

Navigating the Divide

A qualitative case study on management control systems in product and process innovation

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Abstract

This thesis examines a company's use of management control systems in product and process innovation, and to what extent they are applied in enabling and constraining manners. In addition, we investigate how the application of management control systems affects the interplay between product and process innovation, and how the firm manages the interplay. The study was conducted as a qualitative single case study through interviews with employees from a listed manufacturing company. Our theoretical framework was based on Simons' (1995) research on management control systems through his four levers of control, Mundy's (2010) research on dynamic tensions, and our addition regarding how companies manage these tensions. Similar to previous research, our study highlights that the company balances all four levers of control across the company, and balances an enabling and constraining application of them. However, as opposed to earlier research, our study shows *where* the balance of management control systems can appear in the firm to create productive dynamic tensions. Additionally, we introduce the concept of coupling mechanisms between product and process innovation that enables seamless operations between the two innovation types.

Keywords: Product Innovation, Process Innovation, Management Control Systems, Enabling, Constraining

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1. Introduction

1.1 Background and Problematization

The prevailing corporate landscape is subject to accelerated adoption of new technologies, resulting in enhanced competition and aggravation of foreseeing upcoming market demands (United Nations, 2019). In such a challenging environment, innovation is essential for achieving a competitive advantage (Apaydin & Crossan, 2010). Mone et al. (1998) describe innovation as the most significant aspect of successful corporate performance, and recent research suggests a solid, positive correlation between innovation and financial performance as it enables corporations to distinguish themselves from other players and thrive in the competitive landscape in which they operate (McKinsey & Company, 2019).

Management control systems (MCSs) play a vital role in enabling innovation while maintaining control within a company (Barros & Ferreira, 2019). Traditional research on management control and innovation viewed MCSs as a hindrance to innovation due to their constraining elements that inhibit creativity (Amabile, 1998; Barros & Ferreira, 2019). However, a recent shift has occurred, where contemporary research proposes a different standpoint. Today, MCSs are seen to bolster corporations' ability to innovate by stimulating different parts of the innovation processes (Barros & Ferreira, 2019; Bedford, 2015). This occurs as MCSs align organizational members' behaviors and corporate performance objectives (Hartmann et al., 2021). The recent paradigm shift has prompted many scholars to engage in the literature and offer novel perspectives on the subject. However, despite a large number of published works, MCSs in innovation are complex phenomena to study (Barros & Ferreira, 2019). Thus, many authors in the field have called for additional studies on the topic that can contribute to more comprehensive and nuanced knowledge (Barros & Ferreira, 2019; Chenhall & Moers, 2015).

Research published both before and after the paradigm shift primarily aimed to determine if MCSs serve as impediments to or enablers of innovation. Consequently, much of the existing literature centers on *whether* MCSs foster innovation (Bedford, 2015; Bernd & Beuren, 2022; Bisbe & Otley, 2004; Lopez-Valeiras et al., 2016). Less attention has been devoted to investigating *how* organizations employ MCSs to facilitate innovation and the underlying reason for such practices.

Moreover, much of the existing literature on the relationship between MCSs and innovation has focused on innovation in general without explicitly examining how MCSs influence different types of innovation. Some studies have made distinctions based on the novelty or magnitude of innovation, such as distinguishing between incremental and radical innovation (Chiesa et al., 2009) or exploitative and exploratory innovation (Bedford, 2015). However, researchers have focused less on investigating the relationship between MCSs and the type of change the innovation embodies, such as the distinction between product and process innovation. It is interesting to strengthen the literature on product and process innovation, as these components are essential parts of an organization. Product innovation concerns meeting customer needs, entering new markets, and realizing short- and medium-term financial objectives, while process innovation regards attaining the organization's long-term financial goals through improved efficiency, productivity, or cost-savings (Fritsch & Meschede, 2001; Guo et al., 2019). Moreover, the two innovation types are interrelated phenomena within a company, as product innovation requires the development of new process innovations to enable the creation of entirely new products or improve existing product components. Conversely, process innovations enable a firm to improve product quality or produce new products (Fritsch & Meschede, 2001; Guo et al., 2019). As product and process innovation obtain different characteristics in terms of knowledge requirements and implementation strategies, and have different relationships to creativity and uncertainty, the two concepts demand varying MCSs (Guo et al., 2019). Within this categorization of innovation, there has been some progress in understanding the role of MCSs in product innovation (Bisbe & Malagueño, 2015; Bisbe & Otley, 2004; Chenhall et al., 2011; Davila, 2000; Löfstål & Pan Fagerlin, 2020). This progress has prompted scholars like Chenhall and Moers (2015) and Lopez-Valeira et al. (2016) to advocate for further exploration of the role of MCSs in forms of innovation other than product innovation. Additionally, according to Guo et al. (2019), there is a lack of research comparing MCSs across product and process innovation.

The scarcity of research that combines product and process innovation has resulted in a subsequent shortage of research exploring the interdependency and interplay between these two types of innovation. Thus, there prevails a significant gap in research regarding the characteristics of the interplay and how firms manage the interplay.

1.2 Research Question

The purpose of this thesis is based on the research gaps we have identified. Firstly, we aim to investigate how MCSs are used in an organization's product and process innovation practices. Secondly, we explore what implications this brings for the interplay between the two innovation types. Third and lastly, we investigate how a company manages this interplay. Thus, the research question is formulated as follows:

How does a company's use of MCSs in product and process innovation impact the interplay between the two innovation types, and how is this interplay managed?

To address our identified research gap, we conduct a single case study where we interview employees at a metal production company (henceforth "ManuCo"). ManuCo specializes in customized product solutions and pursues product innovation through its construction function and process innovation through its production function. We have developed a theoretical framework for our study to address our research question. It employs Simons' Levers of Control as the primary theory and incorporates Mundy's extension of Simons' research by discussing the dynamic tensions that arise when balancing enabling and constraining controls. Furthermore, the framework explores how a firm can manage such tensions.

1.3 Contributions

This paper has three primary contributions to MCSs and innovation research. First and foremost, our contribution is prevalent through an enhanced understanding of how MCSs can be aligned with the pursuit of innovation in an organization. Our research affirms that by balancing enabling and constraining MCSs and all four levers of control, organizations can create dynamic tensions that foster product and process innovation. Secondly, we contribute by demonstrating that a corporation can have separated product and process innovation operations and manage organizational conflicts arising from dynamic tensions by implementing two types of coupling mechanisms, a matter that is not addressed in the existing literature. The first coupling mechanism we suggest is cross-functional meetings with employees working on product and process innovation. The meetings allow a firm to harness the tensions and conflicts to enhance innovation. The second coupling mechanism regards aligning the workforce towards a common goal that serves the corporation as a whole, as it mitigates the negative aspects arising from tensions and conflicts between

product and process innovation. Lastly, we contribute to the literature by suggesting how or where the balance of enabling and constraining controls should prevail within a corporation. Prior research has yet to determine if a company should have both types of control systems in each organizational division or if a balance can be maintained by having predominantly enabling controls in one division and constraining controls in another. Our contribution suggests that even if there is a significant lack of one type of control in a specific function, a company can still create dynamic tensions between the two control systems by maintaining a balance on an overall organizational level.

2. Theory and Literature Review

The following section presents previous research on MCSs, and product and process innovation. Firstly, we identify different approaches for how MCSs have been linked to innovation. Thereafter, we discuss the concepts of product and process innovation and how researchers have studied these innovation types in relation to MCSs. Lastly, we present our theoretical framework, which originates from Simons' and Mundy's research on MCSs and innovation.

2.1 Management Control Systems and Innovation

MCSs are an indispensable aspect of controlling corporate operations, as emphasized by Hartmann et al. (2021). Although there is no consensus about what constitutes MCSs, Simons (1995, p.5) defines MCSs as “*formal, information-based routines and procedures used by managers to sustain or modify patterns in organizational activities.*” Bisbe and Otley (2004) further contribute to this definition by stating that MCSs are both formal and informal control systems that managers implement complementary. Therefore, MCSs enable the organization to achieve its strategic goals by ensuring employees act according to these objectives (Bisbe & Otley, 2004). These definitions place significant prominence on MCSs' influence on strategy and the attainment of corporate objectives (Barros & Ferreira, 2019). Furthermore, they highlight the importance of MCSs in providing valuable insights throughout decision-making, planning, and assessment (Widener, 2007). Thus, MCSs constitute an essential role within firms in controlling and managing their operational procedures (Barros & Ferreira, 2019).

Scholars commonly agree that there is a twofold complementary and interdependent purpose of utilizing MCSs; *enabling* and *constraining*. *Enabling* MCSs aims to empower employees to explore innovative ways to solve problems (Davila, 2000; Mundy, 2010; Simons, 1995). These controls are associated with spontaneity, transparency, adaptation, information-sharing, entrepreneurialism, and adaptability. *Constraining* MCSs reduces uncertainty and improve decision-making. They do this by emphasizing productivity and increasing predictability by narrowing the number of decisions one can make. Moreover, they also highlight formality and the disallowance of improvisation. Consequently, these types of MCSs help companies meet their short-term objectives (Mundy, 2010; Sprinkle, 2003). Although constraining applications of MCSs are also described as *controlling* or *coercive* in research, the characteristics are identical (Mundy, 2010). In this study, the term *constraining* is adopted consistently.

