structured understanding of the role and evolution of calculative practices throughout the different phases of the development process and also how one and the same calculative practice works in different ways in different phases of the process. As a second gap, we argue the academic understanding of the role of stage-gate models and accounting remains largely underdeveloped with limited empirical observations (Jørgensen & Messner, 2009). Combining these two niched streams of research, Jørgensen and Messner (2009) focus mainly on the stage-gate model with very limited attention to its relationship with calculative practices and development over time in the different phases. Jørgensen and Messner (2009) put most focus on the specific gates and mostly on the connection between accounting and strategizing, leaving the specific role of the calculative practices rather underdeveloped.

Motivation for our research question

This study is motivated from the theoretical perspective as it aims to contribute to the theory of management control for innovation in general and fill some of the existing research gaps for calculative practices and stage-gate models in specific. By doing this in a purely market-driven

innovation it is also motivated on a higher level. Through this study, we aim to contribute to the previous academic literature in three distinct ways by addressing our research question: *What is the role of calculative practices in a stage-gate innovation process?*

First, we aim to increase the understanding of the role of calculative practices within innovation and product development. As previous literature has clearly demonstrated that calculative controls are able to be facilitative for innovation, we aim to increase the understanding of *why*, *how* and *where* this is true. In our case organisation, we find that calculative practices were used throughout all the different product development phases in the form of a single business case shifting roles and functions over time, being contingent on development phase, management setting and organisational members currently in use of the business case.

Second, the understanding of stage-gate models as a management accounting tool and its intersection with calculative practices is explored further. We find that the structure of project teams affected the role of how the stage-gate model was used in combination with calculative practices and that the structure of the project teams implied another role for stage-gate control than explained by Jørgensen and Messner (2009).

Third, we contribute to the very limited research on innovation and market orientation. While we recognize that previous research to some extent has addressed market-driven organisations implicitly (Jørgensen & Messner, 2009) as well as explicitly (Mouritsen et al., 2009), the focus on this contextual factor as an explanation for answering questions of how management accounting functions in an organisation has largely been neglected. In our view, the popularity among organisations of trying to address customer needs makes market orientation a contextual factor in need of much more explicit focus within the academic literature in order to stay relevant for practitioners.

2.2. Innovation Management Concept

The following section will present an overview of the theoretical concepts of a market-driven organisation and their role with regards to innovation. To get a full understanding of what impacts the innovation process, we also introduce the concepts of bottom-up vs top-down innovation management. These theories will be utilised in analysing the case study to shed further light on our findings.

2.2.1. Market-Driven Innovation

The dichotomy of market- versus technology-driven innovation is not a new concept. The division has previously been discussed in terms of high- and low-tech innovations (Khandwalla, 1976/1977) as well as technology-push and market-pull (Souder, 1989). Other authors such as Kumar, Scheer and Kotler (2000) have divided the concept into sales-driven versus market- and customer-driven firms and constructed an even more sophisticated concept by splitting market-driven into two different parts. Regardless of which dichotomy is used, the underlying logic is that organisations use different approaches to innovation, and a distinction could be made between firms that begin by looking at the customer, the market and the existing opportunities in demand, an outside-in perspective, and firms that begin by looking at technology and the product and what opportunities exist on the supply side, an inside-out perspective.

As the exact definitions of market- versus technology-driven innovations have shifted shapes across time and authors, we see a need to clarify our view of the concept for the purpose of this thesis. We define a market-driven innovation process as any innovation process which starts at the marketing or sales end of an organisation with the aim of delivering an innovation which solves a customer need identified ex-ante through interactions with customers. As such, our view encapsulates both customer-driven and market-driven innovation processes as defined by Kumar et al. (2000). On the other hand, we define technology-driven innovation as any innovation process originating within an R&D department which does not include any customer interactions. While the process may include an outspoken goal of solving a certain customer problem, such an ambition is not necessary in a technology-driven innovation process.

2.2.2. Bottom-up and Top-down Innovation Management

Another innovation management dichotomy that is important for understanding the innovation setting is the differences between bottom-up and top-down managed innovation.

Bottom-up Innovation

A bottom-up management concept of innovation means that everyone in the organisation from the bottom of the hierarchy is involved in the idea generation phase. The fundamental logic is that everyone could come up with the idea of the next direction of the business, or the next initiative for development or change, and that it is important to capture that idea. The challenge

is to create processes and structures on letting ideas bubble up from all throughout the organisation (M. J. Epstein, Davila, & Manzon, 2014; M. J. Epstein, 2016).

Top-down Innovation

The concept of top-down innovation means that the top-management decides the direction of the innovations. The people in power of the organization set the pace, the targets and the objectives and then decides on funding. In this type of management, the employees have the role of implementing the decided activities. In a top-down managed innovation the people resources are usually the bottleneck and only limit. The ideas are already there – the challenge is the implementation (M. J. Epstein et al., 2014; M. J. Epstein, 2016).

2.3. Theoretical Framework

In order to gain better insight into our research question and assist in the understanding of our case organisation, we use a theoretical framework developed using the concept of market-driven innovation and bottom-up versus top-down organisational innovation trajectories.

The market-driven organisation is highly dependent on sensing and assessing the market's needs in deciding what product development projects or innovations to pursue. Looking instead towards the dichotomy of bottom-up versus top-down innovation management, it is evident that the number of organisational interfaces towards the market will generally be higher in using a bottom-up approach rather than a top-down approach. As such, the market-driven organisation and the bottom-up innovation management strategy seem to walk hand in hand.

In contrast, for a bottom-up approach to be preferred in a market-driven organisation, customers would presumably have to be numerous and dispersed. In such a setting, the shere number of customer interfaces of the bottom-up approach is a benefit as customer needs are often as diverse as the number of customers itself. Therefore, in a setting of highly specialised products or solutions where diversity within the product portfolio is small and adaptation to a small base of individual customers and their needs is large, a top-down approach may be more suitable for the market-driven organisation. In this type of contextual setting, the disadvantage of high time-consumption of the bottom-up approach would exceed the benefit of the vast number of market interfaces that this organisational approach creates.

