VIKRANT SIHAG

The Effectiveness of Organizational Controls

A meta-analytic review and an investigation in NPD outsourcing

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De Effectiviteit van Organisatorische Controlemechanismen: Een meta-analytische review en onderzoek in NPD-uitbesteding

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Vikrant Sihag
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CHAPTER 1

INTRODUCTION

1.1 RESEARCH BACKGROUND AND MOTIVATION

Management scholars and practitioners have long acknowledged that organizational controls are an integral part of organizational functioning (Cardinal, Sitkin, and Long, 2010). Many of the controls emphasized by present-day managers and researchers have been in use for a number of centuries in diverse contexts ranging from ancient Chinese workplaces through eighteenth-century European industries to American businesses (Dunbar and Statler, 2010; Rindova and Starbuck, 1997). Managers exercise organizational controls to resolve the divergence of interests that exists between the managers and the organizational employees or the external partners (e.g., suppliers, retailers). In other words, controls help managers to align the interests of organizational employees and external partners with their interests (Das and Teng, 1998; Ouchi, 1980). The use of organizational controls is therefore an important aspect of the organizational life of the managers.

Organizational controls refer to the process through which managers direct and motivate organizational employees and external partners to behave in ways that are in alignment with the organizational objectives (Cardinal, 2001; Turner and Makhija, 2006). Controls are exercised by a controller (i.e., one who exercises the control), such as project manager, departmental head, business unit head or a client firm, over a controllee (i.e., one over whom the control is exercised), such as project team members, departmental employees, business unit employees or a vendor firm (Brenner and Ambos,

2013; Rijsdijk and van den Ende, 2011; Tiwana and Keil, 2009). While a large number of studies have examined organizational controls in a wide variety of contexts, ranging from functional tasks, such as sales (e.g., Guenzi, Baldauf, and Panagopoulos, 2014; Kim and Tiwana, 2017) and human resource management (e.g., Snell and Youndt, 1995; Voss and Brettel, 2014), to the management of subsidiaries (e.g., Brenner and Ambos, 2013; Grewal, Kumar, Mallapragada, and Saini, 2013) and outsourcing partners (e.g., Gopal and Gosain, 2010; Tiwana, 2008), there are still several issues that need to be addressed.

First, the extant research on the relationship between the organizational controls and performance remains equivocal. Prior studies on organizational controls have provided empirical evidence that performance can be enhanced by employing different types of controls (Kreutzer, Cardinal, Walter, and Lechner, 2016; Liu, 2015). However, some studies have also reported that the effect of controls on performance is either negative or not significant (e.g., Rijsdijk and van den Ende, 2011; Stouthuysen, Slabbinck, and Roodhooft, 2012). As such, there are mixed findings related to the organizational controls-performance relationships. These contradictory findings present a dilemma for researchers and practitioners related to the controls that can be exercised to enhance performance and therefore additional empirical research is essential for further clarification.

Second, managers often exercise organizational controls to effectively manage new product development (NPD) projects (Carbonell and Rodriguez-Escudero, 2013; Rijsdijk and van den Ende, 2011), but these projects can pose a special challenge for managers to effectively exercise

controls due to their evolving nature. Due to the evolving aspect of NPD projects, flexibility is essentially required in these projects to accommodate the evolving requirements and that can be at odds with the primary intent of controls, that is, behaving in a desired manner (Tatikonda and Rosenthal, 2000; Turner and Makhija, 2006). While the extant literature has posited that there is simultaneous need for control and flexibility in NPD projects, the relationship between them remains unclear (Carbonell and Rodriguez-Escudero, 2013; Rijsdijk and van den Ende, 2011). Although the extant literature recognizes that controls affect flexibility, this discussion has been mainly implicit in prior research (Carbonell and Rodriguez-Escudero, 2013; Carson, 2007; Tiwana, 2010). There is therefore very little empirical research on the organizational controls-flexibility relationships especially in NPD projects. As such, the relationship between organizational controls and flexibility in NPD projects remains theoretically underdeveloped.

Third, research on controls in NPD projects has typically focused on the in-house NPD projects (e.g., Carbonell and Rodriguez-Escudero, 2013; Rijsdijk and van den Ende, 2011). While this research provides important empirical insights, it is limited in that it does not examine the influence of organizational controls in an inter-organizational setting where the organizations lack a formal managerial authority over their external partners (Choudhury and Sabherwal, 2003; Tiwana and Keil, 2007). The lack of managerial authority can further add to the difficulty of effectively governing tasks that involve external partners, particularly in an outsourcing context (Tiwana and Keil, 2007). Moreover, the studies that have investigated controls in the outsourcing context have mainly focused on information systems (IS) development projects where the managers in both the

organizations that outsource the development activities and the external partners to whom the activities are outsourced are usually IS professionals (e.g., Tiwana, 2008; Tiwana and Keil, 2009). However, in NPD outsourcing, organizations usually outsource their NPD tasks to access the complementary and distinct domain knowledge of external partners (Carson, 2007). As such, the difference in the knowledge expertise between the managers in the two organizations in NPD outsourcing can be relatively higher than in IS development projects. Outsourcing organizations therefore can face difficulty in effectively specifying desired outcomes or processes associated with transformation of inputs into outputs to their external partners (Choudhury and Sabherwal, 2003; Tiwana and Keil, 2009). Therefore, the efficacy of organizational controls in NPD outsourcing can remarkably vary.

Overall, investigating controls in NPD outsourcing is critical because our understanding related to the influence of organizational controls in NPD outsourcing remains limited. This research insufficiency is also remarkable in light of the facts that organizations exercise controls to govern their NPD tasks and that they also generally outsource their NPD tasks (Carson, 2007; Quinn, 2000; Rijsdijk and van den Ende, 2011).

Fourth, prior controls research also suggests that various organizational controls can have diverse behavioral consequences, but this research is mostly limited to intra-organizational settings (e.g., Boss et al., 2009; Ramaswami, 1996). As such, the empirical evidence related to the behavioral responses to controls in inter-organizational settings remains scant. This research gap is especially important considering the fact that inter-organizational control literature implicitly recognizes that controls can evoke varied behavioral responses in external partners, especially the ones

that are not desired. For example, Grewal et al. (2013) stated that the use of controls by an organization can inhibit its foreign distributor's motivation to perform. Similarly, some other control studies have implicitly discussed the influence of organizational controls on intrinsic motivation, which refers to the motivation to perform an activity within a particular context (Carson, 2007; Kreutzer et al., 2016). Since intrinsic motivation is also critical for the completion of NPD tasks (Amabile, 1997; Burroughs et al., 2011), inattention to the relationship between organizational controls and intrinsic motivation in NPD outsourcing also represents a critical theoretical gap. In sum, there are critical research gaps in the organizational controls literature, most notably in the context of NPD outsourcing that need to be addressed. This dissertation therefore aims to delve into several of these critical research gaps.

1.1.1 Theoretical Background

Most of the work on controls is based on the seminal work by Ouchi (1979) that discriminates between three prototypical organizational controls: *outcome, behavior,* and *clan* (Eisenhardt, 1985a; Ouchi, 1979). When exercising outcome control, controllers specify performance outputs, and evaluate controllees based on the extent to which they have achieved the specified outputs (Cardinal, 2001; Turner and Makhija, 2006). When employing behavior control, controllers specify appropriate behaviors, explicit procedures, or rules for controllees, and monitor and evaluate them based on their adherence to the specified behaviors , procedures or rules (Cardinal, 2001; Kirsch, 1996). Clan control is exercised by controllers using

socialization mechanisms that facilitate interpersonal interactions, meetings, and trainings with controllees (Kirsch, 1996; Turner and Makhija, 2006). When using clan control, controllers seek to facilitate development of shared values, goals, and understanding with controllees (Kirsch et al., 2010).

As depicted in Figure 1.1, Ouchi's (1979) framework postulates that the effectiveness of outcome, behavior, and clan control depends on the following two conditions: knowledge of the transformation process and outcome measurability. Knowledge of the transformation process refers to the controller's understanding related to the process required to transform inputs into outputs (Ouchi, 1979; Snell, 1992b). If knowledge of the transformation process is perfect, it means that the process needed for transforming inputs into outputs is well understood by the controller. The other concept of outcome measurability refers to the extent to which the outputs can be clearly measured (Eisenhardt, 1985a; Ouchi, 1979). A high level of outcome measurability means that the controller can specify and measure the desired outputs.

Figure 1.1. Organizational Control Framework
(adapted from Ouchi (1979))

Outcome Measurability	Knowledge of the Transformation Process: Perfect	Knowledge of the Transformation Process: Imperfect
High	Outcome Control or Behavior Control	Outcome Control
Low	Behavior Control	Clan Control

Traditional controls research based on Ouchi's (1979) framework has emphasized singular control approach, that is, they have theoretically and empirically focused on a single type of control and, as such, has advocated one control over the other. For example, Ouchi's framework suggests that outcome control can be effectively exercised when outcome measurability is high. Similarly, behavior control can be effectively exercised when a controller's knowledge of the transformation process is high. Clan control is only viable when a controller's understanding related to the transformation process is lacking, and the controller cannot measure outputs effectively. There is considerable empirical research that provides support for the singular control approach (e.g., Govindarajan and Fisher, 1990; Henderson and Lee, 1992; Snell, 1992).

At the time of Ouchi's (1979) framework conceptualization, organizations used to be more bureaucratic in nature with clear hierarchical reporting relationships. Much of the work in these organizations used to involve identifiable goals and processes. However, the organizational structure and work in contemporary organizations vary greatly in design as they span across departments, business units, and organizations (Sitkin et al., 2010). As such, the traditional control research that advocates a single type of control in a particular context is less likely to "provide a complete understanding of control in complex, dynamic, and uncertain organizational environments" (Kirsch and Choudhury, 2010, Pg. 320). Therefore, the recent contemporary controls research has emphasized that managers in contemporary organizations are more likely to use a variety of controls within various contexts because of evolving organizational conditions (e.g., Cardinal, Sitkin and Long, 2010; Kreutzer and Lechner, 2010; Kreutzer,

Walter and Cardinal, 2015). Hence, this dissertation follows the contemporary view on organizational controls that suggests employing multiple controls in a particular context to provide a better understanding related to the organizational controls (e.g., Cardinal et al., 2004; Kreutzer and Lechner, 2010).

1.2 DISSERTATION OBJECTIVE AND OUTLINE

The overall research goal of this dissertation was to study the effectiveness of the three organizational controls (outcome, behavior, clan) to further our understanding about ***what are the behavioral and performance consequences of outcome, behavior, and clan control*?** This research question is addressed by focusing on two related research objectives.

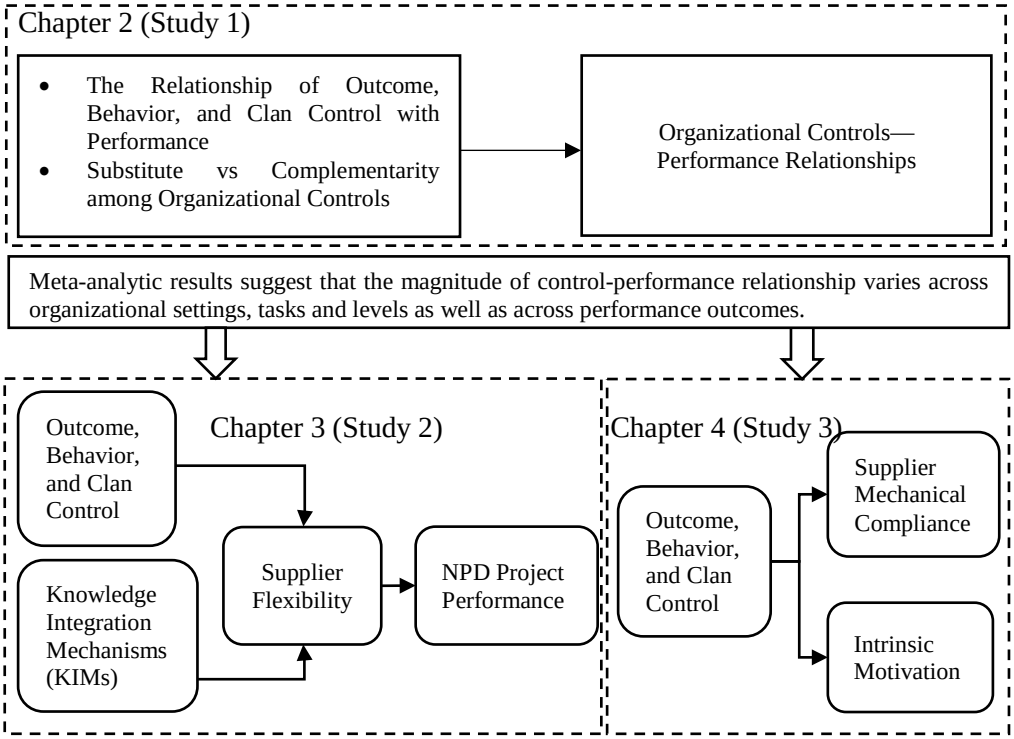
The first research objective of this dissertation is to provide a better understanding related to the effectiveness of controls, in general, by assessing the relationship between the three organizational controls (outcome, behavior, clan) and performance along with their performance effects in combination. To this end, Chapter 2 (Study 1) meta-analyzes the empirical evidence related to organizational controls-performance relationships and provides insights related to these relationships. Using some of these insights and critical gaps in the controls literature, the rest of the dissertation focuses on the effectiveness of controls in NPD outsourcing.

The second research objective of this dissertation is therefore to investigate the behavioral and performance consequences of the three organizational controls in NPD outsourcing. Accordingly, Chapter 3 (Study 2) and Chapter 4 (Study 3) examines the performance and behavioral implications of three controls in NPD outsourcing. Chapter 3 (Study 2)

investigates the influence of organizational controls and knowledge integration mechanisms (KIMs) on NPD project performance via supplier flexibility. Chapter 4 (Study 3) examines the behavioral consequences of controls in outsourced NPD tasks.

The Chapter 5 (Discussion) of this dissertation summarizes the overall findings and contributions of the three empirical studies. In doing so, this chapter also discusses the managerial implications of this dissertation and directions for future research. Figure 1.2 depicts the outline of the three empirical studies conducted in this dissertation. The relationships among the three empirical studies are encapsulated in the next section. The next section also describes in detail the research motivation and objectives of each of three empirical studies.

Figure 1.2. Outline of the Studies in the Dissertation



1.3 EMPIRICAL STUDIES OVERVIEW

1.3.1 Research Motivation and Objectives Chapter 2 (Study 1)

Chapter 2 (Study 1) of this dissertation meta-analyzes the relationship between the three organizational controls (outcome, behavior, clan) and performance (see Figure 1.2). While the research on the relationship between organizational controls and various performance outcomes have gained momentum in recent years, the empirical evidence related to the effectiveness of outcome, behavior, and clan control remains inconclusive. Prior studies have investigated the effectiveness of three controls in a wide variety of organizational tasks, such as sales (e.g., Guenzi et al., 2014; Joshi and Randall, 2001), information systems development (e.g., Gopal and Gosain, 2010; Tiwana and Keil, 2007), human resource management (e.g., Snell, 1992; Snell and Youndt, 1995), and new product development (e.g. Bonner et al., 2002; Rijsdijk & van den Ende, 2011) across different organizational settings and levels (Cardinal, 2001; Stouthuysen et al., 2012). However, these studies have reported mixed results on the effects of outcome, behavior, and clan control on performance. For instance, some of the studies have reported positive effects of outcome control on performance (e.g, Tiwana, 2010), whereas other studies have reported negative or no effects (e.g., Aulakh and Gencturk, 2000; Bonner et al., 2002).

Similarly, studies have reported mixed results for both behavior control-performance and clan control-performance relationships (e.g., Aulakh and Gencturk, 2000; Bello and Gilliland, 1997; Bonner et al., 2002; Tiwana and Keil, 2009). Moreover, the controls research also remains divided whether the effectiveness of one control depends on its interplay with

other controls. While some scholars have posited that one control decreases (substitutes) the effectiveness of other controls, other scholars have asserted that exercising one control increases (complements) the effectiveness of other controls (Cardinal et al., 2004; Eisenhardt, 1985a; Long, Burton, and Cardinal, 2002; Ouchi, 1979). To address these research gaps, Chapter 2 (Study 1) therefore examines the following research questions: **(a) how do organizational controls affect performance,** and **(b) do controls *substitute* or *complement* one another's effects.**

The Chapter 2 (Study 1) of this dissertation also sheds light on the effect of several additional variables on the strength of organizational controls—performance relationships. First, it analyzes whether the three organizational controls have differential relationships with different types of performance outcomes (rational-goal, adaptability, process, human relations) and the relationship between each control and performance is moderated by the type of performance outcome. Second, the moderating effect of performance data is also analyzed because self-reported data can cause upward bias relative to archival data (Williams et al., 2010). Third, the moderating effects of organizational setting (intra- and inter-organizational), task type (NPD, IS development, Sales, HRM) and level of analysis (firm, business unit, project team, individual) are also analyzed as task specification, observation, and evaluation in one context can be easier than the others (Kirsch, 1996). Overall, Chapter 2 (Study 1) provides insights on the effectiveness of outcome, behavior, and clan control and that also act as inputs for Chapter 3 (Study 2) and Chapter 4 (Study 3). As such, the first few paragraphs of the next two sections (section 1. 3.2 and section 1.3.3) discuss how Chapter 3 (Study 2) and Chapter 4 (Study 3) build on empirical insights

provided by Chapter 2 (Study 1) and existing research gaps in the controls literature.

1.3.2 Research Motivation and Objectives Chapter 3 (Study 2)

The meta-analytic study in Chapter 2 (Study 1) indicates that our understanding related to the use of organizational controls in NPD outsourcing is limited. In particular, the paradoxical meta-analytic results that outcome, behavior, and clan control generally enhance performance, but behavior control is not effective in NPD tasks indicate that more research investigating the use of controls in NPD tasks is needed. Moreover, the meta-analytic sample indicates that present controls research has mainly focused on the effectiveness of outcome, behavior, and clan control in in-house NPD projects. This is surprising in light of the fact that organizations exercise controls to govern their outsourced NPD tasks (Carson, 2007). Given the scant empirical evidence on the effectiveness of controls in NPD outsourcing, the inconsistent finding that all the three controls are effective in inter-organizational settings further suggests that, in general, additional research is needed on the effectiveness of controls in inter-organizational settings. Overall, the aforementioned arguments suggest that additional research is needed to better understand the effectiveness of organizational controls in NPD outsourcing.