Innovation is a concept widely covered in the research. However, there prevails a broad range of definitions of the matter. Barros and Ferreira (2019) summarize the various definitions of innovation as “*a process by which the implementation of new ideas happens*” (Barros & Ferreira, 2019, p.345). The authors emphasize the role of MCSs in innovation, as they view innovative processes as consciously implemented organizational processes that management effectively supervises rather than arbitrary events. Furthermore, Apaydin and Crossan (2010) underline the significance of innovation as a vital source of competitive advantage. Several scholars in management concur that the capability to innovate is the most critical determinant of firm performance and a pivotal driver of value creation (Apaydin & Crossan, 2010). Hence, managers persistently seek instruments or strategies to foster innovation within organizations and effectively manage the associated processes (Bisbe & Malagueño, 2015).

Early research maintains that MCSs are incompatible with innovation since they provide an inadequate foundation to cope with the uncertainty that often characterizes innovation (Amabile, 1998). Barros and Ferreira (2022) contribute to this claim by stating that MCSs historically have been used to undermine creativity and flexibility, which are significant aspects of the innovation process, to establish efficiency and profitability.

However, recent literature maintains that MCSs do not necessarily hinder innovation. On the contrary, Barros and Ferreira (2022) state that there is a consensus today that MCSs comprise an essential part of the innovation processes, as they facilitate significant decision-making aspects. They further emphasize that MCSs can work to ensure the strategic fulfillment of

innovation objectives. Additionally, Merchant and Van de Stede (2012) state that MCSs improve the creativity of employees that work with innovation. Furthermore, Lopez-Valeiras et al. (2016) claim that MCSs augment the innovation process by enhancing information flows across departments of organizations and throughout the different stages of the innovation process. Simons (1995) argues that managers can utilize MCSs to stimulate innovation by encouraging organizational members to continuously aim for new opportunities while ensuring that these innovation processes result in concrete performance and goal achievement.

2.2 Product and Process Innovation

A strand of research within the innovation literature distinguishes between product and process innovation (Fritsch & Meschede, 2001; Guo et al., 2019). Product innovation involves implementing a new technology or artifact as a response to the demands of the consumer or market. In contrast, process innovation pertains to the novel elements or processes that an organization adopts to enhance existing production or service operations (Higgins, 1996). Divergent organizational objectives drive the pursuit of both product and process innovation. Product innovation aims to cater to customer demands, enter new markets, and meet short- and medium-term financial targets (Guo et al., 2019). Process innovation, however, is oriented toward realizing long-term goals, such as enhancing efficiency, productivity, or cost-saving improvements (Guo et al., 2019). Although objectives differ, the two types of innovation modes are interrelated (Fritsch & Meschede, 2001). On the one hand, product innovation necessitates the development of new process innovations that enable the creation of entirely novel products or facilitate improvements in existing product components. On the other hand, process innovation enables a firm to improve its product quality or produce entirely new products (Fritsch & Meschede, 2001; Guo et al., 2019). Authors such as Fritsch and Meschede (2001) and Damanpour (2010) have emphasized the importance of achieving both types of innovation simultaneously, as it promotes competitive advantage by integrating their contributions, rather than treating them as independent factors.

2.2.1 Management Control Systems in Product and Process Innovation

The existing literature on MCSs connected to product and process innovation has predominantly focused on product innovation, whereas process innovation has received less attention (Chenhall & Moers, 2015). Moreover, most of the literature on the subject has examined each innovation type separately, with a limited investigation of their characteristics

and interrelatedness in a combined setting. However, despite the inconclusive literature, researchers generally agree that different controls are necessary for process innovation patterns, as they exhibit notable differences from conventional product innovation strategies (Lopez-Valeiras et al., 2016).

Scholars have taken an approach to analyzing variations in MCSs across different types of innovation by considering the contextual factors that shape the design of appropriate controls for different innovation modes. Chiesa et al. (2009) suggest that organizations should design control systems considering contextual factors, such as the type of activities under control, the quantity and quality of available resources, and the business strategy. The study's authors underscore the significance of contextual control systems, particularly when different functional areas within an organization are responsible for distinct types of innovation. Such innovation types may exhibit distinctive traits that necessitate customized control mechanisms.

In the discourse surrounding the contextual characteristics that influence the design of control systems, scholars frequently contemplate several factors, including the situation's complexity and the degree of knowledge (Chiesa et al., 2009; Guo et al., 2019; Revellino & Mouritsen, 2009). Guo et al. (2019) maintain that despite their interrelatedness, the distinctiveness of product and process innovation translates into different knowledge requirements. Product innovation is closely tied to market and customer demands and therefore necessitates the acquisition of external knowledge to a significant extent. In contrast, process innovation primarily requires knowledge of the organization's internal capabilities (Guo et al., 2019). Chiesa et al. (2009) suggest that other contextual factors considered by organizations when designing control systems are the level of uncertainty and the accessibility of information. They found that organizations utilize interactive and boundary control systems more intensely when operating in an innovation context that is characterized by uncertainty and a lack of information. On the contrary, as the information becomes more tacit and widely dispersed, diagnostic controls become more feasible and commonly adopted.

Other scholars study MCSs in product and process innovation in relation to enabling and constraining characters. These researchers disentangle the role of enabling controls in product and process innovation and find that enabling MCSs fosters both innovation classifications. In a study by Turner et al. (2021), the authors investigated the utilization of diverse MCSs for product and process innovation. Their research reveals that in work environments

characterized by autonomy, enabling controls positively impacts employees' innovative behaviors by shaping their perceptions of managerial support. Moreover, Bernd and Beuren (2022) studied enabling control systems in process innovation and found that the design of enabling MCSs directly and positively impacts process innovation. In particular, they found that enabling MCSs stimulate actions that increase innovation concerning production techniques, reducing costs and improving production quality. Such stimulation can be attributed to the inherent problem-solving nature of process innovation, which mandates the implementation of controls that allow employees to be autonomous and flexible.

Revellino and Mouritsen (2009) conclude that while constraining MCSs can facilitate efficient utilization of resources in innovation projects, they also impose constraints on creativity and are, therefore, in and of themselves, unable to support innovation. Instead, the researchers suggest that organizations adopt a balanced MCS, which integrates enabling and constraining controls to optimize innovation outcomes. Correspondingly, Chenhall and Euske (2007) conducted a study examining the utilization of MCSs in different types of innovation. Their research revealed that corporations adopt a hybrid approach that balances constraining and enabling controls to facilitate innovation. Furthermore, they state that the optimal balance between these two control types may vary depending on the type of innovation pursued.

2.3 Theoretical Perspective

To address our research question, we have developed a theoretical framework based on Simons' (1995) research and Mundy's (2010) extension of Simons' research. However, we also add our own component to the framework as it enables us to address our research question more accurately.

2.3.1 Simons' Research on Levers of Control

Robert Simons provided a novel perspective on MCSs and innovation when he presented his framework on *the four levers of control* in the late twentieth century (Simons, 1995). Since then, his theory has been widely adopted in the research field of MCSs and innovation (Barros & Ferreira, 2022; Bedford, 2015; Bisbe & Otley, 2004; Mundy, 2010; Widener, 2007). The framework introduces the concept of the four levers of control; *belief systems*, *boundary systems*, *diagnostic systems*, and *interactive systems* (Simons, 1995). He argues that for effective strategy implementation, firms ought to balance these four levers of control, representing opposing forces. Belief and interactive systems create intrinsic motivation in

employees by designing a positive informational environment that encourages and inspires employees to search creatively and expand opportunity space. For this reason, Simons categorizes these two control systems as enabling. Boundary and diagnostic systems, on the other hand, aim to ensure compliance through extrinsic motivation and are therefore regarded as constraining. Compliance is, for instance, achieved by supplying formula-based rewards and delimiting the domain for opportunity-seeking (Simons, 1995). Simons (1995) describes that enabling and constraining MCSs allow corporations to balance (1) the ability to constrain employee behaviors and ensure the accomplishment of organizational objectives, as well as (2) the empowerment among employees to proactively and creatively explore prospects and address challenges within the organizational context. As such, he defines control as “*managing the inherent tension between innovation on the one hand, and predictable goal achievement, on the other, so that both are transformed into profitable growth*” (Simons, 1995, p. 29).

Belief systems are utilized by managers to communicate and reinforce the values, purpose, and direction of the organization, all of which are rooted in the firm's business strategy (Simons, 1995). They are typically expressed through means such as mission statements, value statements, credos, and statements of purpose. Their primary function is to motivate the search for opportunities by inspiring and guiding employees to search for new ways of creating value (Simons, 1995). Their crucial role extends across various organizational contexts, all of which are intricately linked to fostering innovation. Specifically, within contexts that require creative thinking, belief systems enhance motivation by facilitating the internalization of organizational values and purpose (Adler & Chen, 2011; Simons, 1995). Similarly, belief systems can provide a clear vision for navigating challenges effectively in uncertain situations (Simons, 1995). Moreover, when an organization's opportunity space expands, belief systems become crucial since managers must explain the organization's direction and foster commitment among employees (Simons, 1995). These contextual examples underscore the critical role belief systems play in aligning and guiding the collective efforts of individuals toward the organization's goals and aspirations.

Boundary systems define employees' acceptable domain of activity (Simons, 1995). Contrary to belief systems, boundary systems specify negative ideals by establishing limits based on business risk. While establishing boundaries may limit freedom, it does not inherently lead to decreased empowerment or motivation (Adler & Chen, 2011). Instead, this concept of bounded autonomy directs subordinates' focus toward key areas that are deemed essential for

the effective execution of ongoing operations (Simons, 1995). Thus, its purpose is to allow employees freedom to innovate and achieve within certain predefined areas. Simons (1995) discusses two different types of boundaries; business conducts boundaries and strategic boundaries. Business conduct boundaries impose codes of conduct, which could be sourced from (1) society's laws, (2) the organization's belief systems, and (3) codes of behavior issued by industry and professional associations. Management implements strategic boundaries to support explicit organizational strategies by limiting organizational members from searching for opportunities in certain product and market domains (Simons, 1995).