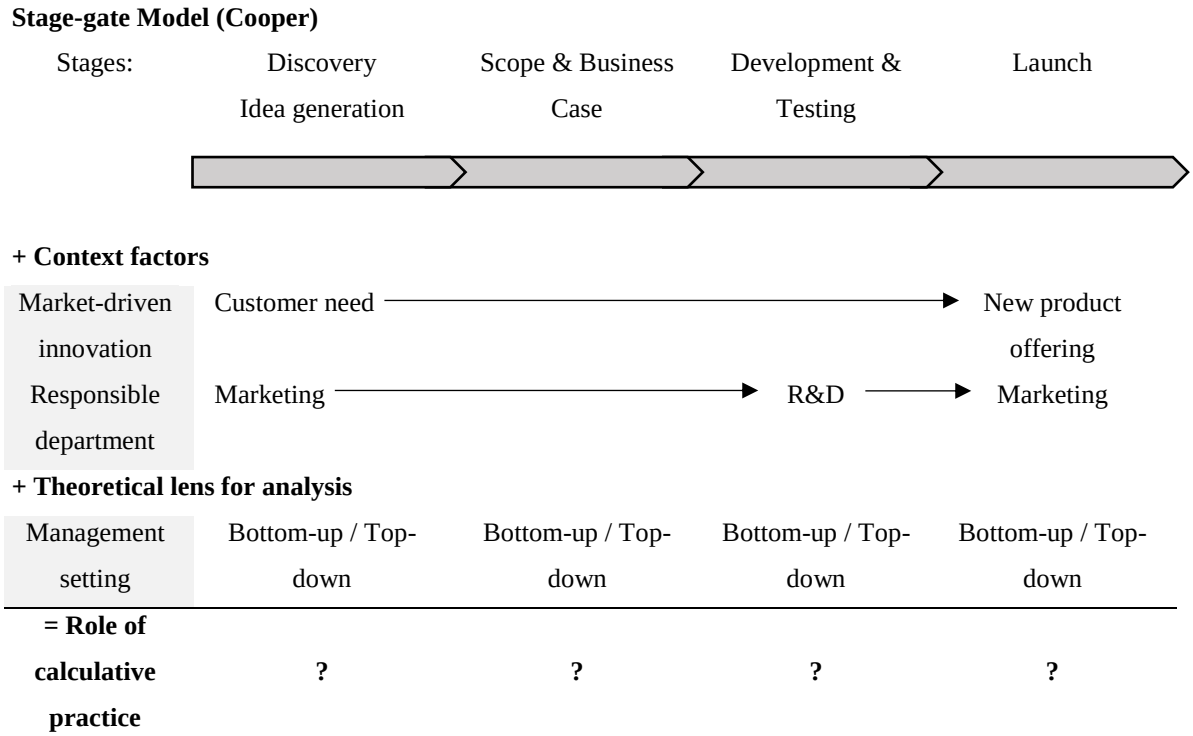
Ensuring an efficient and effective innovation process in a bottom-up or a top-down organisation with the aim of capturing the market's needs will presumably put different demands on the design of control mechanisms. First, the issue of facilitating innovative ideas

within the organisation should mean high individual autonomy within the bottom-up organisation as idea generation needs to be a top priority for many of the organisational members. In the next stage, the vast number of potential ideas hopefully generated in the organisation require effective selection of ideas and deployment of resources. In combination, the bottom-up organisation would need to construct a control structure which would simultaneously facilitate innovative ideas in plenty and, at the same time, quickly cut out ideas of sub-standard quality without destroying morale.

In contrast, generating ideas in a top-down organisation is of less concern for the control structure as top managers are the ones in charge of creating ideas and choosing what ideas, however accurate, should be pursued. Instead, a fast and efficient implementation of the ideas that are selected by top-management is needed to quickly respond to customer needs. However, while generating and selecting ideas is not a control issue within the top-down organisation, the process of actually designing the process will oftentimes require a problem-solving orientation among organisational members, indicating that too formalistic and coercive controls may not be an optimal solution to this sort of situation as it is also in need of abstract high-level thinking.

In essence, considering the organisation from a top-down versus bottom-up perspective will assist in understanding the organisation's choice of control measures, or possibly help explain sub-standard organisational performance where the control methods do not match its organisational approach with regards to innovation.

Figure 2: Theoretical framework



The target with this study is to understand the role of the calculative practices in a stage-gate process, in the context of a market-driven business. This is going to be investigated through the complete stage-gate process from discovery and the scratch of an idea until a finished product offer. To analyse and understand the calculative practice in each stage and why and how it is related to innovation we use the fundamental settings of a market-driven firm and its meaning of the different stages, together with an understanding of the different requirements for control for bottom-up versus top-down management elaborated on earlier in this section.

3. Research Method

The following chapter will provide an overview of the methodology used in our study. Section 3.1 will provide an explanation of the research design chosen to answer our research question. First the chosen empirical method is motivated according to research theory and elaborated on. Second, we discuss the chosen approach and third we explain the process of selecting a case organisation to study. Section 3.2 will provide insights in how the data was collected and in section 3.3 we explain how the collected data has been analysed and interpreted. Finally, section 3.4 contains a discussion regarding the quality, reliability and trustworthiness of the data collected and analysed.

3.1. Research Design

3.1.1. Empirical Method

To answer the research question, this study will use an empirical method in form of a qualitative, single in-depth case study. A case study is a research strategy that involves using one or more cases to create theoretical constructs, propositions and/or midrange theory from case-based empirical evidence (Eisenhardt, 1989; Eisenhardt & Graebner, 2007). Case studies give rich empirical evidence when evaluating specific phenomenon, based on a variety of data sources (Yin, 1994). A major reason for the popularity and relevance from building theory based on case studies is that it is one of the best bridges from rich qualitative evidence to mainstream deductive research. Both inductive and abductive case research is theory-building approaches based on rich empirical data and builds theory that is accurate, interesting, and testable (Dubois & Gadde, 2002; Eisenhardt & Graebner, 2007). Case studies are appropriate to build up theory which later can be tested with other methods.

Since we want to develop the theory about management control for market-driven innovation and investigate the phenomenon of calculative practices in a stage-gate development process which is an unexplored area, a case study is an appropriate method. We are not testing old theory but breaking new grounds. This is also the reason why a qualitative study is appropriate even if the theory for management control for innovation is in an intermediate state.

The development of a theory consists of different phases, where the current position of a theory could be in either a *nascent*, *intermediate* or *mature* state (Edmondson & Mcmanus, 2007). Edmondson and McManus recommend that when a theory is in a nascent phase, a qualitative

study to build theory is appropriate, but in a mature phase quantitative studies are more appropriate, focusing on hypothesis testing and supporting or rejecting earlier theory. When a theory is in between nascent and mature, hybrid methods of qualitative and quantitative research is recommended; developing and testing the nascent theories. However, this could be complicated and messy in practice, which is why it is often recommended to separate them (Edmondson & Mcmanus, 2007).

The theory of management control for innovation is, according to us, in an intermediate state. Earlier nascent ideas from the end of the 1990s and 2000s have been tested and elaborated on during the last years. The theory of calculative practices and stage-gate development processes have also been investigated, but in a limited amount and not with a specific focus of combining the two of them. Since we stand in the forefront of the research and want to investigate what role calculative practices have in the stage-gate process in a context of a market-driven organization, we are improving and developing rather than testing the nascent theory. This means that a qualitative study is suitable (Eisenhardt & Graebner, 2007).

The choice of conducting a single case study instead of a multiple case study is made as it enables greater depth in order to investigate and understand the phenomenon in detail rather than conducting a broader and more shallow comparison. A single case study could richly describe the existence of a phenomenon (Siggelkow, 2007) which is what this study aims to achieve.

3.1.2. Approach

We have based our case study on an abductive approach, or as Dubois and Gadde (2002) define it: "systematic combining". Instead of doing a pure inductive research where the main approach is to generate theory from data without any preconditions, an abductive approach is more focused on theory development. In the abductive approach it is the interplay between theory and empirical observations and the process of elaborating and shifting focus from theory to observations back and forth in an iterative process as new insights and conclusions are made (Dubois & Gadde, 2002; Eisenhardt & Graebner, 2007).