The task requirements in NPD projects change over the course of the project due to the evolving nature of these projects (Iansiti, 1995; Tatikonda and Rosenthal, 2000). Organizations want their suppliers to flexibly respond to the changing requirements and therefore depend on supplier flexibility, which is the willingness of suppliers to respond flexibly to the changing

requirements of organizations (Ivens, 2005; Noordewier et al., 1990). To facilitate flexible behavior from suppliers, organizations need to ensure that its suppliers are willing to align their efforts. Alignment of efforts requires both cooperation (alignment of interests) and coordination (alignment of actions) from suppliers as suppliers may not coordinate their actions even when their interests are aligned with outsourcing organizations (Gulati et al., 2005). Existing research on flexibility has focused on those determinants (e.g., supply management, opportunism, market uncertainty, relationship-specific investments) of supplier flexibility that do not focus on the cooperation and coordination aspect independently (e.g., Chu et al., 2012; Ivens, 2005; Liao et al., 2010). While organizational controls have been recognized as mechanisms that facilitate cooperation (e.g., Turner and Makhija, 2006), knowledge integration mechanisms (KIMs) have been highlighted as mechanisms that facilitate coordination (De Luca and Atuahene-Gima, 2007). KIMs refer to the processes and structures that facilitate knowledge sharing as they enable one party to capture, articulate, combine, and exploit the varied knowledge and skills of other parties (Olson, Walker, and Ruekert, 1995; Zahra, Ireland, and Hitt, 2000). As such, Chapter 3 (Study 2) investigates the research question, **do organizational controls and KIMs enhance supplier flexibility in NPD outsourcing?**

Increased flexibility from suppliers can help organizations to achieve the desired NPD project objectives as organizations can efficiently use the supplier resources to respond to the changes in project requirements (Cannon and Homburg, 2001). In contrast, a lack of supplier flexibility can lead to problems such as developing a product that does not meet the outsourcing organization's requirements and that can lead to lower project performance.

As such, supplier flexibility is critical for the success of NPD projects. Previous studies on the performance consequences of flexibility has either focused on relational outcomes such as buyer satisfaction, relationship quality and commitment or supply chain performance such as cost, reliability etc. (Ivens, 2005; Liao et al., 2010). The empirical evidence related to the effect of supplier flexibility on NPD project performance is therefore lacking. Thus, another question addressed in Chapter 3 (Study 2) is, **does supplier flexibility influence NPD project performance?** In sum, Chapter 3 (Study 2) provides insights related to the relationship of organizational controls and KIM with supplier flexibility, and its effect on NPD project performance (see Figure) using survey data on 109 outsourced NPD projects gathered from clients' managers.

1.3.3 Research Motivation and Objectives Chapter 4 (Study 3)

The findings from both the meta-analytic study in Chapter 2 (Study 1) and empirical studies on controls highlight that exercising various controls can result in distinct behavioral influences (e.g., Agarwal and Ramaswami, 1993; Boss et al., 2009). Korsgaard et al. (2010) have also asserted that controls can lead to varied behavioral consequences because different motivational mechanisms underlie different types of control. Although there is some research about behavioral responses to controls in intra-organizational settings (e.g., Boss et al., 2009; Ramaswami, 1996), they do not capture the characteristics of an inter-organizational setting that involves weaker managerial authority.

Further, scholars have implicitly asserted that the use of controls can evoke diverse behavioral responses in external partners, especially the ones

that are not desirable. For example, Tiwana and Keil (2007) suggest that a client's emphasis on explicit procedures that suppliers need to follow can result in its suppliers faithfully following the specified procedures such that the suppliers sometimes do not use their own idiosyncratic expertise due to fear of non-compliance. Therefore, notwithstanding that organizational controls are used extensively in outsourcing (e.g., Tiwana, 2010; Tiwana and Keil, 2007), existing empirical research on the behavioral responses to organizational controls in outsourcing remains scarce.

To address this void in the controls research, Chapter 4 (Study 3) explores the behavioral consequences of organizational controls in the outsourcing context, particularly, NPD outsourcing. Organizations that outsource their NPD tasks want their suppliers to comply with prescribed outcomes and procedures, but they also want them to leverage their complementary expertise to a greater extent for successful completion of outsourced NPD tasks. Further, intrinsic motivation plays a critical role in completion of NPD tasks as it enhances creative behavior and problem-solving capabilities (Amabile, 1997; Burroughs et al., 2011). As such, suppliers lack of use of idiosyncratic expertise and their lower intrinsic motivation can greatly impact outsourced tasks completion (Carson, 2007; Tiwana and Keil, 2007).

Chapter 4 (Study 3) therefore examines the influence of organizational controls on two behavioral consequences (supplier mechanical compliance and intrinsic motivation). Specifically, Chapter 4 (Study 3) examines the research question, ***what are the effects of various organizational controls on supplier mechanical compliance and intrinsic motivation?*** Supplier mechanical compliance refers to the extent to which a supplier adheres to the

specified prescriptions without sometimes using its own idiosyncratic expertise, whereas intrinsic motivation refers to the intent of a supplier to perform the outsourced tasks to experience satisfaction and enjoyment inherent in the tasks (Chae et al., 2017; Tiwana and Keil, 2007).

Research on controls has stressed that outcome and behavior controls function through extrinsic motivation by emphasizing compliance with explicit outcomes and procedures (Stouthuysen et al., 2012; Tiwana, 2008). In contrast, clan control promotes intrinsic motivation through internalization of values, norms, and beliefs (Cardinal et al., 2004; Korsgaard et al., 2010). Self-determination theory (SDT) theory posits that different regulatory processes underlie extrinsic and intrinsic motivation (Deci and Ryan, 1985; Ryan and Deci, 2000b). These regulatory processes range from passive compliance based on the avoidance of non-compliance to external prescriptions (extrinsic motivation) to active commitment based on the inherent enjoyment and interest (intrinsic motivation) (Ryan and Deci, 2000b). Using SDT, Chapter 4 (Study 3) therefore asserts that outcome and behavior control that draw on extrinsic motivation can induce supplier mechanical compliance, but diminish intrinsic motivation. On the other hand, clan control that draws on intrinsic motivation not only reduces mechanical compliance, but also enhances intrinsic motivation. The hypothesized relationships are examined using survey data on 114 outsourced projects gathered from suppliers' managers as the hypotheses focus on understanding how the controls are perceived by those (in this case suppliers) that are subjected to them and, as such, stimulate their behavioral responses, such as compliance and intrinsic motivation (Korsgaard et al., 2010; Long, 2010; Weibel, 2010).

1.4 DECLARATION OF CONTRIBUTIONS

I hereby declare my contribution to the different chapters of this dissertation and also acknowledge the contributions of other contributors where relevant.

Chapter 1: The author of this dissertation has independently written this chapter, and the feedback from the co-promotor Serge Rijsdijk and promotor Jan van den Ende has been implemented.

Chapter 2: The majority of the work has been done independently by the author of this dissertation. The author formulated the research question, performed the literature review, collected the data, conducted the data analysis, and interpreted the findings. The majority of the manuscript was also written by the author of this dissertation and implemented the detailed feedback provided by the co-promotor Serge Rijsdijk. Serge Rijsdijk also worked towards improving certain sections of this chapter. This chapter has been published in the special issue of Journal of Management Studies on meta-analysis. The author of this dissertation is the first author of this chapter, and the co-promotor is the co-author.

Chapter 3: This chapter has been written independently by the author of this dissertation. The author formulated the research questions, performed the literature review, conducted the data analysis, interpreted the findings, and wrote the manuscript. The survey data used for this chapter comes from the Netherlands Organization for Scientific Research (NWO) project #458-04-006 conducted by the co-promotor Serge Rijsdijk and has not been used in any previous publication. The respondents that filled the survey measures used in this chapter (see Appendix 3.1) belonged to client organizations. The co-promotor Serge Rijsdijk and promotor Jan van den

Ende gave valuable feedback throughout the development of this chapter. The author of this dissertation is the first author of this chapter, and the co-promotor and the promotor are the two co-authors. The manuscript based on this chapter is being prepared for submission to a journal.

Chapter 4: This chapter has been written independently by the author of this dissertation. The author formulated the research questions, performed the literature review, conducted the data analysis, interpreted the findings, and wrote the manuscript. Similar to Chapter 2, the main source of data for this chapter comes from the NWO project #458-04-006 conducted by co-promotor Serge Rijsdijk and has not been used in any previous publication. The respondents that filled the survey measures used in this chapter (see Appendix 4.1) belonged to supplier organizations. The co-promotor gave valuable feedback throughout the development of this chapter. The author of this dissertation is the first author of this chapter, and the co-promotor is the co-author. The manuscript based on this chapter is being prepared for submission to a journal

Chapter 5: The majority of the work in this chapter has been done independently by the author of this dissertation. The feedback from the co-promotor Serge Rijsdijk and promotor Jan van den Ende has been implemented.

CHAPTER 2

Organizational Controls and Performance Outcomes: A Meta-Analytic Assessment and Extension[1]

ABSTRACT

Managing employees and external partners effectively has been a primary concern for organizations and their managers. Many studies have investigated the effectiveness of organizational controls in a wide variety of contexts. Using organizational controls literature that discriminates among *outcome, behavior, and clan control*, this study synthesizes the research on the effectiveness of these controls. In particular, the study examines 23,839 organizational controls–performance relationships from 120 independent samples, and tests several new hypotheses using advanced meta-analytic methods. The results indicate that outcome, behavior, and clan controls generally enhance performance, with each control having a distinct performance effect. Our analysis also demonstrates that controls function as complements to one another. This finding indicates that one form of control increases the effectiveness of other forms of control. We also examine the organizational controls–performance relationships across various contexts, and our results show that they vary according to the type of task. The paper concludes with a discussion on the theoretical and managerial implications of these findings.

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2.1 INTRODUCTION

Organizational controls are "integral to the way in which organizations function" (Cardinal et al., 2010, p. 51). They are exercised by controllers (e.g., project managers, client firms, business unit heads) over controllees (e.g., project team members, suppliers, business unit members). Controls are defined as any process through which controllers motivate and direct controllees to behave in ways that are aligned with the controllers' objectives (Cardinal et al., 2010; Kirsch, 2004). In the absence of organizational controls, or when controls are used inappropriately, controllees are assumed to act in ways that favor their own interests and objectives that are not necessarily in line with the controllers' objectives (Eisenhardt, 1989).

The organizational controls literature specifies three prototypical types of control: outcome, behavior, and clan (Ouchi, 1979; Turner and Makhija, 2006). Outcome and behavior controls focus on the specification and evaluation of desired task outcomes and behaviors. Clan controls involve socialization and input (e.g., selection and training) mechanisms for influencing controllees' behavior (Cardinal et al., 2010; Kirsch, 1996). A growing body of research on organizational controls has investigated how organizational controls shape performance in various empirical settings. These studies generally assert that controls increase performance, as they limit the extent to which controllees act in their own self-interest and behave opportunistically (Ouchi, 1979). However, two issues still remain that need to be addressed to advance our understanding of the organizational controls-performance landscape.

First, the empirical evidence for the assertion that organizational controls increase performance remains equivocal (Cardinal, Kreutzer, and

Miller, 2017). Some studies report that controls have a positive effect on performance (e.g., Liu, 2015), while other studies report that they are ineffective (Tiwana and Keil, 2007). Specifically, there have been contradictory findings in previous studies as to how outcome, behavior, and clan controls affect performance. For instance, several studies have reported that outcome control has a positive effect on performance (e.g., Liu, 2015; Tiwana, 2008), whereas other studies have found that the effect of outcome control on performance is insignificant or negative (e.g., Aulakh et al., 1996; Bonner et al., 2002). Similarly, mixed findings exist with regard to the effects of behavior and clan controls (e.g., Aulakh and Gencturk, 2000; Bello and Gilliland, 1997; Bonner et al., 2002; Tiwana, 2010; Tiwana and Keil, 2009). Therefore, additional empirical evidence is necessary to understand whether and to what extent organizational controls are related to performance.

Second, the performance effect of one control may depend on its interplay with another control. Some researchers have taken a *singular* view of control and suggest the use of single form of control over another to achieve the desired performance (Cardinal et al., 2017) – for example, behavior control rather than outcome control or clan control rather than behavior control. In other words, researchers have historically advocated that different controls function as *substitutes*, and that using one type of control decreases the effectiveness of the others (Eisenhardt, 1985a; Ouchi, 1979). Contemporary researchers have taken a *holistic* view of control and advocate that different controls jointly influence performance. Specifically, what these researchers have suggested is that the different controls function as *complements*, and that exercising one type of control makes the other controls more effective (e.g., Kreutzer et al., 2015; Long et al., 2002). In a recent

review, Cardinal et al. (2017) also suggested that we still have only a limited understanding of control configurations that commonly exist in organizations and how different controls combine with each other. From a managerial perspective, achieving the desired performance is strongly dependent on the types of control exercised by managers (Cardinal et al., 2017; Kirsch, 1996). The current ambivalent findings on the interplay of outcome, behavior, and clan controls are likely to confuse managers. Clarification of whether and how different controls interact with each other to improve performance is therefore needed.

In sum, the present study addresses two primary research questions: (a) How do organizational controls affect performance, and (b) Do controls *substitute* or *complement* one another's effects? To investigate these questions, we need to meta-analyze the organizational controls–performance relationships found in prior research. Meta-analysis allows conflicting empirical findings to be reconciled by calculating effect sizes from existing empirical observations using weighted average techniques (Hedges and Olkin, 1985; Hunter and Schmidt, 2004). This method not only provides a rigorous assessment of a relationship as it corrects for the distorting effects of statistical artifacts, but it also facilitates theory extension by throwing light on how different controls combine with each other with the help of meta-analytic path analysis (Cao and Lumineau, 2015; Hunter and Schmidt, 2004).

This study therefore contributes to current controls research as follows. It provides rigorously derived discrete estimates for the three controls–performance relationships. This also allows us to assess how much controls matter. Consolidating the relationship between the three organizational controls and performance across different organizational

settings provides a broader and more complete picture of the relationships. Further, since meta-analysis helps in addressing open research questions with data that are more proximate to the general population than those supplied in an individual primary study (Eden, 2002), this study makes a substantial contribution to the ongoing debate in the organizational controls literature on the interplay among individual controls. By focusing on the interplay among the three controls, we are able to move controls research forward by providing greater clarity on whether the different types of control are more or less effective when combined.

2.2 THEORETICAL BACKGROUND AND HYPOTHESES

Organizational controls are defined as any process through which controllers motivate and direct controllees to behave in ways that are aligned with the controllers' objectives (Cardinal et al., 2010; Turner and Makhija, 2006). The organizational controls literature discriminates among three prototypical controls: *outcome, behavior,* and *clan*.[1] Controllers (who exercise control) can use outcome, behavior, and clan controls to motivate the controllees (those over whom the control is exercised) to achieve the desired performance (Kirsch, 1996; Tiwana, 2008).

2.2.1 Organizational Controls and Performance

Controllers exercising outcome controls specify quantitative performance objectives and reward controllees based on the extent to which they achieve those objectives (Cardinal, 2001; Turner and Makhija, 2006). To exercise outcome control effectively, the controller does not need to understand the

process by which inputs are transformed into outputs (Kirsch, 1996; Ouchi, 1979). Also, outcome control does not require controllers to monitor controllees' behavior closely, and controllers can thus save time and resources (Kreutzer et al., 2015). The hands-off approach of outcome control therefore makes it an efficient form of control. Some scholars have argued that this hands-off approach may also result in a disconnect between controllers and controllees (e.g., Anderson and Oliver, 1987; Kreutzer et al., 2015). However, others have argued that the hands-off approach allows controllees discretion in terms of how they behave and this can give them a greater sense of commitment and engagement (e.g., Snell, 1992). Outcome control therefore leads to higher performance as it incentivizes controllees and holds them accountable for achieving the specified goals. Outcome control also gives controllees flexibility and motivation as it allows them discretion to select their own ways of achieving the specified goals (Kreutzer et al., 2015).

In outcome control, controllers can review the activities completed by controllees and provide feedback so that they can take corrective actions or make further improvements (Carbonell and Rodriguez-Escudero, 2013; Liu, 2015). Outcome control therefore enables controllees to deliver efficiently on the requirements specified by the controller. In addition, it helps in specifying clear and unambiguous goals and requirements. Control researchers have asserted that controllees who are given clear performance goals adopt appropriate behavior to achieve the specified goals (Bonner et al., 2002; Kirsch, 1997). This perspective on controls is also supported by path–goal and agency theory that discuss the positive influence of setting straightforward goals (Eisenhardt, 1989; House, 1971). Thus, specifying

appropriate goals helps to align controllees' interests with controllers' objectives and thus enables the desired performance to be achieved. We therefore propose the following hypothesis:

Hypothesis 1a: Outcome control is positively related to performance.

In behavior control, controllers emphasize procedures and rules that controllees are expected to follow while doing their assigned tasks and they evaluate controllees' performance on how they adhere to the prescribed procedures (Cardinal et al., 2010; Kirsch, 1996). Different tasks involve a certain level of ambiguity and complexity that could hamper controllees' ability to finish them on time or within budget. Controllers aim to mitigate these inefficiencies by exercising behavior control as they encase controllees' tasks with standardized development practices. Standardized development methods help to reduce errors and ensure consistency in the procedures followed to complete tasks (Gopal and Gosain, 2010; Turner and Makhija, 2006). Prescribing specific methodologies and procedures also helps in providing guidance and direction to controllees throughout the entire process (Ouchi and Maguire, 1975). Thus, behavior control improves the consistency of controllees' work.

Some scholars have suggested that some controllers do not have sufficient foresight and knowledge and thus do not understand fully the process by which inputs are transformed into outputs. These controllers may therefore find it difficult to specify effective procedures that controllees need to follow (Hendry, 2002; Kirsch et al., 2002). Also, even with the right knowledge of the transformation process, monitoring controllees' behavior involves substantial time and cost (Eisenhardt, 1985b). Despite these

disadvantages, researchers assert that behavior control involves dynamic involvement from controllers as they need to actively provide input on the behaviors that controllees need to follow in order to complete various tasks (Aulakh and Gencturk, 2000). Such active involvement signals that the controller is committed to the activity. This not only helps to create an active dialogue between controllers and controllees, but also fosters commitment from controllees (Atuahene-Gima and Li, 2002; Kreutzer et al., 2015). Thus, behavior control motivates controllees to follow the specified procedures and achieve the desired performance. In line with these arguments, we propose that:

Hypothesis 1b: Behavior control is positively related to performance.

Clan control refers to the mechanisms used by controllers to ensure that controllees embrace common values and goals and commit to shared objectives (Cardinal et al., 2010; Kirsch et al., 2010).[2] Examples of such mechanisms include socialization approaches such as social events, off-site meetings, and casual lunches or dinners (Choudhury and Sabherwal, 2003; Kirsch et al., 2010) or input mechanisms such as selection, training, and development procedures (Snell and Youndt, 1995). These mechanisms allows beliefs, values, and norms to be transmitted by the controller to the controllees. Thus, socialization mechanisms help in cultivating a common understanding and language between them (Kirsch, 1996; Liu, 2015). Shared understanding and values provide a rich, broad implicit guide to controllees as to what is considered by the controller to be acceptable or deviant behavior without the controller formally monitoring whether controllees are adhering to acceptable behaviors (Kirsch et al., 2010). Unlike outcome and behavior

control, clan control relies on common values and norms to put pressure on controllees to conform to acceptable behaviors (Barker, 1993; Kirsch et al., 2010). As such, clan control helps to guide controllees toward actions and behaviors that ensure the desired performance is achieved.