Diagnostic systems, often referred to as the backbone of traditional management control, compare actual performance against predetermined targets. The primary objective of these systems is to guarantee goal achievement. This is done by identifying unfavorable variances and potential mistakes in a firm's *critical performance variables*, representing important performance dimensions of a given strategy, and thereby directing management towards areas where corrective actions are needed. This process of providing feedback on variance information enables organizations to make necessary adjustments to inputs or fine-tune the overall process, leading to future outputs that closely align with the predetermined standards (Simons, 1995). To effectively implement diagnostic control, periodic measurement and comparison of the quantity and quality of output are essential components. Profit plans and budgets belong to the most common diagnostic control systems. However, non-financial performance variables are often used in conjunction with these systems as supplementary measures (Simons, 1995).

Interactive systems are formal information systems that involve frequent and intense two-way communication between managers and subordinates at various organizational levels. The purpose of interactive control systems is to debate or challenge the underlying assumptions and action plans that drive an organization's activities, intending to address emergent opportunities and strategic uncertainties. They are forward-looking and inspirational, providing a positive control lever that positively affects firm performance in innovative and changing settings (Simons, 1995). To effectively utilize interactive systems, senior managers need to devote considerable attention to remaining vigilant about strategic uncertainties that could impact the achievement of organizational goals (Bisbe & Otley, 2004). However, attention should also be directed to the inside of the operations. By actively and personally engaging themselves in the activities of subordinates, interactive control grants top managers direct access to emergent patterns of activity. This insight enables managers to strategically

allocate resources toward initiatives demonstrating the greatest potential for yielding a competitive advantage (Simons, 1995).

Simons' framework is noted for its particular strengths, which initially include a strong emphasis on strategic matters, and how they affect the MCSs (Ferreira & Otley, 2009). Additionally, his framework comprises a broad range of control systems, where the four levers of control provide a comprehensive perspective. This, in turn, enables a deepened understanding of the design of the control systems, which is significant to ensure that the control systems indeed balance the attainment of goals and the ability to be creative and flexible to maintain sufficient innovative operations (Ferreira & Otley, 2009).

2.3.2 Mundy's Research on Dynamic Tensions

Mundy (2010) extends Simons' research and investigates the implications of combining enabling and constraining uses of Simons' levers of control. Contrary to Simons, Mundy argues that it is incorrect to categorize two of his levers as enabling and the other two as constraining. Instead, she suggests that each lever of control could be applied in an enabling or constraining manner. Moreover, she maintains that balancing enabling and constraining controls creates *dynamic tensions*. According to Mundy's reasoning, these dynamic tensions are consequential for corporations, as they generate competitive advantages through strengthened innovation, organizational learning, entrepreneurship, and market orientation, which are all essential for financial growth. Subsequently, dynamic tensions allow a corporation to improve its ability to acknowledge and adapt to changes in its business environment. These dynamic tensions are visible through organizational conflicts initiated between enabling and constraining applications of MCSs, which often appear when emerging strategic ideas challenge existing operations. The tensions are dynamic, as they arise from ongoing and diverse strategic forces, both internally and externally, that continuously alter the relative magnitude of the different levers (Mundy, 2010). Although Mundy's (2010) research extends beyond these aspects, we limit our study to the factors mentioned. While Mundy also discusses factors that influence corporations' capacity to balance enabling and constraining MCSs (Mundy, 2010), this is outside the scope of our research question. Instead, what we include from Mundy's research is her perspective regarding the dynamic tensions arising between these enabling and constraining MCSs. Additionally, we adopt Mundy's perspective that all levers of control can be applied in enabling and constraining ways.

2.3.3 Theoretical Framework

While Simons' (1995) study constitutes a good foundation for our framework as it provides a satisfactory ground for understanding MCSs and innovation, it has some shortcomings. We mitigate these by complementing our framework with research conducted by Mundy (2010). Initially, Simons' research focuses on *what* controls should be implemented, while Mundy acknowledges that *how* controls are used is equally important. Thus, Mundy provides an additional level of analysis in her research compared to Simons. Furthermore, Simons suggests that boundary and diagnostic control systems are constraining, while belief and interactive control systems are enabling (Simons, 1995). However, Mundy provides more nuance as she proposes that all the levers of control can be enabling and constraining, depending on how they are applied. Additionally, while Simons suggests that firms balance controls to *manage* tensions, Mundy further explores the matter and concludes that tensions arising due to a balance of controls benefit corporations. Rather than Simons' reasoning, Mundy suggests that firms should balance controls to *create* tensions, which thereafter can be leveraged to enhance corporate performance and increase innovation.

Our theoretical framework, visualized in Figure 1, has been developed based on Simons' levers of control and Mundy's research on dynamic tensions and organizational conflicts, and provides an overall visualization of the MCSs present at the innovation divisions at the case company. We add to the framework by including how firms manage organizational conflicts and dynamic tensions between product and process innovation, a matter that existing research has not investigated.

Our theoretical framework is motivated by the recommendation of adopting a holistic approach that considers multiple control mechanisms, as highlighted by Barros and Ferreira (2019). Studying individual control mechanisms in isolation may result in incorrect conclusions (Chenhall & Moers, 2015) and risk not fully capturing the intricate relationship between management control and innovation (Barros & Ferreira, 2019; Chenhall & Moers, 2015). Furthermore, Mundy (2010) explains that analyzing multiple controls is essential since the balance and dynamic tensions derive from the interrelations between all levers. Thus, we adopt a holistic perspective in our research by including all four levers of control and acknowledging that they all can be applied in an enabling or constraining manner.

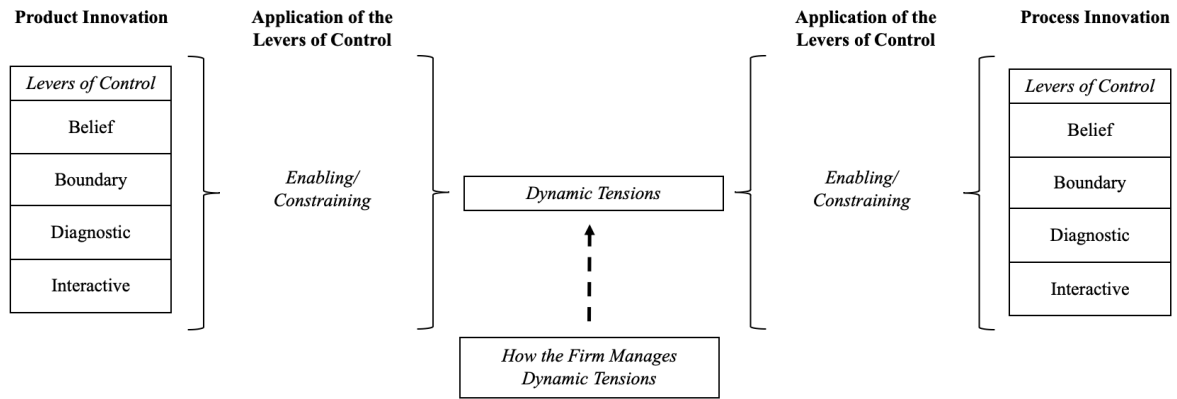


Figure 1: Theoretical Framework (author's adaptation of Simons, 1995 & Mundy, 2010)

Levers of Control at the Product and Process Innovation

Our theoretical framework focuses on the organization's product and process innovation, where we examine the MCSs implemented by the case company in each innovation type respectively. Simons' four levers of control serve as the foundation for examining the various control systems present. Thus, the levers of control provide the starting point for our analysis.

Application of the Levers of Control

Additionally, the framework enables an understanding of how the case company applies each lever of control, by concluding whether each lever is utilized predominantly enabling or predominantly constraining in the respective innovation type. When doing this, we adopt Mundy's perspective on enabling and constraining levers of control, assuming that each lever of control can be applied in an enabling or constraining way.

Dynamic Tension and How the Case Company Manages Them

Subsequently, the framework allows us to identify dynamic tensions arising from enabling and constraining applications of control systems between product and process innovation. Specifically, we explore the circumstances under which these tensions arise, their intensity, and the extent to which they pose challenges for the organization. Furthermore, we include an additional aspect in the framework by analyzing how the firm manages the dynamic tensions that arise. This addition to the framework enables a closer exploration of what, if any, actions the case company undertakes that allow them to manage dynamic tensions.

3. Method

This part describes the method by which we conducted our research. The section begins with an outline of the research approach and the rationale behind selecting our case company. Thereafter, we describe the interview and data collection process. Lastly, we conclude the methodology section with data analysis, describing how we analyzed our empirics.

3.1 Research Design

This study adopts a qualitative method to analyze how an organization uses MCSs in product and process innovation. This choice was made because we believe a qualitative research method more effectively captures the diverse nuances associated with management accounting applications than a quantitative one. As Barr (2004) explains, the rationale behind this assertion is that qualitative research encourages researchers to interpret the data they collect based on the participants' perspectives. Corporations use management tools in unique ways since it is a dynamic and organizationally embedded phenomenon (Vaivio, 2008). Moreover, management tools are often complex and temporary rather than stable and fixed (Vaivio, 2008). Utilizing a qualitative method, therefore, allows us to explore the phenomena more nuanced and contextualized, as it recognizes the subjectivity of the studied individuals (Barr, 2004).

We conduct a single case study since it allows for more in-depth analysis (Yin, 2014). Given that we interview individuals working with product innovation and individuals working with process innovation, we require a considerable sample size to draw meaningful conclusions. Therefore, the single case study approach facilitates a comprehensive comparison between the two distinct divisions within the case company. Such an intra-organizational comparison is critical to achieving our research objective of investigating how the case company manages tensions between product and process innovation. Conducting a multiple case study would increase the sample size considerably. However, this is not feasible considering our time and resources. Although a single case study may limit the generalizability of our findings, a qualitative and in-depth analysis outweighs this drawback.