Since we aim to develop and refine the earlier theory on management control for innovation, and not invent a completely new one, an abductive approach is appropriate. This means that central in our research has been the theoretical framework and its interaction with empirics. We started early on before collecting data to do a thorough literature review about our broader

research topic management control for innovation. From this we investigated gaps in earlier research and structured a theoretical framework. This framework built the structure for the first interviews and data collection. However, along the phase of the data collection, and with increasingly more insight in the case, both the research question and theoretical framework have been successively modified. Based on a detailed early knowledge of the theory, together with careful analysis of the incremental empirical findings, we were able to develop new theoretical concepts in the understanding for management control. We shifted focus from general management control for innovation, to specifically investigating calculative practices in a stage-gate development process and analysed it through a lens of bottom-up vs top-down management. This approach is motivated because it creates fruitful cross-fertilization through a mixture of established theoretical models with new concepts derived from the observed reality (Dubois & Gadde, 2002).

3.1.3. Case Company

The selected case company that has been studied, InduCorp, is motivated from two factors. First, it is an organisation suitable for studying the topic of management control for innovation, and second, we were able to gain good access to the organisation creating opportunities for research of high quality. According to Eisenhardt and Graebner (2007) a qualitative study should use "theoretical sampling", meaning that a case should be selected because it could be particularly suitable for illuminating and extending relationships and logic among constructs. Also, the case organisation could be chosen if it provides opportunities for unusual research access (Eisenhardt & Graebner, 2007; Yin, 1994).

InduCorp is one of the greatest success stories among Swedish companies. InduCorp has so far managed to continuously grow and thrive in a fast-changing business world due to its ability to continuously develop new products and services that the market demands. As InduCorp defines it: "There is a strong correlation between innovation and growth rates" and "InduCorp is all about the innovative spirit, and market leading innovation is part of our DNA". Since innovation is such a central part in InduCorp it is an interesting case object to study.

We have chosen to conduct our study at the divisional level and on process level due to two reasons. First this is the level in the organisation where the most critical steering for development is happening. Second, it is a level motivated by earlier research gap, and it is the level where we could get good, broad and thorough access.

3.2. Data Collection

3.2.1. Primary Data - Interviews

Our primary data source for empirics has been semi-structured interviews with members from different hierarchical levels and different departments within the division. The first initial interview was made in the beginning of February, but most of the interviews were conducted in March and April of 2018. In total we conducted 17 interviews between 45 and 70 minutes each. All interviews were made in person, face-to-face. Both authors were represented in all interviews except one, (16/17). All interviews where recorded and transcribed afterwards.

Eisenhardt and Grabner (2007) argue that interviews under most circumstances is an appropriate source for primary data in a qualitative study. They argue that interviews are a highly efficient way to gather rich, empirical data. However, they also argue that one of the big challenges with interview data is that it can be impacted by bias, creating a challenge for the interviewer in mitigating the same. We have handled this by conducting a large number of interviews (17) with highly knowledgeable informants from different part of the organisation. By doing interviews with people that see a phenomenon from different positions in the division, we could mitigate this potential bias (Eisenhardt & Graebner, 2007).

We also wanted to gather a comprehensive picture of the case and the division to better analyse our research question. Due to this, we interviewed people from different horizontal parts of the division. We interviewed people from R&D, marketing and finance, both managers pursuing control and employees being controlled. By attaining a comprehensive picture, we argue that an overall, detailed and unbiased understanding of the phenomenon of innovation control was gathered.

We began by conducting interviews with the three Vice Presidents for the three different departments. The reason for this was to start by getting a holistic perspective of the division. After this we conducted more detailed interviews with managers and employees further down the hierarchy, with a higher focus on detail. Preferably, we would also have wanted to do an interview with the president of the division, but since the division at the moment lacked a president, this was not possible.

All the interviews were semi-structured, meaning that a list of questions and discussion topics were prepared beforehand, but no strict structured schema was followed during each interview. The discussions and questions were modified during the interview depending on the insights

gained throughout the study. Since, we did our research following an abductive approach the interview questions changed during the time of the study, due to increasing understanding and insight as well as a more focused research question. Since the people interviewed held different positions we customised the interviews for each interview. All interviews followed the approach described by Edmondson and McManus. We, as researchers, collected data opportunistically and both the interview questions and interview objects were determined iteratively as new insights and ideas emerged in the process.

3.2.2. Secondary Data

The primary interview data has been supported by secondary data in the form of documents and written organizational information. These have been written internal documents, planning documents, presentations, information videos and external public information on webpages. The secondary data has given us a better insight and understanding of the division, its management control and its innovation processes. This has helped to support our conclusions derived from the primary data and as recommended by Dubois and Gadde (2002).

3.3. Data Analysis

After each conducted interview a discussion and notice were made about the most important take-aways from the interview, and concepts were discussed and clarified to make sure everything was interpreted in a correct way. Shortly after each interview the recording was listened through and the interview transcribed. This process was important to quickly investigate the data during which process several interesting findings and perspectives were noticed and later discussed. The advantage of doing the transcription closely after the interviews was that we could use the analysis and bring it in to our questions to the next interview. The second advantage was that later in the analysis we could search and analyse the data with code words and in a structured way.

Findings from the different interviews were analysed and structured in different topics. For example, we created categories for different stages in the innovation process and collected interesting data from the different interviews into each of the categories. We could easily compare findings from different interviews in order to construct a comprehensive analysis. Important in qualitative analysis is to not force the data into the different categories. It was important to be open-minded and systematic during the analysis process and let the interview data itself define which different categories we should use.

3.4. Data Quality

Maxwell (2012) explains that in a qualitative study of this kind, there are different types of validity risk that the researchers need to mitigate. The overall risk is that the data presented is biased; it could both be grounded in the interviewee not telling the truth, or it could be the authors that interpret the data in a biased way. As explained earlier in section 3.2, since we have conducted a large number of interviews we have been able to ask similar questions to different people in order to triangulate the empirics. The topics and findings we are using are data points from different interview objects giving the same or similar answers.

The risk of bias from the authors has been limited according to Yin (1994), that both authors should be represented during the interviews. In 16 of 17 interviews both authors were represented. All the data is also tape recorded, and can be listened to again, as a validity point.

4. Empirics

The following section will start by providing a description of the case organisation and studied division. Thereafter, an overview of the product development process will follow, describing how the organisation goes from generating the first spark of an idea until a finished product is ready for launch. In addition, the identified management control tool of a formal business case (a type of calculative practice), will be elaborated simultaneously along the process.

4.1. The InduCorp Group

InduCorp is a large Swedish industrial company with a turnover of about SEK 120bn founded over 140 years ago. The company is widely recognised for having been very profitable while growing significantly over a long period of time. InduCorp has an outspoken strategy of delivering exceptional customer value and not trying to compete based on price as the sole factor.

InduCorp is organised in five different business areas involving the company in supplying industrial equipment to various industries within the industrial sector. The business areas carry strategic responsibility for their respective operations with the aim of achieving "sustainable, profitable development". In turn, each business segment is divided into several divisions, based on a product or service focus.

As InduCorp follows a decentralised organisational structure, each division is its own operational unit with high autonomy and managed by independent presidents, similar to a CEO of each division. The divisions have a global responsibility and operate through one or more product companies with product development, manufacturing and marketing responsibilities as well as multiple customer centres responsible for customer contacts, sales and services.

The case study discussed in this paper was conducted at a division which hereafter will be referred to as ToolsDiv; a division manufacturing industrial tools and assembly systems targeting the general manufacturing industries such as aerospace, off-road vehicles, appliances and electronics among others.