Clan control also promotes mutual trust and interests through social interactions (Choudhury and Sabherwal, 2003; Huang et al., 2005). The increase in positive mutual expectations and interests further motivates controllees to commit to their relationship with controllers and encourages cooperative behavior from them (Das and Teng, 2001; Sengun and Wasti, 2009). Clan control therefore plays an important role in fostering mutual working relationships between controllers and controllees. Past research has also shown that shared interests and understanding between controllers and controllees lead to improved decision making and on-time completion of tasks (Choudhury and Sabherwal, 2003; Kirsch, 1996). Furthermore, clan control through input approaches ensures rigorous selection and training of controllees (Snell and Youndt, 1995). Through training controllees acquire the right knowledge and skills to understand diverse perspectives and internalize the controller's values and goals (Cardinal, 2001; Liao, 2006). In sum, clan control facilitates the transmission of common beliefs, values, and understanding, and these help in achieving the desired performance. We therefore propose that:

Hypothesis 1c: Clan control is positively related to performance.

2.2.2 Organizational Controls: Substitutes or Complements?

The interplay among the three organizational controls has been a topic of considerable debate in the controls literature (Cardinal et al., 2017; Tiwana,

2010). Specifically, existing research on outcome, behavior, and clan controls is divided about whether the three controls *substitute* or *complement* each other in explaining performance. Controls function as *substitutes* when one control reduces the effectiveness of other controls. Conversely, they function as *complements* when one control reinforces the effectiveness of other controls (Milgrom and Roberts, 1995; Siggelkow, 2002; Tiwana, 2010).

Scholars advancing a *substitutes* perspective take a "singular" approach and have implicitly advocated the use of one form of control rather than multiple forms (Cardinal et al., 2017, pg. 22). They contend that exercising multiple organizational controls simultaneously creates redundancies and inefficiencies, thus weakening the impact of individual controls on performance. For example, Rijsdijk and van den Ende (2011) postulate that using clan control and behavior control as complements is "inefficient", because clan control weakens the positive influence of behavior control on performance "as both types of controls are relatively communication-intensive" (Rijsdijk and van den Ende, 2011, p. 876). Clan control can replace behavior control as both perform the same function of reducing the ambiguity surrounding the behaviors that controllees need to follow (Govindarajan and Fisher, 1990). There is therefore no need for one control if another can be exercised. The simultaneous use of behavior and clan control that rely on active communication between a controller and a controllee can therefore be inefficient. Similarly, Tiwana (2010) posits that exercising clan control with outcome control is not beneficial, since the information needed to exercise outcome control effectively can be measured reliably without requiring clan control.

Empirical studies have used contingency-based theoretical arguments to emphasize the substitute perspective, that is, that only one type of control is effective in a given context (Cardinal et al., 2017). The contingency view builds on Ouchi's (1979) framework where it is argued that outcome control should be exercised when outputs can be clearly specified and measured by a controller, and behavior control should be exercised when a controller understands the process required to transform inputs into outputs. When the outcomes are not measurable and controllers also do not have sufficient understanding of how inputs can be transformed into outputs, clan control is suggested to be an effective form of control.

Scholars have also used other theories and empirical arguments to suggest that different forms of control act as substitutes (e.g., Nidumolu and Subramani, 2003; Tiwana and Keil, 2009). Using transaction cost theory as a theoretical foundation, some scholars have posited that exercising multiple forms of control is costly and they advocate the use of one control over the other, based on the costs of specification, measurement, and evaluation. Some other scholars have used agency theory (Eisenhardt, 1989) to argue that, as tasks become more complex and ambiguous, a controller must then exercise behavior control instead of outcome control as controllees are typically risk-averse, and exercising outcome control would shift the risk unnecessarily on to the controllees. Scholars have also posited that exercising multiple controls simultaneously can prove counterproductive as it signals a lack of trust to controllees, who are thereby encouraged to engage in opportunistic and other undesirable behaviors (Aulakh and Gencturk, 2000; Tiwana, 2010).

In contrast, contemporary scholars who suggest a *complements* perspective argue for a "holistic" approach and have focused on understanding how different forms of control jointly influence performance (Cardinal et al., 2017, pg. 24). Specifically, they have focused on blending different types of control to achieve the desired performance (e.g., Cardinal et al., 2004; Long et al., 2002), and have described the singular view of control as problematic because it does not reflect actual controller–controllee settings that are often dynamic and complex and involve various forms of control (Cardinal et al., 2017; Kreutzer et al., 2016, 2015). They suggest instead that a holistic approach allows for a greater variety of control and provides a better reflection of actual controller–controllee settings. Therefore, a complements perspective allows us to understand better how the combination of different forms of control is greater than the sum of the single control mechanisms.

Empirical studies investigating the complements perspective posit that each control addresses the limitations of the other controls and thereby improves performance. For example, Kreutzer et al. (2015) argue that outcome and behavior controls jointly improve the performance of strategic organizational initiatives by mitigating one another's disadvantages. Similarly, Tiwana (2010) argues that clan controls create an environment in which controllees freely share information about specified behaviors and the effectiveness of behavior control is thereby increased. Further, the communication between controller and controllee while behavior control is being exercised can also facilitate interpersonal relationships between them, and this can establish conditions that are favorable for effective clan control (Choudhury and Sabherwal, 2003; Kirsch, 2004).

Scholars also argue that exercising outcome and behavior controls provide extrinsic motivation for controllees and that clan controls provide intrinsic motivation by internalizing group traditions, values, and norms (Kirsch, 1996; Merchant, 1985). Using all three types of control motivates controllees to achieve prescribed outputs and behaviors and at the same time reduces their tendency to show ineffective behaviors. Therefore, investigating different forms of control together provides a better understanding of how controllers can manage dynamic, fluid, and complex managerial challenges effectively.

Some scholars argue for a substitutes view in which controls weaken the performance effects of other controls, while other scholars support the complements view in which controls strengthen the performance effects of those other controls. To reflect this lack of consensus, we propose two competing hypotheses:

Hypothesis 2a: Outcome, behavior, and clan controls weaken one another's effects on performance.

Hypothesis 2b: Outcome, behavior, and clan controls strengthen one another's effects on performance.

2.3 METHODS

2.3.1 Literature Search and Inclusion Criteria

The objective of our data collection was to identify all studies that investigated organizational control–performance relationships. To retrieve the relevant studies for the meta-analysis, we used the following search strategies. First, we used Boolean combinations of relevant keywords to

explore five electronic databases: (1) ABI/INFORM, (2) ISI Web of Knowledge, (3) EBSCO, (4) Google Scholar, and (5) JSTOR. The keywords used were “outcome control”, “output control”, “market control”, “results control”, “behavior control”, “process control”, “action control”, “bureaucratic control”, “clan control”, “cultural control”, “social control”, “personnel control”, “input control”, “formal control”, and “informal control”. We specified no start date and the search included studies published up till May 2017. We excluded those studies that included keywords such as conceptual, case study (or studies), review, or synthesis in their abstract. Second, we explored and traced the reference lists of all the studies identified using Google Scholar, especially the seminal article by Ouchi (1979) and the review article by Cardinal et al. (2017). Third, we searched the proceedings of conferences (e.g., Academy of Management Proceedings), Research Gate, and the Open Access Theses and Dissertation Database as well as the Research Gate discussion forum and a variety of electronic listservs (e.g., AOM’s Organization and Management Theory Division) to identify unpublished manuscripts.

Four criteria were used to select the studies for our meta-analysis. First, a study had to include at least one measure of any of the three organizational controls and one measure of performance. A common problem faced by meta-analytic researchers is how to deal with constructs that are labeled differently but have identical measures and constructs that are labeled identically across studies. To address this problem, Lipsey and Wilson (2001) suggest defining appropriately the focal constructs and measurements used in various studies that make use of these definitions.

Table 2.1 summarizes the focal construct definitions that are consistent with prior literature and some of the representative measures.

Second, studies had to report the sample size and correlations or other statistics (e.g., t or F statistics) needed to calculate correlations among the organizational controls and performance outcome(s) (Hunter and Schmidt, 2004). Third, the unit of analysis for the meta-analytic research needed to be the individual sample and not the individual effect size (Hedges and Olkin, 1985). Therefore, if multiple measures of one or more controls (e.g., monitoring, directing, evaluating, and rewarding) or one or more performance outcomes (e.g., quality and project efficiency) were used in a single study, and separate correlations were reported for those measures, the correlations were averaged to calculate a single estimate for the study (Hunter and Schmidt, 2004). However, if effect sizes for multiple countries were reported, they were considered as different samples and were included as individual effect sizes. Fourth, to avoid the problem of conceptual replication (Geyskens et al., 2006) we ascertained that all studies were independent and had no overlapping samples. Our sample contained nine sets of studies that had overlapping samples.[3] Thus, we examined these sets of studies for duplication following the detection heuristic provided by Wood (2008). While five sets of studies with duplicate datasets were coded separately as they examined either different constructs or measures, two published studies and one PhD dissertation were marked as duplicate as four sets of studies appeared to use similar data, construct, and measures.[4]

Table 2.1. Definition of Study Constructs and Representative Measures

Construct	Definition and Representative Measures
Outcome Control	*Construct Definition:* Control where the controller specifies performance outputs, standards, or goals, and monitors and evaluates controllees' performance relative to those outputs or goals (Cardinal, 2001; Kirsch, 2004). *Representative Measures:* Our company establishes specific and clear performance objectives for the service provider (Stouthuysen et al., 2012); The client placed significant weight on accomplishing project goals (Tiwana, 2008).
Behavior Control	*Construct Definition:* Control where the controller specifies appropriate behaviors, explicit procedures, or rules for the controllee, and monitors and evaluates controllees based on their performance relative to specified behaviors or procedures (Cardinal, 2001; Turner and Makhija, 2006). *Representative Measures:* The project followed documented processes for software development (Gopal and Gosain, 2010); Upper management specified procedures used by the team (Bonner et al., 2002).
Clan Control	*Construct Definition:* Control where the controller relies upon informal interactions to achieve shared values and norms among the controllees, and within the group to which they are affiliated. The controller also relies on input mechanisms such as selection and value training to guide and influence controllee behaviors (Cardinal et al., 2010; Kirsch et al., 2010). *Representative Measures:* There was a strong community feeling between myself and the team members (Rijsdijk and van den Ende, 2011); we often have social meetings where our firm managers and foreign agents interact with each other (Aulakh and Gencturk, 2000); Managers received substantial formal training (task-related knowledge, e.g., market knowledge) before they assumed responsibility in growth initiatives (Kreutzer et al., 2015).
Performance	*Construct Definition:* Multi-dimensional measures that include self-reported evaluations and archival records of goal accomplishments. *Representative Measures:* Adherence to schedules, overall effectiveness, overall efficiency (Tiwana and Keil, 2007); Customer satisfaction, market share, profitability (Baldauf et al., 2001b).

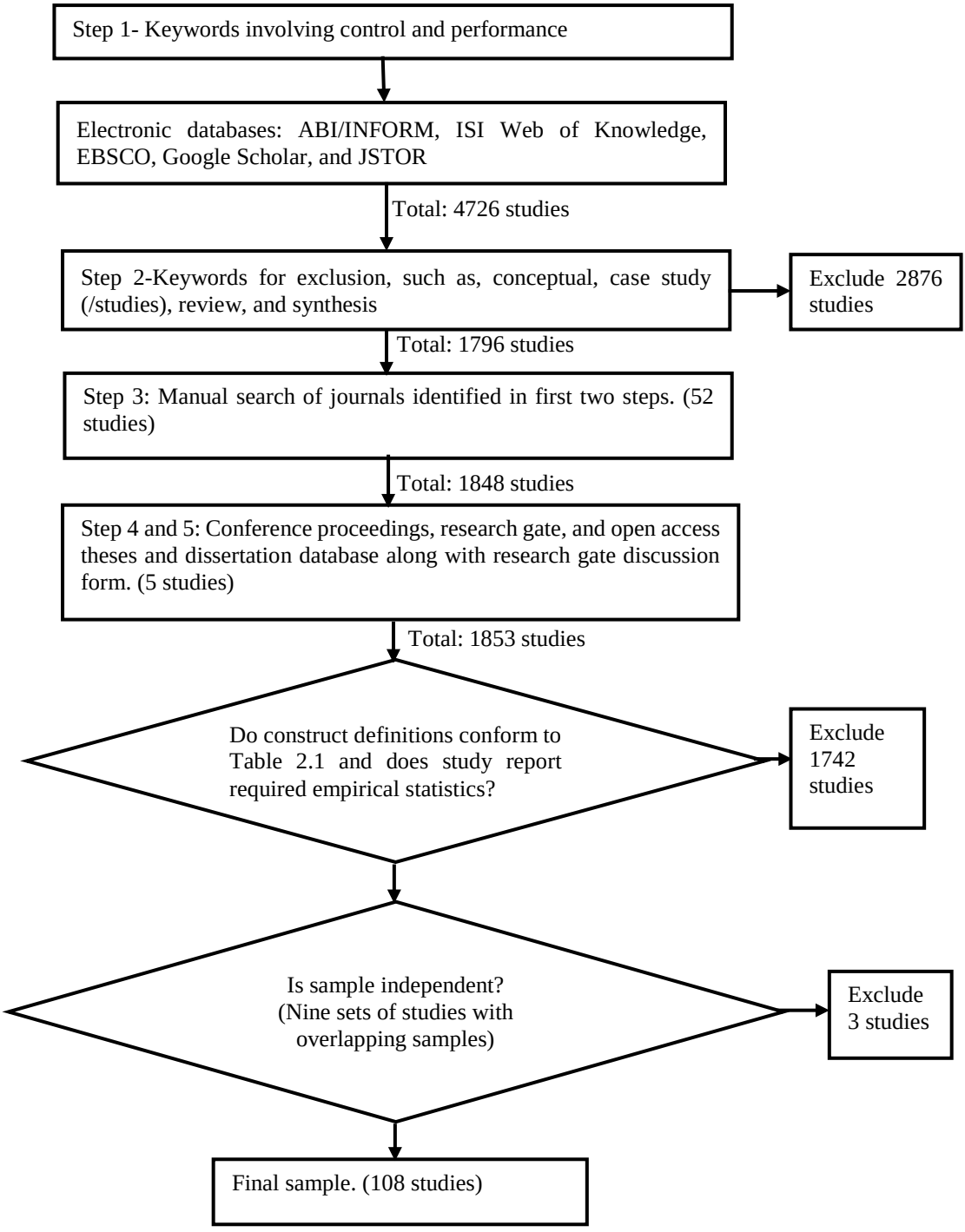
Altogether, these procedures yielded 23,893 observations from 120 datasets across 108 studies. These studies were based on various levels of analysis, including individual, business unit, and firm, with firm being the most prevalent level of analysis. The 108 studies are reported in Appendix 2.1. The literature search and selection process are illustrated in Figure 2.1.

2.3.2 Coding

To code for Hypotheses 1a, 1b, and 1c we obtained three statistics from each study: sample size, correlation coefficients of the three organizational controls with performance, and reliability levels for the three organizational controls and performance. We used the composite reliability or Cronbach's alpha to represent reliability. If a study did not report one of these two indicators, we used the average reliability to replace the missing values (Lipsey and Wilson, 2001). If studies reported multiple measures for a construct, we averaged the correlations and reliability measures to yield a single estimate and each sample is only represented once (Hunter and Schmidt, 2004).

To test Hypotheses 2a and 2b, we also needed correlations among the three organizational controls. We therefore also obtained the correlations among outcome, behavior, and clan control measures. Also, controls researchers generally suggest that a large organization has more means with which to achieve the desired performance (Gencturk and Aulakh, 1995; Kreutzer et al., 2015), and firm size is therefore an important control variable. To this end, we also obtained correlations of firm size with the three organizational controls and performance.

Figure 2.1. Literature search and selection process



Using the definitions of three control constructs provided in Table 2.1 and focusing also on how the control constructs were measured, we categorized the organizational controls of the various studies into outcome, behavior, and clan controls. For example, Menguc and Barker (2003) use 'incentive pay' as an outcome control. The construct measures the amount of incentives paid to salespeople when they meet performance targets and is in line with the definition of outcome control as described in Table 2.1. Outcome controls included construct labels such as output control, results control, outcome-based control, financial control, incentive pay, outcome-based incentives, and use of outcome controls. Behavior controls consisted of construct labels such as process control, behavior-based control, action control, supervisor monitoring, activity control, and capability control. Clan controls covered construct labels such as social control, informal control, clan culture, professional control, relational governance, and formal and informal socialization mechanisms. Appendix 2.1 provides an overview of the studies used in this meta-analysis and the labels they employed.

We also coded several additional variables that might play a role in determining the strength of the organizational controls–performance relationships. First, the three organizational controls may play different roles in enhancing different types of performance outcome (Cardinal et al., 2017). We therefore coded all the performance measures into the four categories of performance outcome proposed by Quinn and Rohrbaugh (1983) and adopted by Cardinal et al. (2017): *rational goal*, *process*, *adaptability*, and *human relations* outcomes. Rational goal outcomes concern efficiency and productivity measured in terms of, for example, speed, quality, financial performance, and other outcomes that are of interest to customers,

shareholders, and partners. Process outcomes concern order, and corresponding measures therefore consider the quality of coordination, cooperation, and information flows. Adaptability focuses on the capabilities required for long-term survival, and representative measures include, for example, innovation, flexibility, and learning orientation. Human relations outcomes concern employee wellbeing and growth, and are captured by measures such as employee satisfaction, relationship quality, and commitment. For studies that reported several performance outcomes, we obtained all the performance outcomes and coded them separately.

Second, we coded the nature of the performance data used in the individual samples as either self-reported or archival. Compared to archival data, self-reported data may cause a potential upward bias (Williams et al., 2010). Archival measures often have a lower reliability and act as unrefined proxies that are subject to many factors, while self-reported perceptual measures tend to be more fine-grained (Venkatraman and Ramanujam, 1986). We therefore coded the *performance data* variable as self-reported (coded as 0) or archival (coded as 1).

Third, researchers have argued that task and outcome information may be more difficult to transmit in *inter-organizational settings* than in *intra-organizational settings*, because in inter-organizational settings the controller and controllees are part of different organizations and information has to be transmitted across organizational boundaries (Choudhury and Sabherwal, 2003; Tiwana and Keil, 2009). We therefore coded whether the organizational setting of a specific study was intra-organizational (coded as '0') or inter-organizational (coded as '1') or both (coded as '2'). For example, the study by Kreutzer et al. (2015) is coded as '0' as it investigates the

management of strategic initiatives within organizations and the controller and controllee are part of the same organization. The study by Wallenburg and Schäffler (2014) is coded as '1' as it focuses on the management of horizontal alliances and the controller and controllee are part of separate organizations. The study by Tiwana and Keil (2009) examines the effectiveness of controls in both internal (intra-organizational) and outsourced (inter-organizational) systems development projects. The study does not provide correlation coefficients separately for these two subsamples and is therefore coded as '2'.

Fourth, we coded the nature of the task being carried out by the controllee as some tasks can be more easily specified, observed, and evaluated than others (Govindarajan and Fisher, 1990; Kirsch, 1996). We classified each study according to the particular type of task involved (e.g., new product development (NPD), information systems (IS) development, sales, human resource management (HRM), etc.) and labeled this variable as *task type*. For instance, a study was coded as *NPD* when it focused on activities associated with identifying and transforming customer needs into new products or as *Sales* when it focused on tasks associated with selling and distribution activities.

Fifth, controls researchers have argued that the level of analysis is important when investigating organizational controls as outcomes, behaviors, and culture vary across organizational levels (Cardinal, 2001; Ouchi, 1977). As such, we coded the variable *level of analysis* into four main categories: firm (coded as '0'), business unit (coded as '1'), project team (coded as '2'), and individual (coded as '3').