Additionally, we base our study on an abductive approach, where we study theory in parallel to conducting interviews (Dubois & Gadde, 2002). This allows us to alternate between theory

and empirics while conducting our research, enabling us to further investigate new strands of research based on empirical findings from the interviews (Dubois & Gadde, 2002). Subsequently, we can alter our interview guide and expand our literature through the research process.

3.2 Selection of the Case Company

To address our research question effectively, selecting an appropriate case firm was critical to our study. Therefore, we established specific criteria that the case firm had to fulfill. The foremost criterion was that the selected firm had to grant us access to relevant information and personnel for interviews. Regarding the employees, we wanted to interview individuals across different hierarchical levels, ranging from top executives to subordinates, to gather diverse insights and perspectives. The second criterion required the case firm to possess product and process innovation operations. Lastly, to facilitate the examination of the relationship between MCSs and innovation, the third criterion was that the company had to have a sufficient level of control systems to enable an exhaustive analysis. The selected case firm, an established player, was chosen after fulfilling all our criteria.

3.3 Data Collection

The underlying principle governing the selection of interviewees within the organization was to get the most comprehensive answers to our research question. As our research question pertains to examining the utilization of MCSs in product and process innovation in the case firm, the interviewees are either involved in selecting control systems or impacted by such systems. Further, conversing with individuals representing diverse hierarchical levels within the company was crucial. Since MCSs tend to be established at higher organizational levels and implemented at lower levels, interviewing personnel involved in different levels of the hierarchy provides a comprehensive overview of the control systems.

We conducted eleven interviews with eight different individuals, which we have listed in Appendix 1. Three interviewees are involved in product innovation, two are engaged in process innovation, one works with both of these innovation types, and two represent the central functions of the firm. As the interviewees represent different parts of the organization, they provided thorough information about the composition and usage of product and process innovation, which is central to our research question. Some specialize in the company's innovative work, whereas others work with business control. Moreover, these individuals

represented different hierarchical parts of the firm, of whom some were senior managers, and others worked more operationally further down in the organization. Additionally, we interviewed two senior managers, who represented the central functions of the firm and occupied professional roles high up in the firm hierarchically. These individuals obtain a holistic view and hold overarching responsibilities across the firm, which allows for a further perspective on the company's innovative operations and management controls. The broad range of individuals interviewed across different departments of the organization and different hierarchical levels provided a more comprehensive and nuanced understanding of the research topic and helped us to identify commonalities and differences among different groups of the interviewed organizational members.

The first contact with the interviewees was initiated through email or LinkedIn, allowing them to reach back to us when they had the time. This message included a brief introduction to our research area and an invitation to participate in our study through an interview. While we encountered a positive attitude towards being interviewed by most individuals, some neglected to reply. Of all initial contacts, 67% (eight out of twelve) accepted our interview request. Contact details to interviewees were enabled through LinkedIn and from existing interviewees.

Collecting empirical data entailed conducting sixty-minute semi-structured interviews through an online video format. An interview template was formulated (see Appendix 2), with open-ended questions covering the areas we deemed essential for our research. As a basis for the composition of the questions, we conducted extensive research on product and process innovation and MCSs. Furthermore, we executed substantial studies on the company and the interviewed employees, allowing us to formulate the questions correctly. The interview template was altered depending on the interviewee's professional role and was continuously revised throughout the research process following discoveries and insights, in accordance with our abductive research approach. While the interview template constituted the foundational structure of the interview, the interviewee was allowed to dive deep into topics they obtained additional expertise in or areas they deemed essential. Consequently, the interview design facilitated co-creation between the interviewers and the interviewee. As both researchers attended each interview, one author focused on posing the predetermined questions while the other formulated follow-up questions based on the interviewee's responses.

3.4 Data Analysis

Our framework, derived from the works of Simons (1995) and Mundy (2010), served as a tool to identify themes and theoretical inconsistencies in the empirical findings. To facilitate our research process, we employed an abductive approach in the study, which allowed us to simultaneously develop theory, collect data, and analyze data throughout the research process (Dubois & Gadde, 2002). The abductive approach was reinforced by an internal discussion following each interview to deliberate on the central principles. Moreover, we recorded the interviews in agreement with each interviewee, allowing us to transcribe each encounter to facilitate the analysis and ensure we considered all meaningful empirical data.

Upon initiating our research process, we maintained a general interest in exploring the role of MCSs in innovation. However, our initial interviews revealed that the company has separate product and process innovation divisions, each utilizing vastly different MCSs. This discovery captured our interest, and in subsequent interviews, we delved deeper into how the firm uses MCSs in each division and how the different control systems affect the relationship between the two divisions. Through continued research in the literature during this period, we established an augmented direction for our work and formulated a research question. Specifically, we immersed ourselves in how the case company employs MCSs differently in product and process innovation, the resulting organizational conflicts, and how ManuCo manages these tensions.

To organize the interview material, we categorized it into themes according to Simons' (1995) and Mundy's (2010) research about the four levers of control and the enabling and constraining applications of the controls. Thereafter, we constructed a table (see Appendix 2), which identifies the MCSs and their corresponding classification as enabling or constraining, to find similarities and contradictions between the respective innovation types and their associated MCSs. It should be noted that this data organization method, as noted by O'Dwyer (2004), requires a comprehensive understanding of the transcript. As such, the analysis was conducted in combination with the processing and organization of the empirical data.

4. Findings

In this section, we present our empirical findings. We begin by describing the innovation process at ManuCo, both in terms of product and process innovation. After that, the MCSs applied in ManuCo's product and process innovation will be presented. This empirical material is structured based on Simons' four levers of control, whereafter a description of the levers' enabling and constraining applications is provided.

4.1 Introducing the Case Company

The case company, ManuCo, is a listed firm with approximately 500 employees. It was established in a small Swedish town during the latter half of the twentieth century, where it has preserved all its operations until this day. The company is a major industrial manufacturing enterprise promoting, designing, and fabricating metal components. ManuCo does not have an existing product assortment but constructs unique products for each customer. The company's diverse clients originate from various industries, with the most prominent sectors being the automotive-, industrial-, and construction sector. The municipality of ManuCo holds significant importance for the company; most of its employees live in the town, and many have worked for ManuCo for several decades. The company places significant value in anchoring its operations locally and supports several local initiatives.

ManuCo is branched into two fundamental parts; the *construction* and *production* functions. The employees in the construction division engage with the customers and use their deep expertise and experience to design products based on the preferences and demands of the purchaser. Contrarily, the production division manufactures the products composed in the construction division.

4.2 Innovation Structure at the Case Company

ManuCo's vision is to be the industry leader in innovative solutions for its customers, and its innovative operations are, thus, an integral part of its business.

If we lean back and stop being innovative, we will be out of the game in under two years. It is something we must do. We improve our products and processes; we cannot relax there. (Operations Development Manager, Interviewee B)

ManuCo's two divisions work with different types of innovation, where the construction function works with *product innovation*, enhancing the product characteristics of the goods sold to the consumers. On the other hand, the production function works with *process innovation*, where the division's employees aim to strengthen the processes through which the products are manufactured.

4.2.1 Product Innovation

The construction division consists of sales professionals, sales technicians, and engineers, who are all engaged in enhancing and innovating the products offered to the firm's customers. These employees work closely with each customer to design and compose a product that meets the client's demands and needs. Consequently, the products sold at ManuCo are developed and designed individually for each customer. Due to the lack of an existing product portfolio at ManuCo, it engages in product innovation in every product development process by creating unique and compelling products that enable ManuCo to differentiate itself from competitors. ManuCo further enhances product innovation by continuously inspecting what product improvements its competitors are performing and investigating whether any such enhancements would be appropriate for ManuCo.

Product innovation happens at [ManuCo] with each individual customer, so it varies a lot. It can regard everything from improvements in small details in the product, or the creation of a completely new product for a customer, and in those cases, we are responsible for the entire product development. (...) We try to find as smart and innovative solutions as possible. (Product Developer, Interviewee A)

ManuCo's product innovation initiates when customers engage ManuCo with a purchase request. The sales professionals are the customers' first touchpoint and they, therefore, spend time with the buyers to understand their demands and needs. After that, the sales professionals turn to the sales technicians and engineers, who have a more profound knowledge of the appropriate product design and characteristics. Subsequently, ManuCo provides innovative enhancement suggestions based on their proficiency and competence. As the requested products can have a significantly broad range of characteristics and utilizations,

serving the needs of a wide variety of customers, ManuCo maintains pride in the expertise that the employees in the construction division withhold.

Our job is to support [the customer] and say: 'If we do this instead, we think the solution could be better', and then you have a dialogue with the customer. (Product Developer, Interviewee A)

When a product design has been developed and agreed on at the construction function, it is transferred to ManuCo's production function for manufacturing.

4.2.2 Process Innovation

In the production function at ManuCo, its process innovation is conducted, through the enhancement of the methods, systems, and procedures regarding the manufacturing of products, intending to achieve increased efficiency, productivity, quality, and cost savings. Subsequently, the firm has implemented KPIs that measure the effectiveness of its production. These measures are checked daily through scheduled meetings where the production of the last twenty-four hours is carefully evaluated together with managers in the production function and employees working operationally in the manufacturing. Such examinations are also conducted monthly, quarterly, and yearly to capture holistic patterns. The examinations allow ManuCo to understand positive developments that may have happened throughout the production facilities but also enables the identification of plague spots where ManuCo would benefit from adjustments.