4.2. The ToolsDiv Division

ToolsDiv produces assembly solutions and tools and is divided into several functional departments including marketing, R&D, finance and operations. While marketing and finance only serve ToolsDiv, operations and R&D are shared with a sister-division, AutoDiv, targeting

the automotive industry with similar and sometimes identical products. Because of the similarities larger shared operations and R&D departments were seen as the best and most useful solution for both divisions' interest. Each respective department has a Vice President of its own in charge. Also, ToolsDiv is supported by several independent customer centres responsible for selling the products developed by the central ToolsDiv-departments. The customer centres are responsible for the sales process, maintaining customer relationships as well as assessing customer needs and are in charge of specific geographical regions within which they are located. In total, the ToolsDiv division has a product portfolio of over 4,000 different products, that it distributes to the market through its 27 customer centres in as many different regions across the globe.

"We are represented across the entire world, that is one of our strengths; we have an amazing global footprint."

VP Marketing

The marketing department has a central role within ToolsDiv and holds the responsibility for handling the division's product portfolio. This entails both regular marketing activities such as customer meetings, presentations, promotions as well as pruning old products and adding new products through initiating development projects in formal product development processes.

"The number one [role for the marketing department] is to be able to understand the market needs and the overall direction of the industry. And with that set a solid plan for what do we need to have in our product portfolio for being competitive in the future."

VP Marketing 2

The marketing department is led by the Vice President of marketing with support from business managers in the level below, each responsible for different segments: assembly, aerospace, off-road vehicles etc. Each business manager has a number of global product managers reporting to him. The global product managers are the commercial owners of the products and each product manager has the responsibility for a range of products, including its characteristics, updates and design.

The marketing department closely collaborate with the customer centres in assessing both customer *needs* and customer *wants*. ToolsDiv aims to be proactive in assessing customer needs and has an ambition of knowing the customers better than the customers know

themselves. Ideally, they would like to be as close to the customers' operations as possible in order to provide solutions for the customers before they have the time to ask for them.

"There is a big difference between a 'need' and a 'want'. You usually say: 'Our customer wants, our customer wants', but really, it's like this: What do they need?"

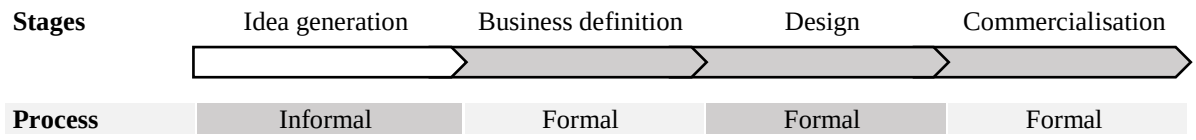
VP Marketing

4.3. The Product Development Process

Looking into the recent past, ToolsDiv comes from a situation where product development projects were approved at a rate above which the R&D department was able to provide a final product of high enough quality in a timely manner. As quality always has been a major focus of ToolsDiv not to be compromised, the product development projects were chronically delayed. Besides disappointing customers by not being able to deliver products when promised, this resulted in the customer centres' ramping up capacity for a new product launch, only to be informed that it was delayed, causing unnecessary costs within the sales organisation.

As a result, ToolsDiv now uses a structured product development process referred to as PDP2 (Product Development Process 2.0). The process consists of three formal phases: *business definition phase, design phase* and *commercialisation phase*. Before a project is formalised, an idea of a new product needs to exist. As such, all product development projects spring out of an informal *idea generation* process preceding the formal PDP2. The following sections will provide a sequential description of the complete product development process from idea generation to commercialization and the management control tools used in the different phases.

Figure 3: The product development process



4.3.1. The Idea Generation Phase

The idea generation phase is an informal phase within ToolsDiv. However, it is an inevitable process to enter the formal PDP2. The process starts with the spark of an idea and ends with a structured *business case draft* which will gain a formal acceptance or denial from top management, meaning permission to enter a formal business definition phase.

"...it always starts from the marketing and clearly that is the business that drives us, so as soon as we see an opportunity or threat, we will start to make a first, say, really soft and a small business case about that."

Product Manager 3

Ideas are most often generated in a serendipitous manner in the interaction with customers and communicated to ToolsDiv either directly through the marketing department or through a customer centre. Ideas could also be generated internally through research activities or strategic discussions. However, product development ideas generally stem from the market. Receiving the same sort of requests from several customer centres is interpreted as a strong signal of a valid need, often causing the marketing department to investigate the communicated need deeper. Interviews are continuously conducted with customers using a structured interview process referred to as *Voice of the Customer* (VoC) (see details in 4.3.4).

"And then if we get certain needs like that from different customer centres around the world, different countries, then okay, there is some market need or opportunity coming up now."

Product manager 1

The central task for the product manager and marketing department in the *idea generation phase* is to construct an early draft of a business case (see details in 4.3.3). This is the outcome of the idea generation phase and the first formalised step in the development process. The aim of the business case draft is to formalise an idea and estimate the idea's market potential in a simple manner. Estimating the market potential of the idea includes estimating selling price, product volumes and their timing in the coming years, development cost and production cost. The business case would from this moment be the formal evaluation tool for creating profitable new development initiatives along the whole development line.

In the early idea generation phase, even if the process itself is structured, the inputs are mainly a guessing game.

"As it is extremely early we have few facts, so I would say that 20% [of the business case inputs] could be based on facts and 80% on feelings."

Product Manager 3

If business case draft turns out to make business sense, and when it is deemed as being worked through in a good-enough manner, the idea is presented to the *gate-board*, a formal decision-making committee for development projects, with a proposal of initiating a development project based on the business case draft. The gate-board challenges the business case draft in order to gain an understanding of the underlying business logic of the idea with the authority to approve or disapprove the proposal. If the business case draft is approved, a formal development project is initiated and a project structure is set up with a core project team. However, far from all business cases get to present to the gate-board. Although many of the business cases that are not pursued further have solid business potential, ToolsDiv wants to "pick diamonds", causing them to reject several business cases with a potential for profitability.

"…and this year maybe we only create 10 projects of a possible 100, just throwing some numbers out there, they are not accurate…"

Product Manager 5

For each formalised development project, a temporary project structure is created consisting of three hierarchical levels. At the bottom, the project team consists of organisational members from the different departments who have a professional interest in the project and/or skills needed for the development of the product, for example a design engineer and a software engineer. The project team is led by a project leader from the R&D department who in turn reports to a steering group, acting on behalf of the sponsor, the division's president.

4.3.2. The Business Definition Phase

As the project structure is formalised, it enters the business definition phase. The main purpose of the business definition phase is to fully investigate the viability of the innovation idea from a business standpoint. This is done by means of developing the business case draft into a final business case. Once a final business case has been constructed, the business case is once again presented to the gate-board in proposing that the project should be brought to the next stage, the design phase. Generally, a final business case is not brought to the gate-board until the entire project team, the project leader and the steering group all agree that the business case is solid enough for the development project to move into the design phase.

*"I think we have a good structure for that [constructing business cases], we put the most skilled people we have and let them be responsible for providing information within their field of expertise. This I believe makes the business case as solid and correct as possible, since the person with most knowled*ge in his field always is involved and responsible."