Measurement quality is important for meta-analytic research as it involves coding of measures based on judgements. (Orwin and Vevea, 2009; Perreault, Leigh, and Leigh, 1989). Each study was therefore coded independently by two coders. After data collection, we used Perreault and Leigh's (1989) method for calculating the interrater reliability index.[5] This method provides more accurate estimates of chance agreement and corrects for problems associated with Cohen's kappa as it does not rely on marginal frequencies. The reliability index estimates of the coders ranged from 0.93 to 0.98 for different constructs. Therefore, the reliability of the coding process is more than sufficient. The coding differences were resolved through discussion. The resulting data were used for meta-analytic calculations.

2.3.3 Meta-Analytic Procedures

To test Hypotheses 1a, 1b and 1c, we applied a random-effects model to compute the sample-size-weighted mean estimates (r) and the reliability-corrected mean estimates (r_c) of the correlations (r) between organizational controls and performance. We used reliability-corrected mean estimates for interpretation as effect sizes reported in an individual study are subject to measurement error (Hedges and Olkin, 1985; Lipsey and Wilson, 2001). We used the 'metafor' package in *R* to perform random-effects model analysis using three steps (Viechtbauer, 2010). First, Fisher's Z_r transformation was used to transform the correlation estimates to minimize skewness in the effect size distribution due to standard error formulation (Lipsey and Wilson, 2001). Secondly, each transformed effect size was weighted by its inverse variance weight to account for sample-size-related differences in precision

(sampling error) across effect sizes (Borenstein et al., 2009; Lipsey and Wilson, 2001). The rationale is that an effect size obtained from a study with a large sample size offers greater precision than an effect size obtained from a study with a small sample size (Ellis, 2006; Hunter and Schmidt, 2004). The inverse variance weight was also used to calculate confidence and credibility intervals for assessing the significance and distribution of effect sizes respectively (Whitener, 1990). Thirdly, the meta-analytic mean was transformed back into the standard correlation form for ease of interpretation (Lipsey and Wilson, 2001).

We used Q and I^2 statistics to examine the heterogeneity in effect size distribution (Hunter and Schmidt, 2004; Sagie and Koslowsky, 1993). The Q statistic tests for the existence of heterogeneity and is calculated by computing the sum of squared deviation of each study's effect size from the mean effect size and weighting the contribution of each study by its invariance (Borenstein et al., 2009). The I^2 estimates indicate the meta-analytic sample and are computed by comparing the Q statistic value with its degrees of freedom (Higgins and Thompson, 2002). In the case of heterogeneity, mean effect sizes are best interpreted as an average rather than as a common true correlation value, which implies that further moderator analyses are required (Hedges and Olkin, 1985).

While estimating the weighted mean effect sizes, we also checked for outliers and publication bias as both may affect the effect sizes obtained (Borenstein et al., 2009; Viechtbauer and Cheung, 2010). We used studentized deleted residuals along with Cook's distances and COVRATIO values to identify potential outliers (Viechtbauer and Cheung, 2010). These diagnostics measure how excluding the observed effect size of a particular

study affects the mean effect size. It is important to note that an outlier model might not have a significant impact on the results, and exclusion should only be considered when it brings about significant changes in the fitted model. While no outlier was found for clan control, one outlier was identified for outcome control and one for behavior control. However, we checked the robustness of mean effect size estimations by including and excluding the outlier correlation coefficients and there was no substantial change in the estimates.

To test Hypotheses 2a and 2b, we used the meta-analytic structural equation modeling (MASEM) procedure for path analysis. In this two-stage method (Cao and Lumineau, 2015; Cheung and Chan, 2005), we first calculated the ten sample sizes and reliability-corrected mean correlations among organizational controls, performance, and firm size using the random-effects procedure to create a correlation matrix. Since sample size varied across the intercorrelations, we used the harmonic mean to calculate the sample size required for the second stage (Viswesvaran and Ones, 1995). In the second stage, we carried out the path analysis using the correlation matrix as input for the structural equation modeling program AMOS.

Testing Hypotheses 2a and 2b required us to assess the complementary vs substitution effects on performance of the three organizational controls: *outcome*, *behavior*, and *clan*.[6] As very few studies had reported the interaction terms of the three organizational controls and their relationship to performance, we employed the following method to investigate the joint effects of the three controls on performance. We simultaneously captured the influence of the three organizational controls on performance to see whether they strengthen one another and whether at the

same time they have a positive and statistically significant relationship to performance. The three organizational controls will have a complementary effect on performance when the total effect of an individual organizational control on performance is greater than the direct effect of that organizational control (Cao and Lumineau, 2015; Milgrom and Roberts, 1995). In contrast, for the substitution effect, the total effect of an individual control on performance should be smaller than the direct effect of that control on performance. To compute the total effect of an organizational control X on performance, the path coefficient values between X and the other two controls should be multiplied by their respective values of direct effect on performance. The resulting value is then added to the direct effect of X on performance (Alwin and Hauser, 1975; Cao and Lumineau, 2015).

We also performed supplementary analyses to examine the differential performance effects of the three organizational controls and moderation effects of the nature of the performance data, organizational setting, task type, and level of analysis. To estimate the effects of outcome, behavior, and clan controls on the four performance outcomes of rational goal, adaptability, human relations, and process, we conducted path analyses in AMOS using the reliability-corrected effect-size estimates among them. The estimates were computed using the random-effects model analysis described earlier. We used Z-tests and the epsilon statistic to assess the differences in effectiveness of the three controls (cf. Jiang et al., 2012). While Z-tests were used to test the significant difference between the path estimates (Clogg et al., 1995), the epsilon statistic was used to compute the relative weight of each type of control in order to calculate the proportion of total variance explained by each control (Johnson, 2000).

2.4 RESULTS

2.4.1 Organizational Controls and Performance

We first tested the main effects of organizational controls on performance. Table 2.2 shows the results for Hypotheses 1a, 1b, and 1c, and indicates that the three organizational controls and performance are positively related. Specifically, the estimates for outcome (r_c = 0.24; CI95% = 0.19-0.29), behavior (r_c = 0.26; CI95% = 0.23-0.30), and clan control (r_c = 0.32; CI95% = 0.26-0.38) are all positively significant.

We also performed statistical tests for publication bias (see Table 2.2). The fail-safe estimates suggest that it would take 32,457, 40,076, and 23,169 additional studies with insignificant results to potentially reduce the effect sizes obtained to null values (Hunter and Schmidt, 2004). The results of the trim and fill procedure indicate that there is no evidence of publication bias as no studies are missing for various controls–performance relationships (Duval and Tweedie, 2000b, 2000a). The Egger rank correlation test also did not show any indication of bias in the data (Egger, Davey Smith, Schneider, and Minder, 1997). Overall, the results of publication bias tests indicate that the effect sizes obtained for the three controls–performance relationships are robust to these tests.

The heterogeneity tests for the relationships between three controls and performance suggest true heterogeneity between samples. The values of the Q statistic are all significantly different from zero ($p < 0.001$), and high values of the I^2 statistic indicate that the effects have substantial heterogeneity. Taken together, these findings imply that additional contextual factors are at play that influence the size of the correlations and

Table 2.1. Meta-analytic Descriptives for the Organizational controls–Performance Relationships

Organizational Controls	k	N	r	r_c	SE	CI95%		CrI95%		Q	I^2	Tests for Publication Bias					
												fsn	Trim and Fill				Egger
													m	$r_{t\&f}$	95%CI		p
Outcome Control	91	19038	0.20***	0.24***	0.03	0.19	0.29	-0.22	0.61	985.03***	91.87%	32457	0	0.24***	0.19	0.30	0.86
Behavior Control	97	19703	0.22***	0.26***	0.02	0.23	0.30	-0.12	0.58	858.92***	88.69%	40076	0	0.27***	0.23	0.31	0.99
Clan Control	58	10060	0.26***	0.32***	0.03	0.26	0.38	-0.14	0.68	692.29***	90.94%	23169	0	0.34***	0.27	0.40	0.70

k = number of effect sizes; N = total sample size; r = sample size weighted correlation; r_c = sample size and reliability-corrected correlation; SE = standard error of r_c; CI95% = confidence interval, Cr.I95%= credibility interval; Q = Cochran's homogeneity test statistic; I^2 = scale-free index of heterogeneity; fsn = fail-safe number; m = missing number of studies; $r_{t\&f}$ = trim and fill correlation; p = p value.* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

explain the heterogeneity (Hedges and Olkin, 1985). Our supplementary analyses discussed below explore this heterogeneity in more detail.

2.4.2 Organizational Controls: Substitutes or Complements?

Table 2.3 presents the meta-analytic correlations matrix employed in our path analysis. Figure 2.2 shows the results. The overall measurement model has a good fit to the data. The fit indices of the model are χ^2 (4) = 135.03, $p < .001$; CFI = 0.98; TLI = 0.95; AGFI = 0.98; RMSEA = 0.06; and SRMR = 0.03. The results in Figure 2.2 show that outcome and behavior control (r_c = 0.53, 95%C.I. = 0.51-0.55), behavior and clan control (r_c = 0.42, 95%C.I. = 0.40-0.44), and outcome and clan control (r_c = 0.37, 95%C.I. = 0.34-0.39) are all positively correlated. The results also indicate that the control variable firm size is not significantly related to performance (r_c = -0.01, 95%C.I. = -0.02-0.01).

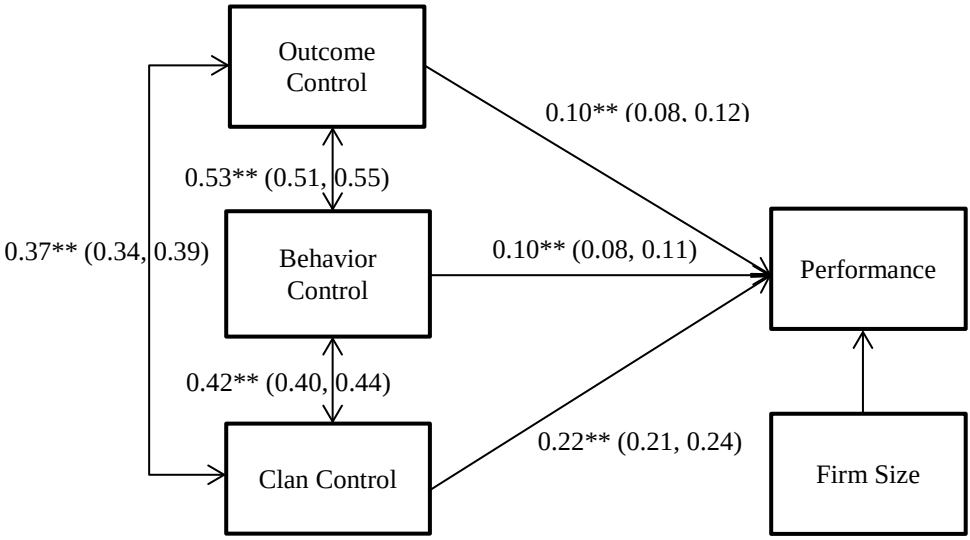
Furthermore, the path estimates for the direct paths from outcome, behavior, and clan control to performance are all positive (0.10, 0.10, and 0.23 respectively). As such, the three types of control impact performance directly but also indirectly, through their strengthening effect on one another. For instance, the indirect effect of outcome control on performance through behavior and clan control is 0.134 (= 0.53*0.10+0.37*0.22), and therefore the total effect of outcome control is 0.234 (=0.10+0.134), which is greater than its direct path estimate (0.10). Controls will function as complements when the total effect of one type of control on performance is greater than the direct effect of that control on performance (cf. Cao and Lumineau, 2015). As such, we can infer that performance is improved because behavior and clan control complement outcome control.

Table 2.3. Meta-analytic correlation matrix [a]

	Outcome Control	Behavior Control	Clan Control	Performance	Firm Size
Outcome Control	1.00	76 (15924)	50 (8943)	91 (19038)	25 (3938)
Behavior Control	0.53***	1.00	44 (7739)	97 (19703)	27 (4507)
Clan Control	0.37***	0.42***	1.00	58(10060)	22 (3483)
Performance	0.25***	0.26***	0.32***	1.00	32 (5127)
Firm Size	0.05	0.07**	0.05	0.02	1.00

[a.]Cells below the diagonal contain sample size and reliability-corrected correlation mean correlations. Cells above the diagonal contain the number of samples (k) and the total number of observations in parentheses (*N*). * p < 0.05, ** p < 0.01, *** p < 0.001. Harmonic mean = 9253

Figure 2.2. Results of the meta-analytic path analysis [b]



[b] Number outside parentheses represent path coefficients, numbers in parentheses represent the lower and upper bounds for the 95% confidence interval for path coefficients. * p < 0.05, ** p < 0.01, *** p < 0.001

Similarly, the total effect for behavior control is 0.245 (=0.10+0.53*0.10+0.42*0.22) and clan control is 0.299 (=0.22+0.37*0.10+0.42*0.10), and that is greater than their individual direct path estimates (0.10 and 0.23 respectively). Hence, Hypothesis 2a is not supported, but Hypothesis 2b is supported. Outcome, behavior, and clan control function as complements.

2.4.3 Supplementary Analyses

We assessed the differential effects of organizational controls on distinct types of performance outcome to determine whether other potential moderators explain the heterogeneity in the effect size distribution. To estimate the differential effects of outcome, behavior, and clan controls, we performed four path analyses for the rational goal, adaptability, human relations, and process outcomes. As shown in Table 2.4, most organizational controls have positive significant effects on the four types of performance outcome. Only for the process outcomes is the effect of outcome control significantly negative ($\beta = -0.15$, $p < 0.001$). The Z-tests show that the path estimates of clan control are systematically and significantly larger than the path estimates of outcome and behavior control for each type of performance outcome. The results also indicate that the path estimates of outcome and behavior control for rational goal outcomes and human-relations outcomes are not significantly different. However, the path estimates of behavior control are

Table 2.4. Differential Effects of Organizational Controls on Various Types of Performance Outcome

Organizational Controls	Types of Performance Outcome											
	Rational Goal			Adaptability			Process			Human Relations		
	β	t	%R^2	β	t	%R^2	β	t	%R^2	β	t	%R^2
Outcome Control	0.11	10.39***	25%	0.04	3.42***	10%	-0.15	-10.32***	21%	.05	3.42***	8%
Behavior Control	0.09	7.87***	19%	0.16	12.00***	34%	0.25	16.36***	33%	.06	4.05***	10%
Clan Control	0.23	23.45***	56%	0.24	19.51***	56%	0.32	23.00***	46%	0.44	33.88***	83%
Total R^2	0.11			0.13			0.18			0.23		
Z, BC-OC	-1.36			5.15***			15.90***			0.42		
Z, CC-OC	7.72**			9.91***			21.30***			18.90***		
X, CC-BC	8.83**			3.79***			2.84**			17.52***		

β = standardized coefficients, t = t statistic, %R2 = proportion of total variance explained by each organizational control, Z = test significance of the difference between the path estimates.* $p < 0.05$, ** $p < 0.01$, *** $p < 0$.

significantly stronger than those of outcome control for adaptability (Z-value = 5.15, $p < 0.01$) and process outcomes (Z-value = 15.90, $p < 0.01$). In addition, we analyzed the complementarity and substitution among the three controls for the four types of performance outcome using the path analysis procedure outlined for testing Hypotheses 2a and 2b. The analysis indicates that the three controls are positively correlated to each other and the correlation values among them remain the same as shown in Figure 2.2. The path estimates for the direct effect of each control on rational goal, adaptability, human relations, and process outcomes are same as the standardized coefficients shown in Table 2.4. When we calculate the total effects of each type of control on each of the four types of performance outcome, the results reveal that the total effects of each control is greater than its direct effect. Even though the direct effect of outcome control on process outcomes is negative (-0.15), the total effect of outcome control on process outcomes is positive (0.103), as the indirect effect is 0.253 (=0.53*0.25+0.37*0.32) and that is greater than -0.15. Therefore, outcome, behavior, and clan control complement each other to improve each type of performance outcome.

We also assessed the influence of the nature of the performance data (self-reported versus archival), the organizational setting (intra-organizational versus inter-organizational), task type (NPD, IS development, sales, and HRM), level of analysis (firm, business unit, project team and individual), and type of performance outcome (rational goal, adaptability, human relations, and process outcomes). Table 2.5 reports the results of these analyses. We found no significant effect for the nature of the performance data, which implies that the correlations reported in studies that use self-

reported performance data are not positively or negatively biased compared to studies that use archival performance data. Also, the strength of the association among the organizational controls and performance does not differ significantly between intra-organizational and inter-organizational settings. The results also show that the outcome control–performance relationship and the clan control–performance relationship do not differ significantly for different task types. However, for behavior control the analysis does support the notion that there are significant differences among the various subgroups of task type ($Q_{M} = 9.21$, $p < 0.05$). To assess whether the estimates of the behavior control–performance relationship for various task types are different from each other, we applied a Wald-type test (Viechtbauer, 2010). The analyses reveal that the behavior control–performance relationship is significantly stronger for IS development tasks ($r_c = 0.30$, 95%CI = 0.20-0.40) and sales tasks ($r_c = 0.29$, 95%CI = 0.24-0.35) than for NPD tasks ($r_c = 0.11$, 95%CI = -0.08-0.29) and HRM tasks ($r_c = 0.12$, 95%CI = 0.04-0.20). Further, the results indicate that neither the level of analysis, nor the type of performance outcome, play a significant role in explaining the heterogeneity in effect sizes.

Finally, although we do not have a theoretical reason to expect performance to influence organizational controls, we calculated the estimates for three control–performance relationships from studies that employ longitudinal data in order to ascertain causality. The results suggest that reverse causality is not likely to be in play as the estimates for outcome ($r_c = 0.20$, 95%CI = 0.06-0.34), behavior ($r_c = 0.29$, 95%CI = 0.11-0.46), and clan control ($r_c = 0.30$, 95%CI = 0.16-0.43) are all positively significant.