Our manufacturing processes focus on becoming more efficient from year to year. This takes a long time, but we constantly learn new things. We need to be out in Europe and see how other companies are doing to better understand what the next level of technology looks like. We did not do what we do today 10, 20 years ago, so slowly but surely, we are constantly moving forward. Here it is about innovating to save money. (Production Manager, Interviewee H)

In addition, ManuCo executes more significant investments that enhance the production of the products in the longer term, which principally concerns efforts to automate their production. This is enabled through modern, advanced technology across machines that reduce the required number of employees working operationally with the production, allowing for a ceaseless production that enhances the production volume capacity and curtails human errors. ManuCo recently built a new production facility that comprises unique and

innovative technology that enables ManuCo to enhance the effectiveness of its manufacturing processes while simultaneously reducing the number of employees necessary to run the production by fifty percent.

Regarding process innovation, we work a lot on automation. Three years ago, we built a brand new facility, which is at the forefront compared to our competitors. We hardly need to have any employees who work operationally there. (Operations Development Manager, Interviewee B)

4.3 Management Control Systems at the Case Company

4.3.1 Belief Systems

ManuCo has formulated a vision emphasizing the significance of being at the forefront of its market segment through innovative solutions. However, while the company's website and intranet provide access to its formal vision, it does not appear to be communicated to the employees. When specifically inquired about the vision, only one interviewee could provide an answer aligning with ManuCo's formal vision. The lack of awareness regarding the vision seems to also be prevalent throughout senior positions:

I would say we do not have [a vision] actually, so it is something we have to work on. There are owner directives which are the closest thing we have to a vision. However, it is not a vision or a mission, it is more what the owners expect in financial terms. (CFO, Interviewee E)

Interviewees who have worked at ManuCo for a significant time expressed that the company has been mediocre in setting longer-term goals that enable the employees to be involved in the vision. They suggested that this is a possible reason for the vision's low recognition among the employees. However, while the vision seems poorly communicated, all interviewees expressed that innovation is vital to the survival and prosperity of the company as the company's success lies in its ability to constantly improve operational flows and processes.

Some interviewees expressed that corporate growth, operation effectiveness, and money generation represent the core vision of ManuCo. For them, the owners' directives constituted the guiding principle of ManuCo. The owners' directives comprise targets regarding profit, turnover, and cost-related items that ManuCo should achieve monthly, quarterly, and

annually, and are available for all employees through ManuCo's intranet. The content of the owners' directives is discussed at quarterly, company-wide meetings. Moreover, the owners of ManuCo are not merely passive stakeholders but actively engage in the company's day-to-day operations. Their level of dedication to the success of the organization is evident.

Our owners are very committed. Despite being a board member, the principal owner actively engages in operational tasks and frequently works on the floor. He expresses demands that we are profitable and follows them up very carefully. He often questions our current processes in order for us to improve, so he is very driven here.
(Operations Development Manager, Interviewee B)

On the other hand, the interviews pointed towards a different matter of considerable significance for ManuCo: the local town where the company has its origin and current operations. Its heritage and anchoring in the area are proudly explained by the interviewees, who, on average, have worked for the firm for nine years. The engagement that the firm devotes itself to within this town, for example, through investments in sports centers for young citizens, is stated on the company website, on the LinkedIn homepage, and in documents found on ManuCo's intranet. Furthermore, interviewees expressed that ManuCo is of significant value to the town, as the firm is the largest employer in the area, providing the vast majority of the occupations. Thus, ManuCo constitutes a symbol of the area and an essential component of the town.

The company has strong local anchoring and pride, as we started from scratch and have grown massively since. For many of our employees, it is connected to that; a local company that has been successful and grown. In that lies the fact that they feel part of a successful company, incentivizing them to make an effort to make us even better. (CFO, Interviewee E)

In conclusion, this indicates that ManuCo's belief systems are predominantly constituted by the owners' directives and the company's heritage. Combined, they create a monetary focus and a sense of belonging across the workforce. This conclusion is drawn across both the construction and production functions within the organization, as their perspectives appeared to be largely similar. Employees in both functions adhere to the same fundamental values and directions, as communication channels conveying the business strategy are consistent across the company.

4.3.2 Boundary Systems

Upon being hired by ManuCo, all new employees sign an employment contract that outlines their specific job description, including their duties, responsibilities, and authorities. In addition, the contract contains general codes of conduct, such as equality of treatment, travel policies, and phone policies. These employment contracts not only specify the duties and responsibilities of the employees but also delineate the actions and behaviors they are prohibited from engaging in. Our findings indicate vast differences concerning this between the construction and production functions.

There are very detailed job descriptions in the production division. (...) I would say that the construction division's employees have a broader role, so it is more difficult to make a clear job description for them. (Operations Development Manager, Interviewee B)

The contracts in the construction function are brief and do not extensively specify the employees' tasks, providing a general overview of their responsibilities. As a result, the employees in the construction division enjoy a considerable degree of autonomy and independence in their day-to-day activities. Several interviewees in the construction function underscored the relative absence of restrictions in advising customers on the blueprint of the products and subsequent product designs. The reason for the scarcity of regulations is that the majority of the employees in the construction function are experienced professionals with knowledge of what characteristics a product should have to create a satisfactory financial margin while simultaneously ensuring that the production function can manufacture the product.

However, employees at the lower levels of the construction function are restricted to some extent by commercial authorities. They dictate the size of deals and decisions the sales professionals can make. This could affect product innovation, as the sales professionals' innovative ideas are limited to the financial boundaries and decision authorities. However, the sales professionals have not expressed this as a significant innovation barrier, as the scopes of the mandates are quite generous.

The commercial authorities primarily exist at lower hierarchical levels of the organization and regard how large deals they can pursue and what decisions they can make. While the sales professionals have a limited entitlement, the department and

regional sales managers have increased accountability in terms of the financial sizes of deals and decisions in product innovation. The CEO has the ultimate authority to approve deals priced above a certain threshold. However, deals seldom reach the financial cap, and my perception is that sales professionals rarely feel limited by the decision authorities. (Sales Manager, Interviewee F)

The employees working within the production function are subject to more limitations through extensive employment contracts with detailed task descriptions, including several obligations that limit their autonomy significantly. Additionally, they must adhere to what has been determined in *contract review meetings*. These meetings are cross-functional encounters where representatives from the construction and production functions gather and approve the product blueprint formalized by the construction function before it is sent to production. For employees in the production division, this implies an obligation to follow the design thoroughly when manufacturing the piece. Given that the customers often incorporate the product from ManuCo into a larger composition, no deviations from the blueprint can occur, as even the slightest variation could adversely affect the final product.

Besides the boundaries mentioned above, which are primarily oriented toward ensuring compliance with business conduct, ManuCo does not employ any strategic boundaries. The firm has yet to encounter any issues that have prompted the organization to limit organizational members from searching for opportunities in certain product and market domains. On the contrary, they frequently encourage them to maintain awareness of new strategic openings.

I cannot say I have experienced employees searching for business opportunities falling outside an acceptable domain. It is rather the opposite; you need to push them to be aware of what is new and coming. (Sales Manager, Interviewee F)

In summary, the construction function is subject to few direct boundaries, while numerous regulations significantly inhibit the production function. This disparity can be attributed to the relatively unrestricted nature of the job responsibilities of the former, as well as to the fact that the contract review meetings attended by representatives from the production function reduce the need for imposing constraints on the construction function.

4.3.3 Diagnostic Systems

From the perspective of being a listed company that has obligations toward its shareholders, ManuCo is constantly pressured to produce profits. When the management team sets overarching goals for the organization, they must constantly consider this. As a result, the measures, targets, and rewards utilized in the construction and production functions are highly financially oriented. Subsequently, the construction division primarily focuses on maximizing revenue, while the production division aims to minimize expenses. The varying objectives of the two divisions imply that ManuCo utilizes distinct diagnostic controls in its construction and production divisions.

Within the construction function, the sales managers establish annual sales budgets in alignment with the directives of the CEO, CFO, and Board of Directors. Individual sales budgets are assigned to each sales professional and are subsequently consolidated into a comprehensive sales budget. This budget is categorized by columns detailing metrics such as annual tonnage sold, percentage of sales falling within the profit margin, and an overall sales figure. Notably, the budgets for the construction function are distinguished by their focus on revenue and absence of consideration for costs. Furthermore, ManuCo has instituted a straightforward incentive scheme linked to sales professionals through the utilization of a bonus system. This system is designed such that sales professionals are granted a bonus upon exceeding their targets, with the amount of bonus received increasing proportionally with the surplus above the target.

The employees in the production division have a fixed salary. In the construction division, however, there is a bonus system that every salesperson can take part in.
(Sales Manager, Interviewee F)

Although the reward system is implemented to increase sales, the employees from the construction function we interviewed emphasized that factors beyond monetary bonuses frequently served as the principal motivators.

In terms of what drives us, it is not always the financial aspect. We have hundreds of customers in various industries and countries, so the network of contacts that you can build up over a few years in this job is invaluable. You cannot work yourself rich here, but you can become competent and an outstanding sales professional. (Sales Professional, Interviewee C)

The people working in the construction division attend to their sales progress continuously to detect deviations from the budget and correct their work. However, if they fail to meet the budgets, the implication is solely that they will not receive their bonus. Employees from the construction function highlighted that anomalies in the sales figures could occur due to circumstances beyond ManuCo's control, such as economic downturns or the bankruptcy of significant clients. In such situations, the sales team's ability to generate revenue may be limited, prompting the company to also focus on cost control measures in the production division.