Assistant Business Controller

In essence, the structure of the business case does not change between the business case draft and the final business case. However, the thoroughness of the final business case is expected to be significantly higher than for a business case draft. While a draft may be only supported mainly by reason and gut feeling, the final business case is a much formal product with a need for supporting data.

Consequently, the process of moulding the business case draft into a final business case entails investigating customer needs, estimating market volumes and their timing as well as potential sales price on a deeper level. Also, a product specification is created with a list of functionalities that the final product should include. On the technical side, R&D will estimate the cost of development, a mixture of time consumption and the number of engineers needed to develop the product, as well as investigate if the know-how exists to develop a product meeting the specifications of the product suggested by marketing.

"*…there is always an analysis, a joint analysis between the market and R&D, on the specifications that we [marketing] wrote. 'That we [R&D] can do, that we know how to do, that we maybe have some doubt about, this I don't have a clue how to do'. And depending on that we make some group that will focus on the specific requests and analyse that: if we can solve that issue or not."*

Product Manager 3

Together with operations, R&D also estimates the cost of production for the new product in order to arrive at a likely future gross margin – a key metric of the final business case. All inputs arrived at by the different project members and their respective departments are sent to an R&D controller responsible for constructing the formal business case product.

4.3.3. The Business Case

The business case is a one page, formal and pre-structured tool to evaluate new initiatives. It consists of three parts:

- a qualitative part in which the business logic of the suggested product is described and motivated
- a quantitative part with metrics for sales price, sales volumes, cost of production, gross profit and cost of development
- two risk metrics, one assessing the technical risk and the other assessing the commercial risk of the product

While the business case itself is presented as a one-pager, various kinds of documents and data is collected throughout the process of constructing the business case. While this data is not explicitly integrated into the business case, it is used for estimating the different quantitative metrics, risk assessments as well as qualitative motivation of the business logic of the product.

The process of constructing a business case can vary significantly in time depending on the scope and type of product suggested. While some business case drafts can be constructed in less than one day, others may take several months to work through. Most business cases are constructed by the product managers within the marketing department, but they can also be constructed by the business managers in charge of a certain customer segment.

4.3.4. Voice of the Customer

As part of constructing a business case, the marketing department often uses a process referred to as *Voice of the Customer* (VoC). The aim of the process is to understand the customer and his needs better than he understands them himself. While the VoC process is often used early on in constructing a business case, it is not restricted to the idea generation phase. It is also utilised in developing the business case from a draft into a final business case throughout the business definition phase.

In a VoC process, the marketing department collaborates with customer centres and conducts 30-40 deep interviews with the segment's customers in order to find what their needs are. Interviewees could include production manager, maintenance manager, plant manager and operator. Interviewing stakeholders in different locations within the organisation is important as they tend to prioritize differently when it comes to what needs the product primarily should address. For example, ergonomics may be essential to the operator, whereas speed may be more important to the plant manager.

In aggregate, a VoC can easily result in 100-200 needs being discovered. As such, the issue of prioritizing the needs is just as important as finding them in the first place. Therefore, the

interviewee is asked to prioritize among the discovered needs, enabling the marketing department to understand what needs should primarily be solved in order to maximize customer value.

The prioritizations of the different interviewees are aggregated, enabling marketing to see what needs are the most highly prioritised for the organisation as a whole. Subsequently, the prioritised needs constitute the basis for the product specification given to R&D from marketing, from which R&D is able to estimate development time and resource consumption after having evaluated if the specifications are possible be met.

4.3.5. The Design Phase

When a final business case has been formalised and approved by the gate-board, it enters the design phase. During this phase, the actual product is developed following the product specifications set in the previous phase. While the project team remains intact and meet regularly, the responsibilities are tilted away from marketing towards the R&D department.

When entering the design phase, a product specification should exist and R&D should have given approval that they believe they have all the technology in place to develop a product with the requested specifications. This implies that the development process is more of a problem-solving phase than an innovation phase. Many problems need to be solved, and innovativeness is important, but following the process no new research should be required.

"As I am working in projects and we need to deliver, throwing research into the project is the most dangerous thing you can do."

Project Manager

For the design phase in PDP2, a time plan with milestones along the way is set up for the project team to aim for. If the project team realises that a certain milestone will not be met on time, the project leader escalates the issue to the steering group. Possible actions taken by the steering group to solve the issue at hand includes adding resources to the project or pushing the project deadline further ahead. What choice the steering group makes depends on how they choose to balance the timeliness of the project and the quality of the product. The importance of these aspects may differ across projects. Any larger changes to the project also needs to be approved by the gate-board. That would include major changes to the time-frame of the project

as well as budget overruns of a need for additional resources. An important part of these decisions is the review of the business cases.

"You are always reviewing that [the business case] at each stage of the design. […], for example, in the design phase, if you are not creating the value or the function that was in the business case before. And so okay, you say, 'we cannot create that', […] But you just 'okay, if I remove that, it will impact my business case, my volumes, my numbers'. So, we will update that business case each time. So, the closer you are to the product, to the end of the planning the closer you are to the right values, and you are always changing that."

Product Manager 3

The review of the business case is a process to always make sure that changes and new initiatives still motivate an end product that is profitable.

Historically, the general rule has been that projects will become delayed in the design phase due to a greater number projects being initiated than R&D has had resources to efficiently cope with in combination with a high emphasis on ensuring that product quality is not lacking when moving a project from the design phase. While quality always has been, and still is, of high importance for ToolsDiv, the importance of project timeliness has received increasingly more attention as of late and has been clearly improved with PDP2. While the view within the marketing department was that quality was not to be compromised with, several R&D members expressed concerns about having to decrease quality of the products to meet deadlines.

"Time is important here. Unfortunately, you have to compromise on quality sometimes but at the same time, I think we make it there anyways."

Test Engineer

In controlling the compromise between time and quality, the window of opportunity plays an important role. A customer may, for example, want to change its entire assembly system within two years, needing some new functions that does not exist in the market. As such, a window of opportunity to deliver a product that have these functions would emerge.

"So, we have this, we know that window of opportunity, and we are checking what will be the impact on our revenue of missing or not this window of opportunity, and based on that, we will create a product with 20 functions. But if the planning of developing that product will make us miss this window of opportunity we come back to these specifications, 'okay maybe if I remove five of these function, to 15, my planning will be according to the windows of opportunity and I can meet that customer'."

Product Manager 3

Another factor affecting the time plan of the design phase are potential alterations to the product suggested by different project members. As time progress and marketing continues to improve their understanding of underlying customer needs, changes to the product currently under development are suggested. Depending on the size and scope of the change as well as how far along the design phase the project is, the project manager may or may not accept the changes. Basically, what will decide in such situations is the estimated impact on the business case.

"...for every step, there is a 10 % cost of starting to change things."

Project Manager

At the end of the design phase, the R&D department has created a final product according to the specifications for the project. After being approved by the gate-board, the project moves into the commercialisation phase.

4.3.6. The Commercialisation Phase

The commercialisation phase is the final stage of the product development process and consists of two sub-steps: *selective sales* and *release full launch.* However, if everything has gone according to plan the products are already finally developed when reaching this phase.

In selective sales, the product is sold to a smaller set of customers informed about the product being in a testing stage. As such, the product is tested in a sharp environment with the aim of discovering any potential issues with the current version that were not discovered through in-house testing during the design phase.