Table 2.5. Supplementary Analyses: Organizational Setting, Task Type, Level of Analysis and Types of Performance Outcome

Variable	k	N	r	r_c	SE	CI95%		Q_M	Q_E
Performance Data									
Outcome Control									
Self-reported	82	15663	0.20***	0.25***	0.03	0.20	0.30	0.25	977.72***
Archival	7	681	0.11	0.14	0.11	-0.07	0.33		
Behavior Control									
Self-reported	88	16329	0.22***	0.27***	0.02	0.23	0.31	1.52	628.14***
Archival	8	756	0.21***	0.25**	0.08	0.10	0.39		
Clan Control									
Self-reported	53	9452	0.26***	0.33***	0.04	0.26	0.39	0.24	679.70***
Archival	5	608	0.22***	0.26***	0.08	0.11	0.40		
Organizational Setting									
Outcome Control									
Intra-organizational	59	13151	0.19***	0.23***	0.03	0.18	0.28	1.63	905.85***
Inter-organizational	25	3916	0.24***	0.30***	0.07	0.18	0.42		
Behavior Control									
Intra-organizational	67	13631	0.21***	0.26***	0.03	0.21	0.30	2.44	826.70***
Inter-organizational	24	3617	0.27***	0.33***	0.05	0.24	0.42		
Clan Control									
Intra-organizational	33	5539	0.25***	0.30***	0.04	0.23	0.37	1.52	459.54***
Inter-organizational	18	2816	0.30***	0.38***	0.06	0.27	0.48		
Task Type									
Outcome Control									
NPD	13	2835	0.19**	0.24*	0.10	0.05	0.41	2.59	797.29***
IS Development	19	2114	0.25***	0.30***	0.06	0.19	0.40		
Sales	36	8845	0.18***	0.22***	0.04	0.14	0.28		
HRM	5	1111	0.10*	0.12	0.07	-0.01	0.25		
Behavior Control									
NPD	8	1454	0.10	0.11	0.10	-0.08	0.29	9.21*	650.92***
IS Development	16	1675	0.26***	0.30***	0.05	0.20	0.40		
Sales	47	10289	0.24***	0.29***	0.03	0.24	0.35		
HRM	5	1111	0.11***	0.12**	0.04	0.05	0.20		
Clan Control									
NPD	8	1605	0.27***	0.34***	0.09	0.18	0.48	1.82	365.41***
IS Development	14	1548	0.22***	0.27***	0.06	0.15	0.38		
Sales	16	2781	0.26***	0.33***	0.06	0.22	0.44		
HRM	5	1111	0.18***	0.22***	0.05	0.13	0.31		

Variable	k	N	r	r_c	SE	CI95%		Q_M	Q_E
Level of Analysis									
Outcome Control									
Firm	44	11881	0.20***	0.24***	0.04	0.18	0.31	4.14	947.29
Business Unit	11	1696	0.10*	0.13*	0.06	0.02	0.24		
Project Team	25	2794	0.24***	0.30***	0.06	0.08	0.41		
Individual	14	2498	0.18***	0.21***	0.04	0.12	0.29		
Behavior Control									
Firm	42	10594	0.21***	0.26***	0.04	0.20	0.33	2.42	885.09***
Business Unit	24	3654	0.23***	0.29***	0.04	0.22	0.35		
Project Team	20	2030	0.18***	0.22***	0.06	0.10	0.33		
Individual	24	3971	0.26***	0.31***	0.04	0.25	0.38		
Clan Control									
Firm	30	5726	0.30***	0.38***	0.05	0.29	0.46	5.97	594.24***
Business Unit	3	495	0.13	0.15	0.08	-0.00	0.29		
Project Team	18	2092	0.25***	0.30***	0.06	0.20	0.40		
Individual	7	1225	0.14	0.17	0.11	-0.04	0.37		
Types of Performance Outcome									
Outcome Control									
Rational Goal	77	15611	0.20***	0.25***	0.01	0.19	0.30	1.87	1187.54***
Adaptability	20	4898	0.19***	0.23***	0.02	0.13	0.33		
Process	6	942	0.10	0.11	0.03	-0.07	0.29		
Human Relations	9	1733	0.22**	0.27*	0.05	0.06	0.45		
Behavior Control									
Rational Goal	84	16980	0.21***	0.25***	0.01	0.21	0.29	1.72	960.31***
Adaptability	18	4120	0.24***	0.30***	0.02	0.20	0.40		
Process	5	766	0.21	0.27	0.08	-0.02	0.51		
Human Relations	11	2028	0.26***	0.30***	0.03	0.16	0.43		
Clan Control									
Rational Goal	51	8528	0.25***	0.31***	0.01	0.24	0.37	7.04	977.38***
Adaptability	12	2684	0.27***	0.34***	0.04	0.19	0.48		
Process	4	646	0.40*	0.48*	0.21	0.04	0.77		
Human Relations	6	955	0.44***	0.54***	0.09	0.29	0.72		

k = number of effect sizes; N = total sample size; r = sample-size-weighted correlation; r_c = sample-size-weighted correlation corrected for unreliability; SE = standard error of r_c; CI95% = confidence interval; Q_M, Q statistic for overall moderator model; Q_E, Q statistic for residual heterogeneity. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

2.5 DISCUSSION

This meta-analytic study had two primary objectives: (a) to investigate the bivariate relationship between the three organizational controls (outcome,

behavior, and clan) and performance, and (b) to assess whether the three controls increase (complement) or decrease (substitute) one another's performance effects. By analyzing data obtained from 120 independent samples comprising 23,839 organizational control–performance relationships, we demonstrate that organizational controls generally have a positive association with performance and they act as complements. Our analysis indicate that the three organizational controls have differential relationships with various performance outcomes. In addition, moderator analyses reveal that the effectiveness of controls does not differ between studies that employ self-reported performance data and those that use archival performance data, and also does not differ for various organizational settings (intra- and inter-organizational), level of analysis (firm, business unit, project team, individual), and type of performance outcome (rational goal, adaptability, human relations, and process outcomes). We also found that the behavior control–performance relationship is moderated by the type of task that is being controlled. Below we discuss the theoretical and managerial implications of these findings.

2.5.1 Theoretical Contributions

This study enriches the organizational controls literature in four important ways. First, a major contribution of this study to the controls literature is that the results show that all three organizational controls positively impact performance and that all are therefore important mechanisms that help organizations to achieve their objectives. The results indicate that controls are at least as important as other determinants of performance such as strategic resources ($r_c = 0.22$) (Crook et al., 2008), organizational knowledge

transfer (r_c = 0.19) (van Wijk et al., 2008), and exploration (r_c = 0.22) and exploitation (r_c = 0.22) (Junni et al., 2013). These positive performance effects were found not only for controlling the firm as a whole, but also for controlling business units, project teams, and individual employees. As such, our results do not provide support for arguments made in prior research that the effectiveness of controls differs for different levels of analysis (Ouchi, 1977). We also find that the three organizational controls are equally effective in intra- and inter-organizational settings. These results therefore do not support the premise that controls are less effective in inter-organizational settings due to controllers having difficulty in measuring and observing controllees' outputs and behaviors, or because controllers and controllees are less likely to have shared values, goals, and understanding (Tiwana, 2010; Tiwana and Keil, 2009). Therefore, future research should focus on gaining a more detailed understanding of how controllers acquire the informational and social requirements needed to exercise controls effectively in inter-organizational settings and at different levels of analysis.

Second, this study complements and extends recent research on the interplay among organizational controls (e.g., Kreutzer et al., 2016, 2015). Our results support the argument that controls act as complements and that each control enhances the performance effects of the other controls. This suggests that each control helps in addressing the limitations of the other controls. For example, the "hands-off" approach of outcome control may result in a disconnect between controllers and controllees, and controllees might therefore receive fewer inputs on the behaviors that need to be followed to improve performance (Anderson and Oliver, 1987; Cardinal, 2001). Complementing outcome control with clan control, for instance, may

help to mitigate these unintended consequences. Clan control may help not only to develop consensus on which behaviors are considered effective for achieving the desired performance, but also to facilitate interactions between controller and controllees and reduce or prevent a possible disconnect between them (Kirsch, 1996; Turner and Makhija, 2006). Our results also show that the three controls function as complements for all the types of performance outcomes that we considered in our study (i.e., rational goal, adaptability, process, and human relations). Therefore, our study provides a means for controls research to move beyond the traditional "singular view" of control as prescriptive (i.e., that in any given context, there is one approach to control that will be effective) towards a "holistic view" that incorporates a variety of controls (Cardinal et al., 2017, 2004; Long et al., 2002). Going forward, we encourage researchers to include all three organizational controls when examining the effectiveness of organizational controls and their interactions. Failure to do so may lead to inaccurate estimates and erroneous inferences about the effectiveness of those controls that are included. In this regard, researchers can employ complementarity theory to investigate why a combination of different controls is more effective than any one individual control used on its own (Cardinal et al., 2017; Kreutzer et al., 2016).

The third contribution of this study lies in the fact that it shows that while all controls generally have positive performance effects, the relationship between each control and performance is not moderated by the type of performance outcome but that the direct effects of three controls on each type of performance outcome differ in strength, depending partly on the type of performance outcome. This suggests that each control has its own

characteristics and provides support for the notion put forward by Korsgaard et al. (2010, pg. 224) that various controls "operate on the behavior of individuals in fundamentally different ways". More specifically, we find that clan control has a stronger effect on each type of performance outcome than outcome and behavior controls. This finding diverges from classic controls research that emphasizes clan control as an "alternative control" that is only effective when outcomes or behaviors cannot be accurately measured or observed (Ouchi, 1979). According to Korsgaard et al. (2010), clan control operates through internalization of values, norms, and beliefs that generally encourage intrinsic motivation, whereas outcome and behavior controls rely on behavioral contingency mechanisms that are mainly associated with extrinsic motivation. Previous research suggests that intrinsic motivation has greater performance consequences than extrinsic rewards (Ryan and Deci, 2000a). A possible reason why clan control is more likely to lead to intrinsic motivation is that it comprises of proportionately greater informal mechanisms than formal mechanisms. However, this notion needs further investigation. As self-determination theory (SDT) focuses on the mechanisms that regulate the intrinsic motivation of individuals (Ryan and Deci, 2000a, 2000b), we encourage future research to examine the motivational mechanisms that underlie different types of control and to use SDT to explicate the behavioral and performance consequences of these mechanisms.

The finding that behavior and outcome controls influence adaptability and process outcomes to different degrees also suggests that each control operates through alternative mechanisms. For example, adaptability outcomes (i.e., flexibility, innovation, and learning) involve

unique situations that emerge continuously over time and require rich controller–controllee interactions (Cardinal et al., 2017). In this regard, behavior control is more effective as it facilitates more active involvement by controllers than outcome control, which involves a hands-off approach (Kreutzer et al., 2015). Process outcomes (i.e., smooth coordination, cooperation, and information flows) rely on consistency and effectiveness in existing routines and practices (Cardinal et al., 2017). Behavior control is more effective in settings where process outcomes are required as it involves the specification of standardized procedures, whereas in outcome control no inputs whatsoever are provided to controllees in terms of the procedures that should be followed (Kirsch, 1996). To understand more about these different paths, we encourage future research to explore other mechanisms that may act as mediators of the control–performance relationships. For example, role theory could be used to explore whether providing greater clarity over the processes and goals for a particular task may help to increase controllees' job satisfaction, and thus lead to higher performance (Carbonell and Rodriguez-Escudero, 2013; Sawyer, 1992).

Fourth, this study contributes to the literature by providing evidence that the effectiveness of controls depends partly on the task that is being controlled. Our results show that behavior control is more effective for tasks such as IS development (Gopal and Gosain, 2010) or sales (Baldauf et al., 2005) that rely on an identifiable series of procedures and routine activities, than for tasks such as NPD and HRM that involve higher levels of complexity and a more varied body of expertise. In our view, these results are underpinned by the notion that behaviors are dependent on the complexity involved in a particular system and that these behaviors can interact with

controls to influence their functioning (Cardinal et al., 2017; McCarthy et al., 2006). This notion is also empirically supported by Liu (2015), who found that the behavior control is generally effective, but that its effectiveness decreases due to high system complexity. Therefore, although we find that behavior control is generally effective for distinct outcomes that span various tasks, the explanation for our finding that behavior control is less effective for HRM and NPD tasks may lie in the fact that NPD and HRM can be viewed as complex systems (Colbert, 2004; McCarthy et al., 2006). NPD and HRM tasks involve more complexity due to the fact that there is high task interdependence and coordination is needed because the activities are cross-functional (Gulati and Singh, 1998; Thompson, 1967). As such, our study suggests that the complexity involved in various tasks may interact with the functioning of the control. We thus encourage future research to explore how systems complexity affects the effectiveness of controls and also how controls function across different tasks.

2.5.2 Managerial Implications

Our meta-analysis suggests that managers can achieve the desired performance outcomes by exercising outcome, behavior, and clan controls. The results also indicate that managers are likely to reap the greatest benefits in terms of performance by emphasizing clan controls that can intrinsically motivate controllees. However, this does not mean that managers should ignore outcome and behavior controls as a means of enhancing performance as these may motivate employees through extrinsic rewards.

Considering the various situations in which managers exercise organizational controls, our results also suggest that they should give equal

emphasis to outcome, behavior, and clan controls when exercising control in intra-organizational or inter-organizational settings. Also, their choice of control should not be dependent on whether the control is being exercised at the firm level, or at the business or functional unit, project team, or individual level. However, we also find that managers cannot take a 'one-size-fits-all' approach across different types of task. More specifically, if they emphasize outcome and clan control managers can expect similar performance effects for various types of tasks. Further, behavior control is less effective for tasks such as NPD and HRM that do not involve an identifiable series of procedures and routine activities than it is for IS development and sales tasks. Finally, our study indicates that managerial controls are complements, and that exercising different types of control simultaneously provides synergies that help in overcoming the limitations of the individual controls. Instead of relying on a single type of control, managers should appreciate the strengths and added value of using all three types of control.

2.6 LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

Although this study has several important implications, the results of this study should be considered in light of several limitations, and additional research is needed to address these. The first limitation is that our findings are silent on the time-dependent performance effects of the interplay among controls. This interplay may well change as controller–controllee relationships evolve over time (Kirsch, 2004). Thus, the way in which controls interact over time remains a black box, and additional longitudinal studies or experimental studies are needed to develop our understanding of

this aspect of organizational control. The second limitation is that we were only able to focus on three moderators as we were limited by the data available for our analysis. As evident in the significant Q statistics through our statistical analyses, there is still a substantial amount of variability in terms of the moderators to be accounted for. The organizational controls literature argues that the effectiveness of controls is also affected by the ability of controllers to measure outcomes, observe behaviors, and understand the process associated with transforming inputs into outputs (Kirsch, 1996; Ouchi, 1979). Investigation of outcome measurability, behavior observability, and knowledge of the transformation process as additional moderators in future empirical studies will help in a better understanding of the organizational controls–performance relationships.[7]

There are at least three other areas for further research. First, building on our findings regarding the different types of task, researchers may want to investigate whether it is better for managers to specialize in controlling one specific type of task (e.g., to limit themselves to controlling only people engaged in sales activities) or whether they might become more effective by diversifying and gaining experience in controlling different tasks (e.g., controlling salespeople and new product development teams, etc.). Second, our research largely suggests that more control is better. However, researchers have acknowledged that the gains obtained from exercising various controls may be canceled out by using more controls due to the high resource requirements and adverse behaviors associated with an increased use of controls (e.g., Grewal et al. , 2013). Thus, we encourage future researchers to determine what the optimal level of controls may be in a context, how that can be achieved, and at what point controls become

excessive. Third, in line with the suggestion by Cardinal et al. (2017), we encourage future studies to explore whether our results will hold in new types of organizational forms and work styles such as relational networks, virtual teams, open innovation, and flexible working practices.

2.7 CONCLUSION

The overall objective of this study was to examine the relationship between organizational controls and performance. We found that outcome, behavior, and clan controls all contribute to performance but that clan control is more effective than the other two controls for each type of performance outcome. Our analyses also highlight that the effectiveness of outcome and clan controls is stable across various organizational settings, levels, and tasks as well as across various performance outcomes, and that it is only for behavior control that the effectiveness of varies according to the type of task. This study also provides strong additional support for the view that one type of control increases the effectiveness of the others. By combining and analyzing the empirical results of many independent studies, we are the first to examine these factors in a systematic manner. In sum, this research opens up several new avenues for future research on the effectiveness of controls that should be explored in order to extend our understanding of organizational controls.

NOTES

[1] The traditional controls research has discussed the three types of control as either formal or informal. Lately, however, scholars have argued that all three types involve both formal and informal mechanisms (Cardinal et al., 2010; Kreutzer et al., 2016).

[2] Historically, clan control has been labeled as an informal control. However, clan control has both formal and informal attributes as it involves selection, training, and diversity of the workforce in addition to socialization and interpersonal approaches to influence norms, values, and beliefs (Kirsch et al., 2010; Ouchi, 1979). We therefore focus on a notion of clan control that includes not only the role of the clan in stimulating specific controllee behaviors through unwritten and unofficial values, norms, and beliefs, but also the search for and selection of controllees who undergo value training to internalize the desired behaviors.

[3] The different sets of studies with duplicate datasets are: (1) Challagalla and Shervani (1996, 1997); (2) Austrian dataset in Baldauf et al. (2002) and Baldauf et al. (2001b); (3) Miller et al. (2013), Saldanha et al. (2013), and Saldanha et al. (2014); (4) Flaherty et al. (2007) and Flaherty and Pappas (2012); (5) Piercy et al. (2009) and Piercy et al. (2012); (6) Solberg (2006b) and Solberg (2008); (7) Smets (2013) and Smets et al. (2013); (8) Smets (2013) and Smets et al. (2016); and (9) Yu and To (2008, 2011).

[4] All the studies in sets 2, 3, 4, 5, and 9 (see endnote 3) were not marked as duplicate and coded separately. The studies in sets 1, 6, 7, and 8 (also endnote 3) were marked as duplicate. We kept Challagalla and Shervani (1996) and Solberg (2006b), but dropped Challagalla and Shervani (1997) and Solberg

(2008) as they were published later. Concerning the PhD dissertation by Smets (2013), we dropped this dissertation as the two studies (i.e., Smets et al. (2013, 2016)) from this have since been published.

[5] The formula for Perreault and Leigh's reliability index is represented by $Ir = \{[(F/N) - (1/k)][k/(k-1)]\}^{0.5}$, for $F/N > 1/k$; where F is the frequency of agreement between coders, N is the total number of judgments, and k is the number of categories (the Ir values range from 0 to 1, with higher values representing greater reliability).

[6] According to Cao and Lumineau (2015), two methodological techniques can be used to examine the complementary or substitute effects between independent variables: (1) using the interaction terms for the independent variables in the structural model for which complementarity or substitute effects need to be examined (Song et al., 2005); (2) analyzing the relationship between the independent variables and dependent variables simultaneously and examining whether the independent variables are positively or negatively related to the dependent variable (Poppo and Zenger, 2002). Given that the studies in our sample did not report the correlation values between the interaction terms and the dependent variable, we employed the second method in our analysis, and we used the approach followed by Cao and Lumineau (2015) in their meta-analytic study.

[7] We want to thank one of the reviewers for drawing our attention to this issue.

CHAPTER 3

Organizational Controls, Knowledge Integration Mechanisms, and Supplier Flexibility in New Product Development Outsourcing[2]

ABSTRACT

Managing outsourced new product development (NPD) activities is a core issue for organizations. Organizations depend on supplier flexibility since NPD generally takes place in a context of uncertainty. Working with suppliers that are able to quickly respond to changes in the demands of organizations is essential for performance. Drawing on organizational control theory and the knowledge-based view, this study posits that the mechanisms aimed at facilitating cooperation and coordination between organizations and their suppliers enhance supplier flexibility. In particular, the study investigates the influence of various forms of organizational control (outcome, behavior, clan) and knowledge integration mechanisms (KIMs) on supplier flexibility, and what effect this has on NPD project performance. Based on data from 109 outsourced NPD projects, the empirical results show that using outcome and clan control encourages suppliers to be more flexible, leading in turn to higher NPD project performance, but that behavior control and KIMs do not promote supplier flexibility. Post-hoc analyses reveal that while outcome control can be a double-edged sword in that it has both beneficial and adverse effects on NPD project performance, clan control

[2] Earlier version of this chapter were presented at the below mentioned conferences:

- Sihag, V., Rijsdijk, S.A., and van den Ende, J (June, 2018). "Managing Outsourced New Product Development: The Role of Organizational Controls, Knowledge Integration Mechanisms, and Supplier Flexibility". In *Innovation and Product Development Management Conference (IPDMC),* Porto, Portugal.
- Sihag, V., Rijsdijk, S.A., and van den Ende, J (March, 2018). "Managing Outsourced New Product Development: The Role of Organizational Controls, Knowledge Integration Mechanisms, and Supplier Flexibility". In *International Purchasing and Supply Education and Research Association (IPSERA) Conference as competitive paper*, Athens, Greece.

helps to achieve higher levels of performance. The analyses also indicate that KIMs can have adverse effect on NPD project performance via supplier flexibility. Collectively, these findings advance our understanding of the antecedents of supplier flexibility and highlight it as an appropriate way of achieving higher project performance in NPD outsourcing.