In the production function at ManuCo, the employees must strive to continuously improve their processes to become more productive and cost-effective. Hence, a systematic approach is used to measure production processes against predetermined targets. This includes tracking over 100 KPIs, such as the amount of scrap per product, output per machine, output per hour, standstills in machines, and the occupancy rate of the machines. Every aspect of the production process is measured to get a holistic view of how the processes perform. ManuCo's objective in conducting process measurements is to evaluate its performance and identify areas where deviations occur, and improvements are necessary. Subsequently, the company can take corrective measures to improve the operational processes as required.

Our entire system, in terms of production, builds on continuous improvements. Every time we have produced a product or made a change or improvement, it is recorded to be applied for the next time. We are constantly working to try to improve quality and efficiency. (Product Developer, Interviewee A)

Some KPIs are updated in real-time and can therefore serve as planning tools, enabling prompt decision-making. Continuously updated KPIs allow the organization to allocate resources efficiently, such as calling employees on hold when needed. This proactive approach to utilizing KPIs aids resource optimization and enhances overall operational efficiency at ManuCo. Moreover, meticulous work is done to follow up on the targets and KPIs related to production. Every morning the production division has meetings where they review yesterday's output, to identify deviations. Furthermore, periodic reviews are conducted at the end of each month and every quarter to refine these KPIs. These reviews allow ManuCo to update its KPIs to align with new internal or external standards. Moreover, it facilitates identifying whether it is necessary to implement new KPIs or discontinue existing ones.

We follow up on the KPIs daily, so every morning the production division has meetings where we go through the last day's production and look at the outcome; what worked and what did not work? If, for example, a machine has had problems, there is a representative from that machine at the meeting. We also follow up monthly, quarterly, and annually to see the big picture. This enables us to identify problem areas so we can find a solution, for example investing in making some change for future years. (Product Developer, Interviewee A)

The departments in the production division do not have a specific budget connected to process innovation. Instead, there is an investment budget for larger investments in the production facilities. When innovative suggestions are raised that are of a larger magnitude, a project is usually initiated, which receives funding based on calculations. Interviewees described that a budget specifically for innovation would be obstructive because employees would quit innovative thinking once the budget is reached. This could be explained by the fact that the budgets in the production function are all cost-based.

Setting a budget for innovation is very difficult because it must not be inhibiting. Therefore, we do not have a budget for innovation. Instead, it is about being able to justify an innovation investment and provide a calculation of the expected effect. (Operations Development Manager, Interviewee B)

As can be derived from above, the construction division's sales budget and the production division's KPIs are employed as mechanisms to maximize profits. ManuCo's sales budget in its construction division encourages the employees to use virtually all means to boost sales, whereas the KPIs in the production function pertain to efficiency gains, cost reductions, and the attainment of short-term targets. However, among the KPIs in the production function, ManuCo has chosen not to implement a cost-based budget related to innovation to encourage employees to conceptualize new innovative initiatives more freely without being concerned about reaching an expense limit. Moreover, the presence of a reward system further distinguishes the production function from the construction function. While the employees in the construction function have a bonus system in addition to their fixed salary, the employees in the production function do not.

4.3.4 Interactive Systems

In order to build internal pressure to break out of narrow search routines and encourage continuous search activity, ManuCo uses its *PDCA system* (an abbreviation for Plan, Do, Check, Act).

It is a system where you can submit improvement proposals with a reward model linked to it. We encourage all our employees to come up with one improvement suggestion every month, which works very well. Subsequently, the PDCA of the month is announced, where the best suggestion receives a small prize and recognition through a posting on the intranet. (Operations Development Manager, Interviewee B)

The suggestions produced in the PDCA system usually focus on improving the daily work of employees, as well as the productivity and efficiency of the operations. While less frequent, some employees utilize the PDCA system to propose strategic opportunities. Consequently, the purpose of the PDCA system is threefold: (1) to improve the workplace environment, (2) to improve the operations, and (3) to encourage the continuous search for new business opportunities. Most of the suggestions put forth via the PDCA system aim to facilitate or improve the operations within the production function rather than the construction function, even though the system is open to the entire organization. However, while the employees in the construction function present fewer suggestions for the PDCA system than employees in the production function, the construction division is generally seen as more favorable towards innovation and transformation compared to the production function:

The general tendency is that the construction division is more drawn in that direction and wants to move forward and test new things. In contrast, the production function is more restrictive. (Business Development Manager, Interviewee G)

The reason for this, as explained by interviewees from the construction function, is that the construction function is responsible for the revenue generated by ManuCo, and thus has higher incentives to enhance the company's capability to increase sales volumes. Rather than providing suggestions in the PDCA system, the interviews show that the employees within the construction function channel their innovative desire and ideas through their significantly free professional roles. Within the construction function, the employees can effectively fulfill their duties of promoting sales through a means deemed optimal from their perspective.

Each construction function employee is free to do what they wish. If anyone wants to go out and visit a customer or have a meeting with a supplier, he does it. There is a great deal of freedom, which I think is beneficial to the business. This applies, in principle, to all roles in the construction division. (Sales Manager, Interviewee F)

Moreover, the construction function runs internal monthly meetings, which constitute a platform for interactive discussions between managers and employees. During these meetings, the significance of maintaining creativity and curiosity and looking for new business opportunities is emphasized.

I have monthly meetings with my department, where we talk a lot about personal development and that we must learn new things, keep being curious, and so on. We talk a lot about personal development because we want our employees to always aim to move from the level where they are to the next level, both for their sake and for the sake of the company. (Sales Manager, Interviewee F)

Similarly, the production function also conducts such scheduled meetings. However, the meetings' focus differs significantly from the construction function's meetings. Rather than encouraging employees to propose new suggestions for innovative improvements or initiatives, the production function's meetings aim to identify deviations from the targets and implement corrective actions to ensure no further increases in costs.

Several interviewees expressed that the production function of ManuCo could benefit from implementing additional interactive systems to foster a culture of innovation and encourage proactive search activities. They recognized this function as change-resistant, struggling to introduce and implement innovative changes due to old-fashioned perspectives.

To conclude, it is evident that although there are formal interactive control systems in the construction and production functions of ManuCo, they differ between the two divisions. While the construction function continuously communicates the importance of maintaining an innovative mindset and looking for new business opportunities, the production function does not discuss similar aspects. Instead, this division communicates the importance of maintaining efficiency and reducing the risk of increased costs.

4.3.5 Enabling and Constraining Management Control Systems

We observed significant segregation between the construction function, which works with product innovation, and its production function, which works with process innovation. Each division is significantly independent, where the MCSs in one function are predominantly separate from the MCSs in the other. Additionally, it is evident from the interviews that there prevails a marked difference in the character of the implemented controls across the two divisions. We detected that enabling control systems are more commonly employed in ManuCo's product innovation, whereas constraining control systems are more rigorously enforced in process innovation. This difference, as was emphasized by many interviewees, can be traced down to the divergent assessment bases of the divisions that perform the corresponding innovation type. The production function has an inherent cost and productivity consciousness, which stems from them being evaluated on cost. Consequently, the division is subject to more restrictive controls aimed at ensuring efficiency, productivity, and meeting short-term goals. On the contrary, the construction function is assessed based on revenue. Management applies principally enabling control systems by encouraging employees in this division to be innovative in their search for new strategic possibilities to increase revenue.

ManuCo's CFO acknowledges that the vast differences in control systems in ManuCo's product and process innovation provide grounds for organizational conflicts between the construction and the production divisions. As the construction division is evaluated on generated revenue streams and the production division is evaluated on cost, there prevails a risk of suboptimization at ManuCo:

The possibility of suboptimization is always present, and in my opinion, even with the best control systems, there remains a risk of suboptimization. [The construction division] could run their race and accept customers or products that become problems for the production division. This is a matter for management to address, and we must be attentive. (CFO, Interviewee E)

To conclude, ManuCo applies the levers of control in both enabling and constraining manners. However, the enabling MCSs are significantly skewed toward ManuCo's product innovation, whereas the constraining MCSs are, to a larger extent, applied in its process innovation. As emphasized by the CFO, this is a matter that ManuCo must manage to reduce the risk of any adverse effects on the operations.

5. Discussion

In this section, we analyze the empirical findings based on our theoretical framework. Firstly, we provide an overview of the research that our study confirms. Thereafter, we present our two additions to existing research. Our first addition provides a perspective on how corporations can manage dynamic tensions and organizational conflicts between product and process innovation. Secondly, we suggest where in the organization the balance between enabling and constraining MCSs can occur to produce productive dynamic tensions.

We analyze our empirical findings through our theoretical framework, as visualized in Figure 2. As our empirics suggest, the employees in ManuCo's product innovation are subject to predominantly enabling controls, whereas the employees in its process innovation are subject to mainly constraining controls. The framework is populated according to the *dominant* control type of either enabling or constraining for each lever. This serves to visualize the distinct patterns and variations in the MCSs for ManuCo's product and process innovation. A more detailed view of the MCSs at ManuCo is presented in Appendix 2.

Product Innovation		Dynamic Tension	Process Innovation	
Lever of Control	Enabling/ Constraining		Enabling/ Constraining	Lever of Control
Belief	Enabling	<i>Different opinions between employees working with product and process innovation regarding product configuration and process improvements</i> How Does the Firm Manage Dynamic Tensions?	Enabling	Belief
Boundary	Enabling		Constraining	Boundary
Diagnostic	Enabling	<i>Cross-functional meetings and a united workforce</i>	Constraining	Diagnostic
Interactive	Enabling		Constraining	Interactive

Figure 2: Applied Theoretical Framework (Häggström and Seitz Brutar, 2023)

The empirical findings reveal that the MCSs employed at ManuCo differ in product and process innovation. Applying Simons' four Levers of Control to evaluate the controls, we discovered differences between ManuCo's product and process innovation in three of the four levers, where the only lever that stays consistent across the two functions is the belief system. This supports the findings made by Chiesa et al. (2009), who conclude that control systems tend to differ in different innovation contexts, and the findings by Guo et al. (2019), who propose that MCSs vary across a firm's product and process innovation.