When the product has been tested and any discovered issues amended, it enters release full launch. Approving the product for this stage means that any customer centre in the world is able to order the product to sell it to customers. At this stage, the project manager is confident

that the product can be supplied with good quality in a timely manner. The project is thereafter dissolved, transferring responsibility of the product to the relevant product manager.

Figure 4: The product development process

Stages	Idea generation	Business definition	Design	Commercialisation
Process	Informal	Formal	Formal	Formal
Management	Marketing	Project group	Project group	Project group
Main Responsibility	Marketing (Product manager)	Marketing + R&D (Product manager)	R&D (Project leader)	R&D + Marketing (Product manager)
Outcome	Business case draft	Full business case (Market plan + Product Specification)	Finished prototype (Finished product for testing)	Finished product (Open for public market)
Management Control System	▪ Business case	▪ Business case ▪ Gate-board	▪ Business case ▪ Gate-board ▪ Milestones ▪ Budget ▪ Time-frame	▪ Business case ▪ Gate-board ▪ Milestones ▪ Budget ▪ Time-frame
Calculative Practice	Business case	Business case	Business case	Business case

5. Analysis

The following analysis is divided into two sections. First, we elaborate on the gate-board structure in use within ToolsDiv and the way in which top-down and bottom-up innovation approaches were used throughout the development process and their respective interrelation with calculative practices in the form of the business case. Second, we explain the different roles that the business case assumed throughout the development process, both explicit and implicit.

5.1. The Gate-board Structure and Top-down versus Bottom-up Innovation

Throughout the product development process, the gate-board was an important control mechanism with the formal power to decide if a project was ready to move on to the next development phase. While this is in line with how stage-gate models have been described in previous literature (Cooper, 1990; Jørgensen & Messner, 2009), we find that the actual decision of allowing a project to proceed to the next development phase does not in fact lie with the gate-board. Instead, an informal and political process of attaining a common understanding with stakeholders within the project team and the steering group of the project being ready for the next phase was the true deciding factor of when a project would enter the next phase, making the gate-board a ritual with the function of informing the top management of the status of different projects.

In between the gate-boards, during the actual phases of the development process, we find that ToolsDiv does not treat bottom-up versus top-down innovation as completely incompatible, instead utilising the two at different stages of the innovation process. This helps us shed light on how and why control mechanisms may be used differently during different phases of the innovation process.

5.1.1. Forcing Stakeholder Discussions Using the Gate-board as a Ritual

While the formal role of the gate-board in ToolsDiv was to approve or disapprove the development project to move on to the next phase, the common view of all interviewees was that the gate-board never denied any project from moving on to the next phase. Instead, the actual, more informal approval-process was attaining a mutual agreement within the project team as well as with the steering group that the project was ready to move on to the next phase. When a common understanding of this was achieved with the organisational stakeholders mentioned, the project was allowed to step up to the gate-board and gain its formal approval.

Instead of its actual role being to give an approval or disapproval for the project, the role of the gate-board was to bring the presidents and other management up to speed with the status of the different development processes as well as ensure that any issues related to the project were addressed prior to the gate-board meeting. The mere fact that an approval from the gate-board was needed to proceed with the project forced any uncertainties to be discussed within the project team and the steering group, as well as between the two, before the project was brought to the gate-board. As such, the basic assumption within the gate-board seemed to be that projects being brought before them were solid, indicating a high level of trust in the system and the ability of the project team and steering group in presenting their honest opinion of the project.

Therefore, instead of exercising the formal power given to the gate-board, its members realised their limited ability to judge an entire project based on one meeting and placed their trust in the existence of the gate-board to push the projects towards honest self-evaluation. As such, the actual decision-making power of the development process lies within the projects themselves.

While the focus of the gate-board largely concerned the financial aspects of the business case such as sales volumes, sales prices and cost of production, these measures where never challenged to the extent that the gate-board decided to hinder a project from moving on to the next phase. Instead, we suggest that the structure of the project teams was able to replace the gate-board's role of ensuring financial consciousness in the projects using the business case by being mixed teams consisting of members from various departments within ToolsDiv. By arranging the project teams in this manner, the teams contained conflicting wishes with regards to the products being developed with the result of no single department being able to run the project wholly according to their wishes. This is something different from Jørgensen and Messner (2009) where "the fact that the project manager had to hand over the project at the next gate, […] impacted the engineers and project managers' sensemaking during the stages".

5.1.2. The Changing Organisational Innovation Approach

During the development phases of the product development process, different departments where implicitly in charge of the process. However, the same project team was intact during the entire development process but the tasks at hand during the different phases shifted in a way, indicating which department was currently in the driving seat.

Looking at the early phases of the product development process, it is evident that the marketing department was the source of almost all innovation ideas in ToolsDiv, making it a market-driven organisation. Also, the business definition phase was mainly run by the marketing department with R&D's role rather being that of checking if the technical product specifications were realistic considering the current know-how of the organisation and letting the marketing department know if the wishes were able to be met. As such, the more creative early phases of the development process, being idea generation and business definition, clearly followed a bottom-up innovation approach where all marketing employees from the bottom of the hierarchy were allowed to come with ideas.

However, moving into the design phase, a clear product specification was available to the project team stemming from the earlier phases of the development process, formally accepted by the gate-board and handed over to be implemented by the project leader. During the design phase, the product specifications were what the R&D department was expected to follow in developing the actual product, making the design phase highly top-down run as the time to question the specifications from R&D's side had already passed.

In summary, ToolsDiv utilised a combined bottom-up and top-down innovation approach. The choice of innovation approach was related to, in our view, the level of innovativeness inherent in the different phases with the bottom-up approach being interrelated with high levels of innovativeness and creativity while the top-down approach was used in phases where timeliness and resource constraints were of higher importance to the project.

Figure 5: The product development process

Management	Marketing	Project group	Project group	Project group
Main Responsibility	Marketing (Product manager)	Marketing + R&D (Product manager)	R&D (Project leader)	R&D + Marketing (Product manager)
Management Setting	Bottom-up	Bottom-up	Top-down	Top-down

5.2. The Business Case as a Management Control Tool

Throughout the product development process, the business case was found to play a key role. Empirically, the business case shares characteristics with the spreadsheet model described by Jørgensen and Messner (2009) in the sense that it was used as a base for decision making – but not as an answer-machine – as well as it entail non-accounting criterion such as product

specifications but also financial information such as selling price, volumes, production cost, development cost and some profitability measurement. However, clear differences also exist, primarily with regards to the business case in play within ToolsDiv demanded that the organisational members not only provide data but also qualitatively motivate the business logic of the idea. As such, we view the business case in use within ToolsDiv as a calculative tool combined with a high degree of qualitative data and motivations.

Furthermore, the role of the business case within ToolsDiv was found to change significantly throughout the innovation process. In conducting this case study, four different functions of the business case as a management control tool were identified: a tool for idea validation, a tool for idea generation, a tool for discussion and a tool for highlighting technology gaps. While the business case as a tool for idea validation and idea generation as well as a technology-gap highlighter was observed both sequentially and simultaneously in the early phases of the development process, the business case was used as a discussion tool throughout the entire project, both in a continuous manner as well as at specific moments in time.