3.1 INTRODUCTION

Organizations outsource their new product development (NPD) activities to complement their core capabilities with the unique knowledge, skills, and resources of their suppliers (Calantone and Stanko, 2007; Carson, 2007). Access to such complementary and specialized knowledge and resources has been found to have a positive influence on a wide range of performance outcomes, as it can lead to shorter development times, improved product quality, and lower development costs (Johnsen, 2009; Quinn, 2000; Takeishi, 2001). NPD outsourcing involves a supplier contributing to the outsourcing organization's product development (Carson, 2007; Lawson, Krause, and Potter, 2015). Despite the benefits to be gained by outsourcing NPD activities, many organizations find it difficult to manage these activities effectively, particularly because of the evolving nature of NPD projects (Johnsen, 2009; Stanko and Calantone, 2011).

NPD projects evolve for various reasons, such as changes in market dynamics, the acquisition of new technical and product knowledge, or the creation of new knowledge as a result of project learning (Iansiti, 1995; Tatikonda and Rosenthal, 2000). Therefore, product specifications often change partway through an NPD project and the project requirements

initially agreed between the outsourcing organizations and their suppliers may no longer be adequate (Ivens, 2005; Noordewier et al., 1990). To address this problem, organizations want their suppliers to incorporate the new requirements. Organizations are therefore highly dependent on supplier flexibility that refers to the willingness of suppliers to respond flexibly to the changing requirements of outsourcing organizations (Cannon and Homburg, 2001; Ivens, 2005).

To encourage flexible behavior from suppliers, organizations need to ensure that their suppliers are willing to align their efforts to those of the outsourcing organization, to incorporate the new requirements (Gulati et al., 2005; Ivens, 2005). Achieving alignment of efforts from suppliers requires both cooperation (alignment of interests) and coordination (alignment of actions) (Gulati et al., 2005). It is difficult for organizations to ensure cooperation and coordination from their suppliers because the suppliers have different interests and knowledge (Gulati et al., 2005; Johansson, Axelson, Enberg, and Tell, 2011). Also, making the adjustments required to comply with the outsourcing organization's requirements entails considerable costs for suppliers as they have to make available additional resources of various kinds (Han, Sung, and Shim, 2014). Suppliers are therefore not always likely to be ready to adjust to the changing requirements of outsourcing organizations. For example, Cui, Loch, Grossman, and He (2009) describe how the launch of a Siemen's product was delayed by half a year because a supplier was not willing to adjust the product specifications. Hence, a lack of flexibility on the supplier's part can result in problems, such as developing a product that does not meet the requirements specified by the outsourcing organizations or lower project performance. In light of these concerns,

scholars and practitioners need to know the mechanisms for improving cooperation and coordination can help to promote supplier flexibility.

Existing research on NPD outsourcing has focused primarily on when and why to outsource NPD activities (Stanko and Calantone, 2011). In addition, researchers have investigated various antecedents (e.g., higher profit margins, control mechanisms), moderators (e.g., market uncertainty, technological uncertainty), and performance outcomes (e.g., stock market reaction, supplier task performance) associated with NPD outsourcing (e.g., Calantone and Stanko 2007; Carson 2007; Raassens, Wuyts, and Geyskens 2012). A number of important insights have been provided in all of these areas. However, the issue of precisely which mechanisms enhance supplier flexibility in NPD outsourcing has not been given sufficient attention.

Against this backdrop, this study examines the influence of organizational controls and knowledge integration mechanisms (KIMs) on supplier flexibility since they have been recognized in previous studies as mechanisms that enable cooperation and coordination respectively (e.g., De Luca and Atuahene-Gima, 2007; Tiwana and Keil, 2009). Organizations can exercise organizational controls to increase cooperation from suppliers as controls advance alignment of interests. Organizational controls refer to the mechanisms exercised by organizations to motivate their suppliers to align their interests with those of the outsourcing organizations (Das and Teng, 1998; Tiwana, 2008). Similarly, KIMs can help organizations to improve the efficacy of their coordination efforts through effective transfer of knowledge between them and suppliers (Cheung, Myers, and Mentzer, 2011; Tsai, Liao, and Hsu, 2015). KIMs refer to the processes and structures that facilitate knowledge sharing as they enable one party to capture, articulate, combine,

and exploit the varied knowledge and skills of other parties (Olson et al., 1995; Zahra et al., 2000). Therefore, the first research question examined in this study is: *Do organizational controls (outcome, behavior, clan) and KIMs enhance supplier flexibility?*

Further, increased flexibility from suppliers can help organizations to achieve their NPD project objectives in a timely manner as they can use supplier resources to respond to the changes in project requirements efficiently (Cannon and Homburg, 2001). This study focuses on the responsive behavior of suppliers, whereas previous research on the outcomes of supplier flexibility that involved behavioral aspects focused mostly on relational outcomes such as buyer satisfaction, relationship commitment, relationship quality, and trust in either industrial buyer–supplier relationships or channel relationships (e.g., Ivens 2005; Han, Sung, and Shim 2014). As such, empirical evidence on the effect of supplier flexibility on the NPD project performance remains limited. Therefore, the second research question investigated by this study is: *Does supplier flexibility influence NPD project performance?*

Investigating these two research questions provides fresh insights that make several contributions to the existing literature. First, by examining the effect of organizational controls and KIMs on supplier flexibility in NPD outsourcing, we can ascertain how organizations may be able to encourage flexible behavior in their suppliers. This is important since NPD projects are inherently knowledge-intensive and involve a high degree of ambiguity; they therefore require higher levels of cooperation and coordination with suppliers than is required in other types of project (Johnsen, 2009; Yan and Dooley, 2013). By providing a better understanding of this issue our study makes a

contribution to the NPD outsourcing literature and the literature on buyer–supplier relationships.

Second, this study contributes to the literature on supplier flexibility. While extant research on supplier flexibility provides useful insights regarding antecedents such as opportunism, market uncertainty, relationship-specific investments, and mutuality (e.g., Ivens 2005; Han, Sung, and Shim 2014), there has been limited research on the determinants of supplier flexibility that focus on cooperation and coordination in inter-organizational relationships. Also, by investigating the relationship between supplier flexibility and NPD project performance we can help to build a better understanding of how supplier flexibility can drive success in NPD outsourcing.

Third, most of the existing research on the effectiveness of organizational controls and KIMs has been limited to the management of in-house NPD projects, even though organizations quite often outsource their NPD activities (e.g., Tsai, Liao, and Hsu 2015; Sihag and Rijsdijk 2018). Therefore, this research also contributes to the literature on organizational controls and KIMs and their effectiveness. In particular, investigating the different effects that organizational controls and KIMs can have on supplier flexibility, and thus NPD project performance, enables us to provide a more nuanced view of their outcomes. Overall, our research provides new insights to practitioners as well as to scholars, and helps them to understand better the various managerial mechanisms that can be used in complex projects where development activities span organizational boundaries.

3.2 THEORETICAL BACKGROUND

3.2.1 Cooperation, Coordination, and Supplier Flexibility

A typical NPD outsourcing relationship involves a supplier developing a particular product component or technology that forms a part of the outsourcing organization's product, but occasionally it also includes the supplier delivering the complete product or technology (Carson, 2007; Lawson et al., 2015; Stanko and Calantone, 2011). Though, organizations (hereafter referred to as clients) outsource their NPD activities to suppliers because they can provide other skills or capabilities that are not available in-house, such differences can also lead to conflicts of interest (Das and Teng, 2001; Johansson et al., 2011). Because they have different objectives, suppliers are more likely to behave in ways that favor their own interests, rather than those of the client (Wallenburg and Schäffler, 2014), and they are therefore less likely to be flexible. Conflicts of interest between clients and suppliers then lead to problems of cooperation (Gulati et al., 2005).

NPD projects also involve high levels of knowledge sharing between clients and their suppliers (Lawson, Petersen, Cousins, and Handfield, 2009). Their different areas of knowledge along with the organizational boundaries between clients and suppliers, makes it difficult for them to share the tacit knowledge held by their employees and embedded in their routines (Johansson et al., 2011; Puranam and Gulati, 2008). Due to the lack of shared and accurate knowledge, the clients and suppliers do not fully understand each other's decision rules and how their actions are interlinked (Gulati et al., 2005; Schreiner, Kale, and Corsten, 2009). Clients therefore find it difficult to coordinate their actions with those of their suppliers and to make

effective decisions regarding how to deal with evolving NPD requirements. Clients therefore need to manage both cooperation and coordination problems in order to foster supplier flexibility.

The problems of cooperation and coordination are rooted in different paradigms. While cooperation problems arise as a result of the differing interests of the client and its suppliers, coordination problems are due to poor knowledge sharing between them (Gulati et al., 2005). Clients therefore need to use different mechanisms to resolve these two types of problem. For better cooperation they need mechanisms to align the suppliers' interests with their own, whereas for better coordination they need mechanisms to enable better knowledge sharing with suppliers. Drawing on organizational control theory and the knowledge-based view, we postulate that clients can stimulate supplier flexibility by using organizational controls to deal with cooperation problems and KIMs to tackle coordination issues.

3.3 HYPOTHESES DEVELOPMENT

3.3.1 Organizational Controls and Supplier Flexibility

Organizational control theory suggests that controls can help clients to manage cooperation problems with suppliers as controls facilitate the alignment of interests (Das and Teng, 2001; Tiwana and Keil, 2009). Organizational controls refer to the mechanisms used by a controller (in this case the client) to motivate its controllee (in this case the supplier) to behave in a manner consistent with the controller's objectives (Cardinal et al., 2010; Tiwana, 2008). Although control scholars have identified several types of organizational control, we focus on the three that have been investigated most

extensively and are thus conceptually well elaborated in the literature: outcome, behavior, and clan (Sihag and Rijsdijk, 2019). In this study, we postulate that a client's use of outcome, behavior, and clan control will resolve cooperation problems with its suppliers and thus enhance supplier flexibility.

Outcome control involves controllers specifying quantitative performance goals and monitoring, evaluating, and rewarding controllees' performance based on the extent to which they have achieved the specified goals (Cardinal, 2001; Turner and Makhija, 2006). In in-house NPD projects, controllers (i.e., project managers) generally specify performance outcomes such as project budget, cycle time, project goals, and deliverables to controllees (i.e., project team members) (Bonner et al., 2002). Such performance outcomes can also be specified by clients to their suppliers and then used to evaluate the suppliers' performance. The outcomes used by clients for development activities that span organizational boundaries are generally derived from the goals that determine the overall project performance (Gopal and Gosain, 2010; Tiwana and Keil, 2009). As a result, outcome control aligns the suppliers' goals with those of the clients. According to Chen, Meindl, and Meindl (1998), one actor will cooperate with another when their goals are positively related. As such, outcome control motivates suppliers to behave more cooperatively. Therefore, suppliers are more likely to show cooperative behaviors such as responding flexibly to clients' needs as goals are associated with the motives that underlie the intended behavior (Jap and Anderson, 2003; Mintzberg, 1983). Outcome control therefore ensures that suppliers identify with a client's requirements and respond in a manner that is in alignment with them.

Outcome control also facilitates cooperative behavior from suppliers because of its hands-off approach, and that further enhances supplier flexibility. It can be seen as hands-off in that it does not specify the type of process that needs to be followed to achieve the specified goals (Turner and Makhija, 2006). Once the client has stated the desired outcomes, suppliers are given substantial autonomy and creativity to select and follow their own procedures to achieve those outcomes (Stouthuysen et al., 2012; Wallenburg and Schäffler, 2014). This allows suppliers to deal efficiently with emerging project requirements, making them therefore more likely to accommodate new requirements from the client. The hands-off approach of outcome control is also perceived by suppliers as less obtrusive and therefore arouses less psychological resistance in them (Anderson and Oliver, 1987; Heide, Wathne, and Rokkan, 2007). Also, the use of outcome control is perceived by suppliers as a signal that their client considers them to be more trustworthy and competent because their behavior is not being closely monitored (Atuahene-Gima and Li, 2006; Kale, Singh, and Perlmutter, 2000). Suppliers are therefore less likely to indulge in opportunistic behaviors. Low levels of opportunism have been shown to be associated with high levels of supplier flexibility (Han et al., 2014). Since outcome control discourages opportunism and encourages flexible behavior from suppliers, we thus propose that:

H1: Outcome control is positively associated with supplier flexibility.

Behavior control can both promote and constrain supplier flexibility. We therefore develop competing hypotheses regarding how behavior control may affect supplier flexibility. Behavior control involves controllers setting out procedures and rules that controllees need to follow while doing their

assigned activities, and controllees are monitored, evaluated, and rewarded for their performance based on how well they have adhered to the prescribed procedures (Bonner et al., 2002; Tiwana and Keil, 2009). Behavior control in a NPD context can include specifying development methodology, rules, and procedures (Cooper, 2001; Tatikonda and Rosenthal, 2000). Scholars and practitioners have posited that prescribing a specific development methodology and procedures such as stage-gate processes, quality function deployment, and design for six sigma, which are analogous to behavior controls, helps in aligning different functional perspectives and interests, and that this leads to the completion of development activities (e.g., Cooper 2001; Bonner, Ruekert, and Walker 2002). We therefore extend this reasoning to the NPD outsourcing context and expect behavior control to have a similar effect in facilitating cooperation between clients and suppliers. In particular, using a standard development methodology and procedures gives structure and flow to the development activities (Tatikonda and Rosenthal, 2000). A structured environment helps suppliers to better understand both their role in a NPD project and the procedures that clients are using to evaluate the suppliers' performance (Aulakh and Gencturk, 2000; Carbonell and Rodriguez-Escudero, 2013). Therefore, the transparent nature of behavior control reinforces suppliers' beliefs that their role is integral to the project and helps them to feel that they are being treated fairly (Long, Bendersky, and Morrill, 2011). Consequently, suppliers are more likely to take ownership of clients' interests and engage in cooperative behaviors by being flexible in allowing adjustments in project requirements.

Behavior control also requires dynamic involvement from clients as they need to actively provide clear inputs to suppliers regarding the behaviors

required of them to ensure complete the various project activities (Aulakh and Gencturk, 2000). Such an active involvement from the client signals to supplier that the client is committed to the project (Nakos and Brouthers, 2008). Being actively involved in supplier's development activities also allows clients to deepen their understanding of various issues relating to a project (Choudhury and Sabherwal, 2003). The knowledge acquired not only helps clients to provide feedback that will enable suppliers to take corrective action, but also helps them to make decisions regarding trade-offs that can be made to deal with changes in project requirements (Smets, Langerak, and Tatikonda, 2016). Behavior control helps suppliers to cope better with uncertain requirements, because it enables any issues they face to be resolved more quickly by the client (Gopal and Gosain, 2010). Thus, behavior control is less likely to be perceived by suppliers as having been imposed by the client without any understanding of the suppliers' own needs and they are therefore likely to be more cooperative as a result. Behavior control therefore makes suppliers more effective at dealing with ambiguous and complex situations, and more flexible with regard to accepting changes to project requirements.

In contrast, some scholars have argued that imposing a standard methodology and procedures for development inhibits suppliers from using their own particular expertise (e.g., Bonner, Ruekert, and Walker 2002; Tiwana and Keil 2007). As noted earlier, NPD project requirements tend to evolve over the course of the project, and suppliers need creativity and independence to respond quickly to emerging problems (Carson, 2007). Thus, limiting their discretion to adjust the development procedures may lead to inertia in suppliers and increase the likelihood that they will be less willing

to accept the changes desired by clients (Sitkin, Sutcliffe, and Schroeder, 1994; Tiwana and Keil, 2007). Using standard procedures can also be perceived by a supplier as a sign that the client does not believe that it can complete the outsourced development activities without being given directions by the client. Further, the monitoring involved in behavior control can send a negative signal to a supplier that it is not completely trusted by the client (Tiwana, 2010; Wallenburg and Schäffler, 2014). Therefore, a client's use of behavior control can result in the supplier feeling circumscribed, and thus becoming unwilling to accept the changes required by the client.

In summary, these arguments suggest that behavior control can either promote or diminish supplier flexibility. Therefore, we put forward the following two competing hypotheses:

H2a: Behavior control is positively associated with supplier flexibility.

H2b: Behavior control is negatively associated with supplier flexibility.

In clan control, controllers employ mechanisms to motivate controllees to embrace common values, norms, and goals, and to behave in a manner that is in line with agreed-upon behaviors (Kirsch et al., 2010; Ouchi, 1979). Examples of such mechanisms in client–supplier relationships include social events, off-site meetings, and casual lunches or dinners (Choudhury and Sabherwal, 2003; Chua, Lim, Soh, and Sia, 2012). These socialization mechanisms facilitate the transmission of beliefs, values, and cultural norms between clients and suppliers and thereby make suppliers more cooperative

in meeting the client's goals' (Kirsch et al., 2002). In other words, clan control facilitates the internalization of values and norms between client and suppliers, making suppliers more dedicated and committed to achieving the project's objectives (Chua et al., 2012; Das and Teng, 2001). Internalizing these values and norms enables suppliers to respond flexibly to new requirements that emerge partway through the project, because the values and norms are clear to them (i.e., achieving project objectives), even though the situation is new (Lebas and Weigenstein, 1986). Also, clan control increases flexibility, because social interactions enable the parties involved to adapt mutually and make adjustments quickly when requirements evolve (Huang et al., 2014; Rijsdijk and van den Ende, 2011).

Clan control also helps to create a common understanding and language between clients and suppliers (Kirsch et al., 2002; Turner and Makhija, 2006). This then further enhances cooperative behavior from suppliers as it gives them a rich and broad implicit guide as to what the clients consider to be either acceptable or deviant behavior without formally monitoring their behaviors to ensure compliance (Aulakh and Gencturk, 2000; Kirsch et al., 2010). As a result, suppliers are intrinsically motivated and are committed to achieving the project objectives (Das and Teng, 2001; Kirsch, 2004); they are therefore more likely to respond flexibly to the client's requirements. As such, clan control helps to realize flexible behaviors from suppliers through cooperation.

Clan control also promotes mutual trust and interests through informal social interactions (Das and Teng, 1998; Kirsch, 2004). The increase in positive mutual expectations and interests motivates suppliers to become more committed to their partnerships with clients (Das and Teng,

2001). This encourages suppliers to openly identify issues and to share and discuss them with clients (Gopal and Gosain, 2010; Huang et al., 2014). Since NPD issues are then more likely to be identified, examined, and resolved, clan control also encourages suppliers to be more cooperative and respond more flexibly. Past research has also shown that mutual trust and interests between clients and suppliers lead to improved decision-making and on-time completion of NPD activities (Bstieler, 2006). All in all, by enabling cooperative behaviors from suppliers clan control plays a pivotal role in promoting supplier flexibility. We therefore hypothesize that:

H3: Clan control is positively associated with supplier flexibility.