Firstly, we noted that employees in the construction function have fewer direct boundaries due to their elusive job description and high knowledge of customer needs. In contrast, employees in the production function face greater constraints. While product innovation is part of ManuCo's ongoing operations, process innovation occurs more disruptively and is characterized by higher uncertainty and complexity, leading management to impose more boundaries on process innovation. Secondly, the diagnostic controls used in the construction and production functions have different designs. KPIs are indispensable in process innovation as it involves monitoring several processes and flows. The absence of KPI monitoring would make it challenging for the production function to obtain critical information for process improvement. Given the relatively uncomplicated nature of the sales professionals' jobs, a simple bonus system is in place for the construction function. Conversely, due to its complex task configuration, the production function lacks an incentive mechanism. Thirdly, regarding interactive control systems, the PDCA tool is primarily used to gather recommendations for process innovations, with limited use in product innovation. There is no corresponding control tool for product innovation. Instead, the construction function pursues strategic opportunities at its discretion. Meetings discussing innovation activities occur more frequently in the production function due to the greater complexity of process innovation. Thus, our analysis of the MCSs in product and process innovation further contributes to Chiesa et al. (2009), Guo et al. (2019), and Revellino and Mouritsen (2009) by confirming that differences in MCSs arise due to the distinctive characteristics of each innovation type, such as their differences in knowledge, information, complexity, and uncertainty. Furthermore, our empirical findings suggest that ManuCo adopts a balanced use of MCSs on an overall organizational level, where all of Simons' (1995) four levers of control are implemented across the firms. However, they differ significantly when looking at product and process innovation individually.

In addition to confirming existing research, we present two additions to research on enabling and constraining MCSs in product and process innovation. Firstly, we provide perspective on how corporations can manage tensions and organizational conflicts between product and process innovation. Secondly, we suggest where in the organization the balance between enabling and constraining MCSs can occur to produce valuable dynamic tensions.

5.1 Coupling Mechanisms for Managing Organizational Conflicts and Tensions

Our empirics show that the divisions pursuing product and process innovation at ManuCo are very segregated from each other and have distinct MCSs in place. Thus, organizational conflicts arise when the operations of the two divisions meet, as they have differing opinions regarding ManuCo's operations. Specifically, the construction function, driven by its MCSs that incentivizes revenue maximization, aims to increase the company's customer base and promote the sale of advanced and high-priced products. Consequently, the employees within this function tend to design expensive products that are challenging for the production function to manufacture due to their excessive complexity. Additionally, the significant autonomy and lack of boundaries that the employees in the construction function are subject to further permit some risk for the construction function to design products with characteristics that the production function is unable or unwilling to manufacture.

On the other hand, the production division tends to be wary regarding manufacturing capabilities, careful not to overextend resources by accepting a surplus of new clients or committing to producing products that surpass their manufacturing abilities. They are often skeptical towards overly complicated products, as their MCSs steer them to keep costs down, making them careful not to perform work that may entail higher variable costs for their division due to unfeasible or difficult manufacturing.

Subsequently, we have identified two matters that work as *coupling mechanisms* between the two segregated divisions. These tools assist ManuCo, not only in managing the dynamic tensions and organizational conflicts that arise between product and process innovation but also in utilizing them for the firm's benefit. Thus, the tensions are leveraged to create organizational success, as proposed by Mundy (2010). In the following sections, we view these matters through our theoretical framework and add to existing limited research on how corporations manage tensions that arise between interrelated product and process innovation.

Our first identified coupling mechanism regards implementing formal communication between ManuCo's product and process innovation. This is done through *contract review meetings* and *company-wide monthly meetings*.

The *contract review meetings* conducted at ManuCo enable the firm to enhance its *product innovation*. In these cross-functional encounters, where representatives from the construction

and production functions gather to agree on the product blueprint before the product is sent to manufacturing, the tensions between employees in the product and process innovation functions are managed. This is because they allow the two divisions to communicate, to, in turn, develop an optimal solution. As explained by our interviewees, there tend to be intense discussions in the contract review meetings since the construction and production divisions, respectively, frequently have differing perspectives on the characteristics or volume of products. While the construction function proposes innovative and complex products and suggests targeting untapped market segments, the production function usually prefers adhering to the current operations to mitigate the risk of incurring unanticipated, extensive expenses. Nevertheless, the conversation is generally constructive since the construction and production division employees have congruent goals; to do what is best for ManuCo. By exchanging perspectives and opinions from their different areas of expertise, the company exploits the dynamic tensions that arise to enhance its corporate performance.

Additionally, ManuCo can exploit dynamic tensions and organizational conflicts to strengthen its *process innovation*. This is evident during its *company-wide monthly meetings*, where employees from the construction and production functions gather with the top management team of ManuCo. In these meetings, all employees are encouraged to express their thoughts on how ManuCo can improve its process innovation. Similar to the contract review meetings, employees within the construction function, who work under principally enabling MCSs, tend to suggest improvements that would enhance ManuCo's production capacity, to be able to produce more complex products and accept new customer segments. These suggestions can regard measures such as accelerating production, pushing the limits of the current production facility to manufacture more sophisticated products, or increasing production volume. On the contrary, the employees in the production function tend to be skeptical of these suggestions, cautious not to compromise on the quality of the products produced.

Additionally, a second coupling mechanism has been identified as reducing issues related to the separation between ManuCo's product and process innovation. This relates to a unique, uniting aspect within the firm, namely the strong connection it holds to the town where it was founded and still operates. This local anchoring, therefore, not only serves as a belief system within the organization but also as a coupling mechanism between the construction and production function at ManuCo, as it spans the whole organization. This was apparent when the interviewees were explicitly inquired about the appearance of organizational conflicts or

tensions between the construction and the production divisions. Several of them expressed that since the firm is of such significance to the locality, they attempt to conduct what is best for the company rather than solely focusing on their individual or their division's needs. The vast majority of the employees in ManuCo have their origin within the area that ManuCo operates in, and thus, they desire its continued existence. Additionally, the average time they have worked for the company is over nine years, implying that they have been part of the locality and the firm for a significant time. The company provides the great majority of all jobs in the area, and there are several small and medium-sized corporations operating in the town that are entirely dependent on ManuCo, as ManuCo is their sole customer. Thus, would ManuCo proceed to another area, or dissipate, a significant amount of jobs would evaporate from the locality. Thereby, its long-term survival is necessary for many citizens within the area to work and live there. This, along with the clear emphasis placed on the town where ManuCo operates, strengthens the distinct sense of unity within the organization. This unity motivates employees to prioritize the best interests of the company as a whole, thereby reducing the prevalence of individual self-indulgent agendas not congruent with ManuCo's objectives in product and process innovation.

The implication derived from this analysis is that a belief system that focuses on creating a united workforce can constitute an effective way to internalize a common objective throughout a firm. Such a belief system can incentivize all employees to work for the company's long-term survival, which, in turn, is a way to manage dynamic tensions and organizational conflicts. Maintaining this belief system throughout the whole organization is essential as it fosters a sense of cohesion and directs collective efforts toward a common overarching goal. ManuCo has accomplished this through its local anchoring. However, other methods may achieve similar outcomes. The key lies in implementing belief systems that internalize a common objective throughout all employees, with a primary focus on the firm's long-term survival and ensuring that these belief systems are maintained throughout the organization.

In conclusion, ManuCo exploits dynamic tensions and organizational conflicts between employees subject to enabling controls and employees subject to constraining controls, which aligns with Mundy's (2010) findings. This enhances ManuCo's innovation, both in terms of product and process innovation. Further affirming her research, ManuCo handles conflicts initiated between enabling and constraining applications of MCSs when emerging strategic ideas challenge existing operations.

However, we show that ManuCo can maintain functioning operations between its completely separated product and process innovation operations through communicative efforts and a united workforce that couple them. The identified coupling mechanisms allow ManuCo to manage the tensions that arise between the functions and make it possible for the company to conserve such vast differences between the two innovation types. Through these bridging systems, the dynamic tensions and organizational conflicts created between ManuCo's divisions do not negatively affect the firm. Instead, they create opportunities for the firm to utilize and envisage different critical organizational perspectives when making corporate decisions. Furthermore, with a united workforce, the employees strive towards the common goal of doing what is best for the firm, meaning that the organizational conflicts that arise do not damage the firm.

Thus, we provide new insights into the domain of MCSs in innovation, showing how a firm can successfully manage tensions between divisions performing product and process innovation. This adds to existing research in the field of MCSs in innovation, as communicative efforts between product and process innovation and a united workforce have yet to be discussed as a manner through which an organization can manage dynamic tensions and organizational conflicts. Additionally, it has not been discussed as a way through which a firm can ease the cooperation between product and process innovation.

5.2 Locating the Balance of Enabling and Constraining Controls

Moreover, our empirics visualized a marked difference in the characteristics of the implemented controls across ManuCo's two divisions that perform product and process innovation. We observed that employees in the construction division, working with product innovation, are subject to predominantly enabling MCSs. In contrast, employees in the production division, engaged in process innovation, are subject to predominantly constraining MCSs. This indicates that each division maintains a skewed composition of enabling and constraining MCSs. Therefore, the dynamic tensions and organizational conflicts arising from the contrasting applications of enabling and constraining MCSs are absent within each function. However, on an organizational level, ManuCo balances enabling and constraining MCSs. The dynamic tensions and organizational conflicts between these different MCSs thus appear *between* the firm's construction and production divisions.