While the previous literature has shown that similar management control tools can be used for managing the innovation process (Jørgensen & Messner, 2009), it has not highlighted the importance of how formal controls, in shifting shapes and functions across time, brings a project from idea generation to the final product. Using the case of ToolsDiv, we contribute to the previous literature by showing the richness with which one well-designed formal tool was able to help ToolsDiv "pick diamonds" among a large plethora of suggested development projects, while simultaneously functioning as a highlighter of technology gaps within the organisation, bringing awareness to technical areas which needed to be addressed for successful market-driven innovations in the future.

5.2.1. The Business Case as an Idea Validating Tool

In the idea generation and business definition phases, the business case was used as a management control tool for validating ideas by assessing whether they possessed business potential as well as formulating complex product innovation ideas in text and numbers. The explicit requirement of constructing a business case as a draft before formalising the project structure, and as a final business case in the business definition phase, forced the organisational members to thoroughly consider the idea from a customer as well as a commercial perspective before being allowed to start developing the product. Also, by forcing the members to answer

implicit questions like “Do we have the capabilities to develop this product?” and “Is there a large enough market for this product?”, they were forced to critically consider their own ideas.

For ToolsDiv, the business case, acting as an idea validating tool, was able to help the organisation improve the product development process in two distinct ways which otherwise could have become an issue in a bottom-up innovation approach. First, the business case helped ensure that resources were not wasted on development projects which could not, or should not, enter the design phase. By forcing the organisational members to formally assess the business logic of a development idea in an early stage, it was possible to ensure that unprofitable projects were eliminated early on, minimizing the resources spent on fruitless innovation.

Second, insisting that the business case was formalised as a hard-copy product increased its measurability as an ex-ante projection of the business potential of the project. While not all product managers considered themselves to overestimate business cases, the empirics points towards a tendency for such practices within the marketing department. Combined with the relatively new follow-up structure of development projects one year after product launch, the risk of overestimated business cases was presumably mitigated by the organisational members having to commit to the business case. It provided a clear incentive to refrain from deliberately overestimating business cases with the aim of promoting one’s own projects and “stealing” resources.

5.2.2. The Business Case as an Idea Generating Tool

While utilising the business case as an idea validating tool was its explicit purpose, its function as an idea generator was less outspoken. The role followed the idea validating role sequentially in the sense that the business case was able to help generate ideas only after having assumed the role of an idea validator. At the same time, the two roles of the business case were able to function simultaneously as ideas were generated through the process of validating an idea.

During the process of constructing the business case draft, as well as the final business case, customer interaction was key, often in the form of customer interviews using VoC. During such sessions with customers, new ideas would emerge on how to solve the customer’s problems as they gained a deeper knowledge and understanding of the underlying problems addressed explicitly or implicitly in the discussion. Such ideas could be related to the business case currently under validation or be of a completely different scope, thereby being an idea around which a business case of its own could be constructed.

As such, the process of working with the business case, of delving deeper into the underlying reasons behind the customers' expressed needs and wants, is idea generating in itself. While ideas could be generated in a customer interaction setting within the process of constructing a business case, innovation ideas could emerge in other settings as well in which the business case is pondered upon. Each interaction with the business case in trying to understand it in its depth therefore became a potential source of spurring ideas for a new product development projects. This is similar to the thesis in earlier research by Revellino and Mouritsen (2015) that calculative practices could work as an engine for innovation.

By being a system able of continuously reinventing itself, the business case as an idea generator was able to ensure a continuous supply of new ideas and therefore business cases, themselves facilitating the emergence of new ideas.

5.2.3. The Business Case as a Discussion Tool

The third role of the business case was that of a discussion tool between hierarchical levels, most importantly between the project team and the steering group. In ToolsDiv, the steering group had the informal function of approving or disapproving proposals of presenting a project to the gate-board for formal approval of either formalising a project in the first place or moving an existing project within the design phase into the next step of the product development process as well as approving major changes to existing projects. The foundation for this decision was always the current version of the business case explaining the business logic of the development project. This perspective has similarities with the concept of short translations elaborated by Mouritsen et al. (2009).

This phase of the development process largely followed a top-down innovation approach as the guidelines for R&D in what to develop were very clear, not leaving a lot of room for interpretation. While this structure helped to increase the efficiency and timeliness of the development projects in the design phase, a top-down innovation approach could potentially lack pragmatism and adaptability if circumstances change, instead following the specifications set up earlier in the development process.

While the business cases entailed hard numbers showing the business potential of the proposed project, these numbers were not self-sufficient in allowing a project to move to the next development phase. Instead, the metrics were used as the starting point for a discussion between the project team and the members of the steering group.

However, the role of the business case as a discussion tool was not limited to the discussions between the project team and the steering group. During the design phase, the business case was used to both advocate and fight changes to the products. In a situation where the project team disagreed on how to proceed with the development process, the business case was used internally to motivate why the product should be changed in a certain way to better fit the customers' needs or why a certain change would not be value creative for the customer, and therefore, not for ToolsDiv either.

5.2.4. The Business Case as a Technology-gap Highlighter

During the construction of the business case draft as well as the final business case, the technical aspects of the product which the organisational members of ToolsDiv want to develop are brought forward. As such, technical wishes made by marketing with the aim of addressing customer needs may not be feasible for R&D to deliver on. If R&D is not able to meet these suggestions without having to do extensive research on the topic, the business case, and the process of constructing it, is able to highlight the technical knowledge gaps currently prevailing within the organisation.

The role of the business case as a tool for highlighting technological gaps within the organisation is of importance for the future success of innovation projects. In creating awareness about what competences, technical solutions and know-how is lacking in the organisation, the business case points out areas in need of improvement for developing innovative products going forward. As this information is shown to managers, they are able to begin filling these gaps so that the organisation is ready for assuming the challenge of developing products of higher technological magnitude later on.

Figure 6: Analysis of calculative practices during the different phases

Management Setting	Bottom-up	Bottom-up	Top-down	Top-down
Calculative Practice	Business case	Business case	Business case	Business case
Analysis of Business case	▪ Formalise ideas ▪ Motivate discussions	▪ Validate ideas ▪ Motivate discussions ▪ Research ▪ Knowledge analysis	▪ Discussion tool ▪ Diagnostic evaluations	▪ Discussion tool ▪ Diagnostic evaluations
Role of Business case	▪ Idea generation tool ▪ Discussion tool	▪ Idea generation tool ▪ Validation tool ▪ Discussion tool ▪ Technology gap highlighter	▪ Discussion tool	▪ Discussion tool

6. Conclusions

In the following section, we will present our findings from the case study at hand as well as how these contribute to the previous academic literature on the topic of management accounting in the form of calculative practices and innovation. Subsequently, we will provide limitations as well as suggestions for further research of this, and related, topics which we have come across during the abductive process of writing this thesis.

6.1. Our Findings and Contributions

In total, we contribute to the previous literature in three distinct ways.