3.3.2 KIMs and Supplier Flexibility

The knowledge-based view of the firm emphasizes that coordination problems can be resolved by using mechanisms such as KIMs that facilitate knowledge sharing (De Luca and Atuahene-Gima, 2007; Gulati et al., 2005). KIMs help different parties to synthesize, analyze, reconfigure, and integrate different types of knowledge among them (Olson et al., 1995). Specifically, KIMs are processes and structures – such as systematic information-sharing meetings, analysis of successful and failed projects, or project reviews – that enable one party to capture, articulate, combine, and exploit the varied knowledge and skills of other parties (De Luca and Atuahene-Gima, 2007). We posit that KIMs play a pivotal role in ensuring effective coordination between clients and suppliers as they enable knowledge to be transferred between them, thereby enhancing the flexibility of suppliers to accept new requirements that emerge during the project.

As new project requirements emerge, they need to be integrated into the development process so that development activities can be completed satisfactorily (Johnsen, 2009; Tatikonda and Rosenthal, 2000). KIMs facilitate the integration of new requirements into development activities as they allow both clients and suppliers to make better sense of the emerging requirements (De Luca and Atuahene-Gima, 2007; Takeishi, 2001). As a result, clients and their suppliers are more likely to make timely decisions about compromises that might need to be made in order to integrate new requirements into the development activities. Therefore, suppliers are more likely to be flexible in aligning their activities in order to integrate the new requirements.

NPD projects also involve the transfer of both codified and tacit knowledge for effective coordination and completion of development activities (Berggren, Bergek, Bengtsson, Söderlund, and Hobday, 2011). While codified knowledge can be easily articulated and transferred, tacit knowledge is not easily transferable or codifiable as it is sticky in nature and requires close observations and interactions (Berggren et al., 2011; Lawson et al., 2009). As such, the transfer of tacit knowledge affects a client's ability to coordinate the development activities and a supplier's ability to respond flexibly as the supplier do not fully understands the interdependencies among various development activities. KIMs facilitate transmission of tacit knowledge as they enable different parties to work together closely and exchange knowledge with each other (De Luca and Atuahene-Gima, 2007; Tsai et al., 2015). Suppliers are therefore better able to understand how the client's development activities are dependent on their own development activities and this encourages them to take the actions needed to fulfill the

client's new requirements. Thus, the use of KIMs facilitates better coordination between clients and suppliers, and promotes supplier flexibility.

KIMs allow different parties to openly discuss the various approaches that could be followed to solve various development problems that emerge during the course of an NPD project. They also provide a common platform for one party to give feedback to another and to analyze various project problems and mistakes (De Luca and Atuahene-Gima, 2007). In other words, KIMs enable the parties involved to learn from previous product development activities and exploit the knowledge acquired effectively in future product development (De Luca and Atuahene-Gima, 2007; Olson et al., 1995). Therefore, clients' use of KIMs will enhance coordinative and flexible behaviors from suppliers because problems can be openly identified, examined, and resolved. In summary, we expect KIMs to enhance supplier flexibility. Therefore, we hypothesize that:

H4: KIMs are positively associated with supplier flexibility.

3.3.3 Supplier Flexibility and NPD Project Performance

A key aspect of supplier flexibility is the supplier's willingness to accommodate changes in the client's requirements (Ivens, 2005). The more flexible a supplier is, the more willing it will be to let the client use its skills and competencies to deal with new project requirements (Narayanan and Narasimhan, 2014). A high level of supplier flexibility, in particular, suggests that a client can easily share its ideas and solve problems with its suppliers (Liao et al., 2010). For example, when a client wants to make changes to its NPD project requirements, it can communicate these easily to

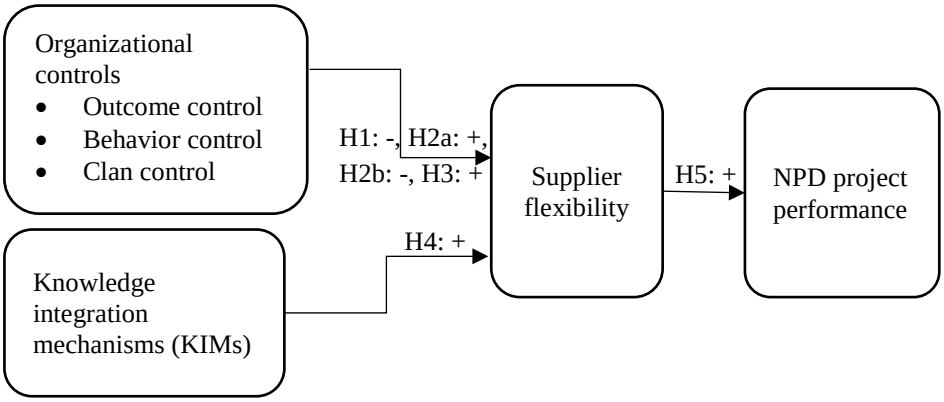
the supplier and explore possible ways of meeting the new requirements. As a result, both client and supplier use fewer resources to accommodate the new requirements and their remaining resources can be used to create better value – for example, finding more appropriate solutions to the new requirements in a timely manner. In essence, a higher level of supplier flexibility helps a client to achieve the desired project performance.

Past research has also shown that greater flexibility from suppliers helps in completing NPD projects within time and budget. For example, Narayanan and Narasimhan (2014) found that a higher level of flexibility from suppliers leads to increased performance in terms of speed of completion, adherence to budget, and quality achieved. This perspective is also supported by the resource-based view (RBV) of the firm, which argues that clients outsource their activities to access rare, valuable, inimitable, and non-substitutable complementary resources that they require to enhance their performance (Barney, 1991; Espino-Rodríguez and Padrón-Robaina, 2006). Supplier flexibility is a complementary resource that helps clients to respond efficiently to the new requirements in outsourced NPD activities. Based on the above arguments, we bring forward the following hypothesis:

> *H5: Supplier flexibility is positively associated with NPD project performance.*

Figure 3.1 shows the complete hypothesized model.

Figure 3.1. Theoretical model



3.4 METHODOLOGY

3.4.1 Sample and Data Collection

To test our hypotheses, we gathered data using a cross-sectional survey design. The sample for our study was drawn from the REACH (Review and Analysis of Companies in Holland) database. The database contains information of all the companies registered at the Chamber of Commerce in the Netherlands and provides industry, contact and other information (Wuyts, Rindfleisch, and Citrin, 2015). The coverage bias is therefore less likely to be an issue as there is less likelihood of some population segment missing out (Blair and Zinkhan, 2006).

The REACH database consists of information related to both clients and supplier organizations. The responses for the survey measures used in this study were only solicited from managers belonging to client organizations. We focused specifically on six research-intensive industries,

indicated below by their two-digit U.S. standard industrial classification (SIC) codes), because organizations in these industries are actively involved in intensive NPD: 28 (Chemicals and Allied Products), 30 (Rubber and Miscellaneous Plastic Products), 35 (Industrial and Commercial Machinery and Computer Equipment), 36 (Electronic and Other Electrical Devices and Components, except Computer Equipment), 37 (Transportation Equipment), 38 (Measuring, Analyzing and Controlling Instruments; Photographic, Medical and Optical Goods; Watches and Clocks Manufacturing). Within these six industries, we gathered contact details for 1502 organizations that had more than 50 employees.

Researchers approached the NPD managers in these organizations to ask them if they could think of a recently completed project that had been outsourced to a supplier. The outsourced projects had to be recent so as to prevent any survey recall issues. Of the 1502 organizations, 153 had outsourced their NPD projects and their managers agreed to participate in the survey. Of these 153 managers, 109 returned usable responses, resulting in a response rate of 71.24%. The respondents had an average tenure of 12.5 years within the client organization and the average project duration was 16 months. Following Carson (2007), we also made sure that the data did not include NPD outsourcing relationships where the client holds any equity in the supplier organization.

3.4.2 Measures

The survey constructs were developed after carefully examining the organizational controls and new product development literatures. The items

used for each construct were adapted from prior instruments. A seven-point Likert scale was used for all the multi-item constructs, and each item was measured on a scale from "strongly disagree" to "strongly agree". The face validity of the construct items was assessed by five management scholars who served as judges. The items were further refined and finalized based on a pilot study with six product development managers to ensure that all the items were understandable and clear. Finally, the questionnaire was administered to the full sample.

Previous studies on organizational controls have used different scales for the organizational controls. Drawing upon these studies, we compiled various items from mature scales to measure the three forms of organizational controls: outcome, behavior, and clan. The measure for *Outcome control* consists of seven items based on Atuahene-Gima and Li (2006), Bonner, Ruekert, and Walker (2002), Kirsch (1996), and Snell (1992b). The measures for *behavior control* are adapted from Bonner, Ruekert, and Walker (2002), Carson (2007), and Snell (1992b), and comprise six items. *Clan control* is a six-item measure, and is adapted from Kirsch (1996) and Kirsch et al. (2002). *KIMs* measures are adapted from De Luca and Atuahene-Gima (2007), and consists of five items. The measure for *supplier flexibility* consists of five items adapted from Bello and Gilliland (1997) and Gulati et al. (2005). *NPD project performance* is measured using five items that indicate the success of the project in relation to project objectives in terms of timing, budget, quality, technical performance, and general satisfaction. We consider NPD project performance to be a formative construct as it is a manifestation of the five measures not necessarily correlated with each other (Diamantopoulos and Winklhofer, 2001). These

perceptual measures are consistent with ones that have been used previously to measure the performance of NPD projects (Bonner et al., 2002; Lawson et al., 2015).

Five control variables were included in this study to ensure the robustness of the results since other variables can account for supplier flexibility and NPD project performance. Respondents were asked to provide information on these variables in the survey. The first set of control variables concerns project characteristics, namely *product component* and *supplier team members*. We included a dummy variable for product component, and measured it by asking respondents whether the 'product' under development was an independent product or a component of a larger system. A product that is a component of a larger system involves more complexity (Swink, Sandvig, and Mabert, 1996), and can therefore require frequent changes, that is, the supplier is required to be flexible more often. Product component can also influence project performance in NPD projects. Independent products usually require low product development management influencing development costs and time and also involve higher knowledge utilization that can lead to desired quality and technical performance (Sanchez and Mahoney, 1996; Ulrich and Eppinger, 2011). We controlled for supplier team members as having more people within the supplier team provides access to a larger pool of dedicated resources and that can potentially lead to higher project performance (Tiwana, 2008). Also, higher levels of supplier team members can lead to relatively higher knowledge exchange between clients and suppliers (Le Dain and Merminod, 2014). Suppliers therefore are able to understand clients' requirements with relative ease and can be more flexible to changes required by clients. Therefore, supplier team members

operationalized as the log transformation of supplier's number of employees involved in the outsourced NPD project.

The second set of control variables entails relationship characteristics, namely *geographic proximity*, *relationship duration*, and *previous projects*. We controlled for geographic proximity, because a supplier that is located closely to a client is likely to be more flexible (Cannon and Homburg, 2001). Geographic proximity also influences NPD performance due to the strong relational ties between clients and their suppliers (Ganesan et al., 2005). The two variables, relationship duration and prior projects, account for the relationship history between clients and its suppliers. The duration (in years) of a relationship - the number of years client has been working with the suppliers - can also influence the various behavioral aspects of a client–supplier relationship (Cannon and Homburg, 2001). Consequently, relationship duration may help explain the flexible behavior of suppliers. Also, clients and suppliers with a longer relationship are more likely to align their project-related activities and this therefore affects project performance (Tiwana, 2010; Wagner, 2012). Further, the number of projects a client and supplier have carried out together in the past can not only potentially facilitate development of trust and shared values (Carson, 2007), but also the level and speed of learning (Wagner, 2012). That can enhance flexible behavior in suppliers and hence performance of NPD projects. We therefore controlled for previous projects that the client and supplier have conducted in the past. Appendix 3.1 presents the constructs, along with the items and control variables used in this study. Table 3.1 provides the mean, standard deviations, and correlations of all the variables in this study.

3.4.3 Unidimensionality, Reliability, and Validity

We took several steps to assess the construct unidimensionality, reliability, and validity. First, each item was tested for robustness to ensure that the data was consistent with the assumptions of multivariate analyses (normal distribution and linearity). We examined the skewness and kurtosis values (i.e., absolute values of skewness below 2.0 and kurtosis below 7.0) for all observed items, and also measured the Mahalanobis distance to determine whether the data included possible outliers. The results showed that there was no significant outlier in the data. Given that NPD project performance is operationalized as a formative construct, we did not consider it for further analysis as traditional techniques are not suitable for assessing its reliability and validity.

Second, we conducted exploratory factor analysis (EFA) using maximum likelihood extraction with promax rotation to assess the unidimensionality of all the constructs. The analysis suggested that five factors underlie the data. We checked whether all the construct items loaded on to their designated construct factors with small cross-factor loadings. While factor loadings above 0.30 are considered to meet the minimum standard, factor loadings in the 0.40–0.50 range are preferable (Hair, Black, Babin, Anderson, and Tatham, 2006). We deleted two items for both outcome control and KIMs, and one item each for behavior control and supplier flexibility (see Appendix 3.1). The deleted items were ones that either loaded low on all of the five factors, and therefore did not represent any of those factors, or ones that loaded high (greater than 0.40) on multiple

factors, and therefore did not distinguish between the various factors (Hair et al., 2006). The five factors account for 70.4% of the total variance in the data.

Third, we further assessed the unidimensionality of all the constructs using confirmatory factor analysis (CFA). To perform CFA, we evaluated the measurement model using the maximum likelihood (ML) approach in AMOS 22. As seen in Appendix 3.1, the factor loadings of all the items on their intended latent construct is significant at $p < 0.001$, supporting convergent validity. The measurement model was evaluated using a number of fit indices that are not sensitive to sample size: the ratio of χ^2 to degrees of freedom; root mean square error of approximation (RMSEA); standardized root mean square residual (SRMR); incremental fit index (IFI); Tucker–Lewis index (TLI); and comparative fit index (CFI) (Hair et al., 2006; Schermelleh-Engel, Moosbrugger, and Müller, 2003). The CFA results suggest that the measurement model has an overall good fit (χ^2 /df = 1.27, RMSEA = 0.05, SRMR = 0.07, CFI = 0.96, IFI = 0.96, and TLI = 0.95).

We used Cronbach's alpha (α), composite reliability (CR), and average variance extracted (AVE) values to establish the reliability and convergent validity of a construct. All the constructs have Cronbach's alpha, CR, and AVE values above the desired levels of 0.70, 0.70, and 0.50 respectively, except for outcome control (Fornell and Larcker, 1981; Nunnally and Bernstein, 1994). While the AVE for outcome control (0.49) is below 0.50, it is still above the acceptable level of 0.40 (Menor, Kristal, and Rosenzweig, 2007). Also, the CR value for outcome control (.80) is above the threshold of 0.70, so we keep the outcome control construct in its current form.

We used the following two methods to demonstrate discriminant validity. First, we conducted chi-square difference tests for all the constructs in pairs to determine whether the restricted model (i.e., correlation fixed at 1) is significantly poorer than the freely estimated model (correlation estimated freely) (Bagozzi, Yi, and Phillips, 1991). The chi-square differences are significant for all the 10 pairs, suggesting that all constructs represent unique scales. Second, we compared the square root values of AVE with the inter-construct correlations. The square root of AVE values for each construct is greater than the corresponding correlations of each construct with other constructs, as seen in Table 3.1 (Fornell and Larcker, 1981). Taken together, the reliability, convergent, and discriminant validity tests indicate that the theoretical constructs exhibit acceptable psychometric properties.

Table 3.1. Descriptive Statistics and Correlations

		Mean (SD)	1	2	3	4	5	6	7	8	9	10	11	12
1	Outcome control	5.11 (0.94)	**0.698**	0.406**	0.302**	0.394**	0.293**	0.010	-0.124	0.042	-0.169	0.262*	0.031	0.066
2	Behavior control	3.25 (1.53)	0.410**	**0.852**	0.035	0.300**	0.103	0.102	0.050	-0.002	-0.208*	0.103	0.342**	0.000
3	Clan control	5.19 (1.03)	0.306**	0.041	**0.770**	0.264*	0.408**	0.373**	-0.059	0.003	0.129	-0.087	0.027	0.126
4	Knowledge integration mechanisms (KIMs)	3.63 (1.39)	0.398**	0.304**	0.268**	**0.771**	-0.004	0.131	-0.175	-0.012	-0.067	0.202*	0.010	-0.104
5	Supplier flexibility	5.03 (1.27)	0.297**	0.108	0.412**	0.002	**0.837**	0.336**	0.058	-0.148	-0.161	-0.227*	0.025	0.230*
6	NPD project performance	20.10 (3.87)	0.016	0.107	0.377**	0.136	0.340**	**NA**	-0.001	0.202	-0.025	-0.118	0.165	0.161
7	Geographic proximity	0.63 (0.48)	-0.117	0.056	-0.053	-0.168	0.064	0.005	**NA**	0.046	-0.088	-0.216*	0.032	0.085
8	Previous projects	5.97 (22.53)	0.048	0.004	0.009	-0.006	-0.141	0.207*	0.052	**NA**	0.346**	0.063	0.032	0.092
9	Relationship duration (years)	6.48 (6.37)	-0.162	-0.201*	0.134	-0.061	-0.154	-0.019	-0.081	0.350**	**NA**	-0.099	-0.193	-0.032
10	Supplier team members (log)	0.49 (0.30)	0.266**	0.108	-0.080	0.207*	-0.220*	-0.111	-0.209*	-0.057	-0.092	**NA**	0.013	0.066
11	Product component	0.35 (0.48)	0.037	0.346**	0.033	0.016	0.031	0.170	0.038	0.038	-0.186	0.019	**NA**	0.089
12	Software platform (marker variable)	0.46 (0.50)	0.072	.006	0.131	-0.097	0.235*	0.166	0.090	0.097	-0.026	0.072	0.094	**NA**

Note: sample size =109. The diagonal represents the average variances extracted. Items below the diagonal are the inter-construct correlations. Items above the diagonal are adjusted correlations for the potential common method bias. **Correlation is significant at the .01 level (two-tailed). *Correlation is significant at the 0.05 level (two-tailed). NA = Not applicable.

3.4.4 Potential Biases

Common method bias can be a potential issue when same survey respondent is used to collect data on independent and dependent variables (Podsakoff, Mackenzie, Lee, and Podsakoff, 2003). To address this issue, we first performed CFA using a single-factor approach. The fit for the single-factor model (χ^2/df = 1.82, RMSEA = 0.09, SRMR = 0.13, CFI = 0.88, IFI = 0.88, and TLI = 0.86) is considerably poorer than for the five-factor model (χ^2 /df = 1.27, RMSEA = 0.05, SRMR = 0.07, CFI = 0.96, IFI = 0.96, and TLI = 0.95), and the chi-square difference between these two models is significant ($\Delta\chi^2$ (3) = 121.84, $p < 0.001$), indicating that the measures do not suffer from the common method bias. Second, we used a marker variable (MV) test (Lindell and Whitney, 2001). In the questionnaire, the construct software platform (see Appendix 3.1) was included as an MV because it is theoretically unrelated to the controls and KIMs variables (Tiwana, 2008). We computed the adjusted construct correlations for all the variables and their statistical significance using the lowest positive correlation (r = 0.006) between the MV and other variables. Table 3.1 shows that all correlations did not change substantially for the predictor variables after the adjustment. These results provide reassuring evidence that the results of this study are not strongly influenced by common method bias.