Existing research discussing the significance of balance between enabling and constraining control systems does not specify where the balance should be achieved (Barros & Ferreira, 2022; Mundy, 2010; Simons, 1995). It is not discussed whether the balance should be applied on an organizational level or if each division must balance enabling and constraining controls. Mundy (2010) states that managers balance enabling and constraining controls to create dynamic tensions, but she does not specify where the balance should be in the organization. Barros and Ferreira (2022) discuss what types of MCSs should be included to create a balance. However, they do not explore where the respective controls appear within the organization and, thus, do not discuss on what organizational level the balance exists. Moreover, Simons (1995) explores the balance of enabling and constraining levers of control, although he excludes a discussion on where in the organization the balance should be.

We suggest that a corporation can balance enabling and constraining MCSs on an organizational level rather than balancing enabling and constraining controls within each division of the firm. Our empirics show that ManuCo successfully balances enabling and constraining MCSs on an organizational level, even though the control systems in its product innovation are significantly skewed towards enabling controls, while the control systems in its process innovation consist of constraining controls. The balancing of, and interrelations between, the enabling and constraining control systems that ManuCo maintains on an organizational level give rise to dynamic tensions in the firm, which confirms Simons' (1995) and Mundy's (2010) research.

This adds to existing research on the balance of the four levers of control and their enabling and constraining applications. While previous research has not explicitly stated where in the organization balance ought to occur, we suggest that a corporation can maintain functional product and process innovation processes without balancing enabling and constraining MCSs within each innovation type. Instead, we propose that the firm can balance enabling and constraining MCSs on an organizational level and utilize the dynamic tensions and organizational conflicts that appear *between*, rather than *within*, each type of innovation.

6. Conclusion

6.1 Contributions

The purpose of this study has been to understand how MCSs are utilized and applied in product and process innovation, as well as how a company manages the dynamic tensions arising from the interplay of these innovation types. The analysis is based on Simons' (1995) framework on Levers of Control and Mundy's (2010) extension of Simons' framework, in which Mundy discusses how dynamic tensions and organizational conflicts can be utilized to strengthen innovation.

We contribute to current research as we confirm that a corporation, in addition to utilizing all four levers of control, also balances enabling and constraining MCSs for its product and process innovation. However, we propose that the balance of enabling and constraining MCSs does not necessarily have to be apparent in each division. Furthermore, we affirm existing research that MCSs differ in different contexts, depending on knowledge, information, complexity, and uncertainty.

We add to existing research as we suggest novel contributions on how corporations can manage tensions and organizational conflicts between product and process innovation where vastly different MCSs have been applied in each respective innovation type. By implementing coupling mechanisms through (1) formal communicative efforts and (2) a united workforce, corporations can utilize such tensions and conflicts to enhance their product and process innovation. The implication from our study is, thus, that a corporation can achieve high-performing operations while having vastly separated product and process innovation operations with different MCSs in the two respective operations. Additionally, it can extract the advantages that arise from dynamic tensions and organizational conflict. This is possible, provided that the firm implements undertakings that allow the two types of innovations to formally encounter and communicate and introduces a uniting aspect that steers the employees towards a common goal.

In addition, current research presupposes that to create dynamic tensions and organizational conflicts between enabling and constraining control systems, a corporation should maintain a balance between enabling and constraining controls. However, it is not explicit how or where the balance should prevail within a corporation. It is not discussed whether a firm must apply enabling and constraining MCSs within each organizational division or if the company can

have predominantly enabling controls in one division and constraining controls in another, maintaining a balance between enabling and constraining MCSs on an overall organizational level. We contribute to this area of research by suggesting that a firm can create dynamic tensions and organizational conflicts between enabling and constraining control systems despite a significant lack of constraining controls in one function and a lack of enabling controls in another. By balancing enabling and constraining controls on an organizational level, a firm can utilize the dynamic tensions and organizational conflicts arising between these types of controls.

6.2 Limitations

Our findings are based solely on one corporation, which narrows our findings and risks making them context-specific. Therefore, it is not certain that our conclusion can be applied to all types of product and process innovation operations, especially since ManuCo is unique in its lack of a product portfolio. Instead, it designs each product individually together with the customer. Additionally, ManuCo is special in that product and process innovation occurs in different functions. If these innovation operations would take place in the same function, it is not certain that the same level of dynamic tensions would appear. Thus, our findings pertain to organizations structured similarly.

Additionally, we acknowledge that MCSs, innovation, and dynamic tensions are difficult to observe and accurately depict. As such, the findings are subject to a degree of bias from the interview subjects and us authors.

6.3 Future Research

We suggest that further research is conducted in the area of MCSs in product and process innovation and how companies manage the interplay between these innovation types. As the area remains inadequately understood, it would benefit from further studies, particularly relating to how or where within a corporation the balance of enabling and constraining controls should prevail, and how corporations manage dynamic tensions and organizational conflicts that arise between employees working with product and process innovation initiatives. Lastly, we propose that further research is conducted in industries other than manufacturing, and in companies that have their own product portfolio to understand the structure of MCSs in product and process innovation as well as the interplay between these innovation types in other contexts.

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8. Appendix

8.1 Appendix 1: Interview Overview

Interviewee	No of Interviews	Professional Role	Function in the Company	Date	Length
A	2	Product Developer	Construction and Production Function	21-03-2023 26-04-2023	60 min 30 min
B	2	Operations Development Manager	Production Function	27-03-2023 26-04-2023	60 min 30 min
C	1	Sales Professional	Construction Function	27-03-2023	60 min
D	1	Business Controller	Central Functions	28-03-2023	60 min
E	1	Chief Financial Officer	Central Functions	31-03-2023	60 min
F	2	Sales Manager	Construction Function	05-04-2023 24-04-2023	60 min 30 min
G	1	Business Development Manager	Construction Function	11-04-2023	60 min
H	1	Production Manager	Production Function	12-04-2023	60 min
Total No of Interviews	11				

8.2 Appendix 2: Management Control Systems at the Case Company

Product Innovation		Process Innovation	
MCS	Enabling/Constraining	MCS	Enabling/Constraining
<i>Belief Systems</i>		<i>Belief Systems</i>	
Vision	Enabling	Vision	Enabling
Owner Directives	Enabling	Owner Directives	Enabling
Local Anchoring	Enabling	Local Anchoring	Enabling
<i>Boundary Systems</i>		<i>Boundary Systems</i>	
Job Description	Enabling	Job Description	Constraining
Commercial Authorities	Constraining	Contract-review meeting	Constraining
<i>Diagnostic Systems</i>		<i>Diagnostic Systems</i>	
Sales Budget	Enabling	Cost-Based KPIs	Constraining
Reward System	Enabling		
<i>Interactive Systems</i>		<i>Interactive Systems</i>	
Monthly Meetings	Enabling	Daily Meetings	Constraining
PDCA	Enabling	PDCA	Enabling

8.3 Appendix 3: Interview Guide

Background

- Can you tell us about your background?
- Can you describe your role and what you do at ManuCo?
- What is your main area of responsibility at ManuCo?
- Who do you report to?

Innovation

- What does innovation mean at ManuCo?
 - Is innovation important to ManuCo? How?
 - What are the main reasons why ManuCo works with innovation?
 - In what ways does ManuCo work with innovation?
- What is your perspective on innovation and financial performance? Would you say they contradict or align with each other?
- Does ManuCo have defined innovation processes?
 - What do those processes look like?
 - Does ManuCo review its processes to see how it can optimize or improve?
- Have ManuCo's current innovation processes always been set up the way they are today?
- Is the form of ManuCo's innovation work determined centrally, or do the employees who work more with innovation opportunities have the opportunity to control it?
 - If it is free, are there any constraints that affect the work?
 - If it is regulated centrally, how does ManuCo work to ensure sufficient levels of freedom to adapt to the customer's wishes?
- Does ManuCo have a formulated budget linked to innovation? Who sets that budget?
- Does ManuCo predict future costs and revenues linked to innovation?

Goals and Objectives of the Division

- Who is involved in setting goals for the organization?
 - Who sets goals for each division?

Belief systems

- What is ManuCo's mission and vision?
- Do you think that ManuCo's mission and vision are conveyed to employees? Do the employees have a clear picture of the mission and vision?

- Does ManuCo use tools to convey its strategy to the employees?

Boundary systems

- Does ManuCo have any policies or rules about what the employees cannot or must do?
 - How free are they when looking for improvements to customer ideas?
 - Does ManuCo have any means to help employees from seeking improvements that would not be considered optimal solutions?
- Aside from the customer's wishes, are there any other regulations or laws that ManuCo must comply with when developing products?
- How does ManuCo ensure that the regulations are followed?

Diagnostic systems

- Through which measures are the divisions at ManuCo evaluated?
- Does ManuCo have any KPIs linked to innovation?
 - Do KPIs differ between the construction and production divisions?
 - If it differs, are there any consequences? Does it create any problems?
- How does ManuCo measure the KPIs?
- How are the KPIs reported?
- How often does ManuCo re-evaluate current KPIs around innovation? What does the process look like?
- How does ManuCo follow up on the goals/KPIs if achieved?
- Does ManuCo work with a reward system linked to the goal, for example through variable salary?

Interactive systems

- Do ManuCo's employees understand the purpose of innovation? How does ManuCo make them understand that?
- How does ManuCo create a commitment to innovation among its employees?
- Are employees encouraged to come up with suggestions for improvements?
- Is innovation on the agenda in weekly/monthly meetings?

Conclusion

- Is there anything you want to add?