First and to answer our research question, we show how one single calculative accounting tool, the business case, was able to fill multiple functions throughout the development process, shifting roles throughout time to address varying needs. The business case was found to assume four distinct roles, both explicit and implicit, in the various development phases. It functioned as an idea generation tool, an idea validation tool, a discussion tool and a technology-gap highlighter. In the earlier innovation phases characterised by the bottom-up approach, the business case as a calculative tool worked as an engine (Revellino & Mouritsen, 2015), forcing the marketing department to generate and formalise ideas, assess their business potential and commit to the estimates by creating a hard-copy business case. In the later stages however, the role shifted, instead now working through short translations (Mouritsen et al., 2009) as a discussion tool in the top-down approach. The business case was further used to assess the impact of and argue for or against suggested changes to the project as well as measure its progress against the plan set up in the business case

Second, we add to the limited literature on the role of stage-gate models and their role as a management control tool for innovation, both standalone and in combination with calculative practices such as the business case in use within ToolsDiv. In our view, the academic of the stage-gate model within accounting is very limited with Jørgensen and Messner (2009) putting most of their emphasis on the relationship between accounting and strategizing.

We provide additional insights to the use of stage-gate models by arguing that the structure of the project team was able to replace the stage-gate's role of ensuring financial consciousness in the project (Jørgensen & Messner, 2009) by using mixed teams with sometimes conflicting goals. By having the various stakeholders look out for their own interests, the mixed teams were able to balance demands on technical aspects, timeliness and financial viability

throughout the development process, thereby replacing the need for the gate-board to use the business case as a base for allowing or disallowing a project to proceed to the next phase. While we stand behind our conclusions, we acknowledge that this study may lack the theoretical depth needed to fully investigate this particular conclusion. As such, there is a need for further research based on this topic.

Third, we provide new empirics to the underdeveloped literature of management control and innovation by specifically targeting an explicitly market-driven organisation, thereby answering the call by Chenhall and Moers (2015). While studies of market-driven organisations have been conducted previously (Mouritsen et al., 2009), this particular aspect of an organisation's character has been neglected to a far too large extent considering its importance for real-life organisations. Instead, the aspect of an organisation being market-driven has either been implicitly assumed (Jørgensen & Messner, 2009) or neglected altogether, thereby decreasing our understanding of this particular subject. We argue that the market-driven organisation, by starting with the marketing department, is able to combine bottom-up and top-down innovation approaches in designing its development process and controlling it through calculative practices such as a business case in the case of ToolsDiv. The combination of the two approaches ensures that the innovation process could be both effective and efficient, the first mentioned being most important in the early stages of the process in deciding what projects to pursue, selecting the projects that have the highest financial potential in the market, and the latter being of higher importance for the actual design phase in controlling the development to keep to the time-schedule and predetermined plan, and rapidly bring the ideas to new product offers in the market.

6.2. Limitations

As with all qualitative research, the generalisability of this study is limited. Since previous studies on the combination of calculative practices and the stage-gate model do not exist, the findings of this thesis pertaining to this particular intersection cannot be contrasted to other studies. It may very well be that future studies targeting the same niche come gain different insights, causing them to draw conclusions which are not in line with our findings. While we have tried to include contextual factors of high importance to the organisation in question, such as the aspect of being market-driven, many more contextual factors reasonably affect the case study and the conclusions that we have been able to draw from it.

Furthermore, the fact that we limit our definition of management control to include only formal controls is a potential limitation of our study. Should we have decided to include the role of informal controls, it is possible that some of our conclusions would have assumed a different role. However, we argue that excluding informal controls remains a solid judgement call due to our ambition of conducting a deeper study of our research question, rather than scarping the surface using several different management control tools, causing the study to lack depth.

Lastly, the data collected for this study was gathered through qualitative interviews with members of InduCorp. We recognise that the interview setting itself constitutes a risk of the interviewees not providing a comprehensive and correct picture of the organisation, either overemphasising certain events or steering attention from others. We have mitigated this issue by conducting multiple (17) interviews with members of different departments and hierarchical levels within the organisation and believe that we, overall, have been able to ensure sufficient quality with regards to the data collected.

6.3. Suggestions for Future Research

In writing this thesis, other interesting issues and research topics arose but were not pursued either due to lack of time, empirical limitations or the question not fitting within the scope of this thesis. As such, we present some of these observations in this sections as suggestions for future research.

6.3.1. The Role of Management Accounting and Product Pruning

While innovation and product development are key issues for many organisations, the concept of handling a product portfolio is much more dynamic than just developing new products. As new products are being added to the portfolio, old products need to be phased out in order to leave room for new. During our study, we found many of our interviewees being concerned with pruning old products as these often still contributed to the profit pool. At the same time, the marketing department needed to prune a certain percentage of their products each year. A very crude search on the topic within academic journals yields few results, indicating an underdeveloped stream of literature in need of further research with regards to the role of accounting in the process of controlling for a healthy approach to product pruning.

6.3.2. The Role of Team Structures and Accounting Practices for Innovation

In order to shed further light on our argument of the team structure in place being able to ensure financial consciousness throughout the development process, we call for additional research addressing the issue of the interrelation between team structures and management accounting within product development. While we regard our study to provide suggestive evidence of the relationship between a mixed team structure and the lack of a need for formal controls ensuring financial consciousness within the project team, we remain open for alternative theories for the observed situation and welcome additional research on the topic.

6.3.3. Alternative Roles of the Stage-Gates

As this paper has shown, the actual role of a stage-gate meeting is not necessarily the formal role that it has been assigned. While we found the role of the stage-gate to be one of forcing discussions between the project team and the steering group as well as within the two groups, there may very well be additional roles of the stage-gate models besides the ones visible in this case study. For instance, stage-gate meetings may potentially act as a forum in which top management assesses future managers and their ability to motivate and present product development projects from a business perspective, thereby affecting their potential of rising through the organisation in the future. While our case provides to little empirical support for such claims, the existence of alternative roles of the stage-gate model as a management control tool cannot be rejected at this stage and should therefore be investigated further.

6.3.4. Market-Driven Organisations and Radical versus Incremental Innovations

The empirics of this case suggest that InduCorp has been very successful in serving their customers with incremental innovations. However, several interviewees expressed concern for a lack of radical innovations with a high degree of technical innovativeness. While the difficulty of market-driven organisations to create radical innovations has been acknowledged in the academic literature (Berthon, Hulbert, & Pitt, 1999; Kumar et al., 2000), the role of accounting in facilitating radical innovations, or balancing the two, lacks depth. As such, we call for academic research targeting this area which is of high relevance to practitioners not the least.

7. Appendix

7.1. List of Interviews Conducted

Table 1: List of interviews conducted

No	Position	Department	Date
1	Vice President Marketing	Marketing	05 February 2018
2	Vice President Finance	Finance	02 March 2018
3	Vice President R&D	R&D	14 March 2018
4	Assistant Business Controller	Finance	16 March 2018
5	Product Manager 1	Marketing	20 March 2018
6	Product Manager 2	Marketing	20 March 2018
7	Business Manager 1	Marketing	21 March 2018
8	Product Manager 3	Marketing	22 March 2018
9	Product Manager 4	Marketing	22 March 2018
10	Product Manager 5	Marketing	23 March 2018
11	Vice President Marketing 2	Marketing	29 March 2018
12	R&D Business Controller	R&D	29 March 2018
13	Program Manager	R&D	04 April 2018
14	Project Manager	R&D	04 April 2018
15	Development Engineer	R&D	04 April 2018
16	Test Engineer	R&D	05 April 2018
17	Business Manager 2	Marketing	27 April 2018

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