We also checked for the potential multicollinearity issues. As per Mason and Perrault's (1991) recommendation, each independent variable was regressed on the other independent variable to detect linear relationships between them. None of the R-square values between the independent variables exceeded the R-square value of the overall model, indicating that

multicollinearity is not an issue. Further, the maximum variance inflation factor (VIF) score of 1.7 is much lower than the recommended value of 10 (O'Brien, 2007), suggesting that multicollinearity is not a major issue in this study.

3.5 ANALYSIS AND RESULTS

The hypothesized relationships as shown in Figure 3.1 were tested by performing path analysis using co-variance-based structural equation modelling (SEM) with maximum likelihood (ML) estimation in AMOS. We used the SEM approach because it is better than the common regression analysis approach for testing indirect relationships between different constructs, especially for sample sizes of less than 200 (Iacobucci, Saldanha, and Deng, 2007). The path analysis was performed using the bootstrapping option. Bootstrapping is a nonparametric statistical method that repeatedly samples from the available dataset with replacement and is particularly useful for small samples as it helps to avoid the problems caused by asymmetric and non-normal sampling distributions (Preacher and Hayes, 2004). The number of resamples for the estimation of bias-corrected bootstrap intervals was set at 5,000 and the level of confidence intervals at 95%. For the path analysis, a single indicator was used for each of the constructs as this minimizes the variance shared by the indicator of each construct and therefore reduces the effect of sampling error on the parameter estimates (Landis, Beal, and Tesluk, 2000).

Before testing the hypotheses, we empirically tested the various alternative nested models to ensure that we were using the right model to

analyze the hypothesized relationships (Iacobucci et al., 2007). The model with both the hypothesized relationships and the direct links from organizational controls and KIMs to NPD project performance was therefore compared with the full mediation model and the model with direct effects only. The full mediation model included direct paths from the three organizational controls (outcome, behavior, clan) and KIMs to supplier flexibility, and from supplier flexibility to NPD project performance. In the direct effects model, organizational controls and KIMs are directly related to NPD project performance.

Table 3.2. Fit Statistics for Alternative Models

Model fit criterion	Full model with direct and indirect effects	Full mediation model with supplier flexibility as mediator	Direct effects only model (model without supplier flexibility)
χ^2	29.542	45.145	72.594
df	27	31	32
RMSEA	0.03	0.07	0.11
SRMR	0.07	0.08	0.10
IFI	0.99	0.92	0.77
TLI	0.97	0.84	0.55
CFI	0.98	0.91	0.74
Chi-square difference (compared to full model)	-	15.60^{**}	43.05^{***}

Notes: $^{*}p < 0.05; ^{**}p < 0.01; ^{***}p < 0.001$

As shown in Table 3.2, the fit indices and chi-square differences clearly indicate that the full model (with direct and indirect effects) is better than the full mediation model ($\Delta\chi^2$ (4) = 15.60, $p < 0.01$) and the direct effects model

($\Delta\chi^2$ (5) = 43.05, p < 0.001). Taken together, the results suggest that the full model fits the data very well.

To address the potential endogeneity issue, the errors terms of the mediator (supplier flexibility) and the dependent variable (NPD project performance) were allowed to co-vary in the full model, as suggested by Antonakis et al. (2010). The model fit (χ^2= 29.542, df = 27, RMSEA = 0.040, SRMR = 0.07, CFI = 0.98, IFI = 0.98, and TLI = 0.95) did not change compared to the full model. Also, the correlation estimate between the error terms of supplier flexibility and NPD project performance was non-significant. These results indicate that endogeneity does not undermine the structural path estimates presented in Table 3.3.

3.5.1 Hypothesized Effects Results

In Table 3.3 we present the path estimates for the hypothesized relationships. H1 positively links outcome control to supplier flexibility. The path estimate for this path is significant (β = 0.266, p < .01). H1 is thus supported. Our results do not support either H2a or H2b, as the estimate for the path leading to supplier flexibility from behavior control is not significant (β = 0.032, n.s.). In H3 we hypothesize that clan control is positively associated with supplier flexibility. The results show that the path estimate is positively significant (β = 0.373, p < .001), and hence support H3.

H4 predicts that KIMs are positively associated with supplier flexibility. We do not find support for H4 as, contrary to our hypothesis, the estimate for the path between KIMs and supplier flexibility path is negative and also not significant (β = -0.167, n.s.). The estimate for the path between

supplier flexibility and NPD project performance is significant and in the expected direction ($\beta = 0.315$, $p < 0.01$). H5 is therefore supported.

Table 3.3. Path Analysis: Standardized Parameter Estimates

	Standardized coefficient	Proposed effect	Result
Hypothesized Relationships			
H1: Outcome control → supplier flexibility	0.266**	Positive	Positive
H2a,b: Behavior control → supplier flexibility	0.032	Positive or Negative	Non-significant
H3: Clan control → supplier flexibility	0.373***	Positive	Positive
H4: KIMs → supplier flexibility	-0.167	Positive	Non-significant
H5: Supplier flexibility → NPD project performance	0.315**	Positive	Positive
Outcome control → NPD project performance	-0.260*		
Behavior control → NPD project performance	0.074		
Clan control → NPD project performance	0.308**		
KIMs → NPD project performance	0.118		
Control Relationships			
Geographic proximity → supplier flexibility	0.027		
Previous projects → supplier flexibility	-0.090		
Relationship duration → supplier flexibility	-0.152†		
Supplier team members → supplier flexibility	-0.237*		
Product component → supplier flexibility	-0.022		
Geographic proximity → NPD project performance	-0.038		
Previous projects → NPD project performance	0.271*		
Relationship duration → NPD project performance	-0.110		
Supplier team members → NPD project performance	0.014		
Product component → NPD project performance	0.102		
Variance explained (R^2) Supplier flexibility	0.370		
Variance explained (R^2) NPD project performance	0.321		

Notes: *p < 0.05; **p < 0.01; ***p < 0.001 (all two-tailed test). Significance levels are based on bootstrapped, bias-corrected confidence intervals.

3.5.2 Post-hoc Analyses: Mediation Effects

To gain additional insights, post-hoc analyses were conducted to investigate whether supplier flexibility mediates the relationship of the three controls (outcome, behavior, and clan) and KIMs with NPD project performance. Table 3.4 presents the detailed standardized coefficient estimates for the total, direct, and indirect effects computed for the mediation analysis. As seen in Table 3.4, the results suggest that the estimate for the path leading from outcome control to NPD project performance is significant but negative (β = -0.260, $p < 0.05$). Given the positive zero-order correlation between outcome control and NPD project performance (see Table 3.1), we conducted some further analysis which revealed that outcome control is a suppressed variable in relation to NPD project performance (see Appendix 3.2 for details). A statistical model should account for the suppression effect as it advances theoretical development because without the suppressor variable the relationship between an independent and a dependent variable may be smaller or may be of opposite signs (Cheung and Lau, 2008; Maassen and Bakker, 2001). Therefore, to interpret the results, one should combine the effects of both the suppressor variable and the suppressed variable (Cheung and Lau, 2008). Since outcome control is a suppressed variable, the model without other predictors of NPD project performance underestimates the direct negative effect of outcome control on NPD project performance. Thus, by including behavior control, clan control, KIMs, and supplier flexibility in our model, we get a more accurate path estimate for direct effect of outcome control on NPD project performance. The results shown in Table 3.4 further demonstrate that the indirect effect of outcome control on NPD project

performance is significant but positive ($\beta = 0.084$, $p < 0.01$). As such, the total effect between outcome control and NPD project performance is not significant. The results therefore imply that there is competitive mediation (or inconsistent mediation) in the relationship between outcome control and NPD project performance. Competitive mediation exists when an independent variable has both direct and indirect effects on a dependent variable, but these effects have opposite signs; this may result in an overall non-significant effect between the two variables (Zhao, Lynch, and Chen, 2010). Thus, supplier flexibility mediates the relationship between outcome control and NPD project performance.

As seen in Table 3.4, the direct and indirect effects of behavior control on project performance are not significant. Supplier flexibility therefore does not mediate the relationship between behavior control and NPD project performance. Concerning clan control, the analysis demonstrates that the path estimates for the direct ($\beta = 0.308$, $p < 0.01$) and indirect ($\beta = 0.118$, $p < 0.01$) effects of clan control on NPD project performance are positive and significant. As such, supplier flexibility mediates the relationship between clan control and NPD project performance. The direct effect of KIMs on NPD project performance is not significant ($\beta = 0.118$, n.s.). In contrast, the indirect effect of KIMs on project performance through supplier flexibility is negative and significant ($\beta = -0.053$, $p < 0.05$), suggesting an indirect-only mediation (Zhao et al., 2010).

Table 3.4. Standardized Direct and Indirect Effects (Bootstrapping two-tailed test)

	Total Effect	LL 95% CI	UL 95% CI	Direct Effect	LL 95% CI	UL 95% CI	Indirect Effect Through Supplier Flexibility	LL 95% CI	UL 95% CI
Outcome control → NPD project performance	-0.176	-0.365	0.088	-0.260*	-0.453	-0.013	0.084**	0.028	0.205
Behavior control → NPD project performance	0.084	-0.139	0.295	0.074	-0.145	0.281	0.010	-0.045	0.072
Clan control → NPD project performance	0.426***	0.244	0.625	0.308**	0.094	0.522	0.118**	0.039	0.262
KIMs → NPD project performance	0.066	-0.145	0.238	0.118	-0.084	0.290	-0.053*	-0.159	-0.002

Notes: *p < 0.05;**p < 0.01; ***p < 0.001 (all two-tailed test). LL = Lower Limit, UL = Upper Limit

3.6 DISCUSSION

Organizations increasingly regard outsourcing of NPD activities to suppliers as a strategic means of improving NPD project performance. The overarching objective of this study was to provide new insights regarding supplier flexibility in NPD outsourcing. This study investigated organizational controls and KIMs as the mechanisms that clients can leverage to generate more flexible behavior from suppliers, enabling them to resolve cooperation and coordination issues and thus achieve better NPD project performance. Our empirical analysis of survey data from 109 NPD projects that involved outsourcing shows that outcome and clan control stimulate supplier flexibility, leading to higher NPD project performance, but that the use of behavior control and KIMs does not enhance supplier flexibility. Post-hoc analyses reveal that supplier flexibility mediates the relationship of outcome and clan control to NPD project performance and that KIMs have an indirect effect on NPD project performance via supplier flexibility. On the whole, this research makes significant contributions to the literature and also has implications for the practice.

3.6.1 Theoretical Implications

This study makes three important contributions to the literature. The first key contribution is that it reveals the direct effects of organizational control on supplier flexibility in NPD outsourcing. The results show that, while outcome and clan control are effective in increasing the willingness of suppliers to behave flexibly, behavior control is not. Our results are therefore not in line with those of traditional control research, where scholars often

advocate using one form of control in a particular context (e.g., Eisenhardt, 1985; Ouchi, 1979). The differences in how outcome and clan control affect supplier flexibility relative to behavior control may also be explained by the fact that outcome and clan control allow suppliers to select their own methods and procedures to complete the outsourced activities. In contrast, behavior control can restrict suppliers from using their own specific knowledge, preventing them from responding quickly to the changes required by clients (Carbonell and Rodriguez-Escudero, 2013; Tiwana and Keil, 2007). Suppliers are therefore less willing to respond to changes in the clients' requirements. However, since our results indicate that behavior control does not influence the supplier flexibility, the dysfunctional effects of behavior control are probably offset by its positive influence and this is an area that warrants further investigation.

The finding that behavior control does not enhance supplier flexibility also supports the previous observation of Sihag and Rijsdijk (2019) that this form of control is not effective in NPD tasks because of the high levels of complexity involved in such tasks. This finding is interesting in that it runs counter to the notion found in the literature that using a structured procedure is helpful when dealing with unpredictable requirements (Gopal and Gosain, 2010; Tatikonda and Rosenthal, 2000). One plausible explanation could be that using behavior control is beneficial for alignment of interests only when the control sets the boundary conditions for how outsourced NPD activities should be carried out. However, behavior control does little or nothing to enhance supplier flexibility if it becomes too explicit in defining the procedures that suppliers have to follow when undertaking those activities. Overall, we encourage future research to focus

on developing a more detailed understanding of how behavior control functions in NPD outsourcing by examining the degree of specifying rules and procedures moderates the effects of behavior control on performance.

The second key contribution of our study is that it provides insights into the relationship between KIMs and supplier flexibility in NPD outsourcing. However, contrary to our prediction, we find that KIMs do not foster supplier flexibility. The fact that KIMs appeared to have little or no influence might be due to differences in perception between clients and suppliers (Chen et al., 2016). For instance, a client may feel that the project requirements need to change and use KIMs to communicate that fact. The supplier, however, sees no need for these changes, and therefore interprets the use of KIMs as a sign that the client does not trust it as a supplier and is looking to analyze something which it, the supplier, has done wrong. In these circumstances the use of KIMs by a client will not encourage a supplier to be more flexible.

Previous research has shown that in situations where there is a high level of variability, communication mechanisms between buyers and suppliers are often not effective because the two parties have different perceptions of these mechanisms and the purpose behind them (Oosterhuis et al., 2011; Yan and Dooley, 2013). However, our results do not dispute the fact that mechanisms that facilitate knowledge sharing between clients and suppliers are important. Rather, our results appear to call into question the claim that using knowledge-sharing mechanisms will readily improve performance in inter-organizational relationships. This may or may not be the case, depending on how suppliers perceive the use of such mechanisms.

Future research therefore needs to examine in depth the role of KIMs in NPD outsourcing.

The third key contribution of this study is that it elucidates the role of supplier flexibility in NPD outsourcing. Our results support the assertion that flexible behavior from suppliers helps clients to achieve higher performance (Liao et al., 2010; Narayanan and Narasimhan, 2014). Our post-hoc analyses provide further insights into the role of supplier flexibility in NPD outsourcing. The analyses suggest that supplier flexibility mediates the effectiveness of outcome and clan control, but does not mediate the relationship between behavior control and NPD project performance. Specifically, the analyses show that both outcome and clan control enhance project performance through their effect on supplier flexibility. The post-hoc analyses also demonstrate that KIMs indirectly diminish NPD project performance via supplier flexibility. Supplier flexibility is therefore one of the most important elements in the relationship between clients and suppliers in NPD outsourcing, and plays a critical role in the success of NPD projects.

Our post-hoc analyses also reveal that clan control also has direct positive effects on NPD project performance. A plausible explanation for this positive effect is that clan control helps to create close channels between clients and suppliers for sharing interpersonal information. Having many bi-directional information-sharing channels has been found to make suppliers more committed to the relationship, so that they become more intrinsically motivated to maintain it (Anderson and Weitz, 1992). With regard to outcome control, the post-hoc analyses show that this form of control is a double-edged sword; while it can benefit performance indirectly by encouraging supplier flexibility, it can also have a direct adverse effect on

performance. Although the finding that outcome control diminishes NPD project performance needs further investigation because of the negative suppression effects, it provides support for the agency theory assertion that rewarding controllees (i.e., suppliers) based on performance outcomes in settings that involve variability (NPD projects in this case) transfers risk to them because achieving those outcomes is dependent on their actions (Eisenhardt, 1989). As controllees are risk-averse, they behave opportunistically and that has a negative effect on performance. Collectively, this study's findings complement the contemporary work on controls which suggests that each type of organizational control works in a different way (e.g., Cardinal et al., 2010; Turner and Makhija, 2006).

3.6.2 Managerial Implications

This study has a number of managerial implications. Managers should recognize that not all mechanisms can be used to promote supplier flexibility. They need to understand that exercising behavior controls may not pay off in NPD outsourcing settings, as their prescriptive nature may not give suppliers sufficient flexibility. Managers should also exercise caution when using KIMs as these mechanisms can result in lower NPD project performance by adversely effecting supplier flexibility.

To promote flexible behavior from suppliers, managers should focus particularly on using outcome and clan control. To achieve greater success, they should prioritize clan control as this not only leads to higher NPD project performance by making suppliers behave flexibly but also has other positive effects on performance because it helps in developing a common

vision and spirit, both of which are central to the functioning of inter-organizational relationships (Chua et al., 2012; Liu, 2015). By contrast, the fact that outcome control can have both beneficial and detrimental effects on the NPD project performance raises the question of how to exercise this form of control effectively. Managers thus need to think carefully before using this form of control. They should not only analyze the potential benefits but also consider the challenges involved. For example, they should take care not to specify outcomes that involve factors beyond the control of suppliers, as this can then transfer undue risk to the suppliers. Risk of this kind can lead to suppliers to behave opportunistically, thereby making the outcome control less effective (Wallenburg and Schäffler, 2014). However, specifying outcomes that are achievable and allowing open discussion of any outcomes that are beyond the suppliers' control can help in ensuring NPD projects are completed successfully. Managers should therefore assess the risks associated with achieving each of the specified outcomes. Overall, since supplier flexibility is such an important element of the NPD outsourcing relationship and critical to the successful completion of projects, managers should take all the steps needed to foster flexibility in their suppliers.

3.7 LIMITATIONS AND FUTURE RESEARCH

This research has limitations that should be taken into account when interpreting the research findings and identifying areas for future research. The first limitation is that the data used in this study is cross-sectional. Cross-sectional data limits the ability to draw conclusions regarding causality. Therefore, future studies should include alternative types of data, such as

longitudinal or experimental data that allow scholars to examine the causal effect of organizational controls and KIMs on the project performance over the course of the project. The second limitation of this study is that it uses self-reported data collected from a single respondent from each client organization. While common method bias is not regarded as a serious concern when using CFA techniques, the possibility of some common method bias affecting the research findings cannot be ruled out. It would be fruitful for future studies to collect data from multiple respondents from each client organization. In addition, future research could use additional sources to measure the dependent variable in order to minimize the potential impact of common method bias. The third and final limitation of our study is the small sample size, although this similar to other studies at the project level (e.g., Tiwana and Keil 2009; Liu 2015), as large sample sizes are difficult to obtain at this level.

CHAPTER 4

Supplier Compliance or Motivation? A Self-Determination Theory Perspective of Organizational Controls in New Product Development Outsourcing

ABSTRACT

Organizations outsource new product development (NPD) tasks to benefit from the idiosyncratic expertise of suppliers. To effectively leverage suppliers' expertise, organizations use various forms of organizational control. Controls can either trigger compliance or prompt intrinsic motivation. Building on self-determination theory (SDT), this study examines the influence of outcome, behavior, and clan control on supplier mechanical compliance and intrinsic motivation. An empirical investigation based on the survey data from 114 suppliers involved in NPD outsourcing shows that outcome control promotes mechanical compliance as it discourages a supplier from utilizing its own idiosyncratic knowledge sometimes, but behavior control does not induce mechanical compliance. We also find that mechanical compliance can be attenuated by exercising clan control. The findings further reveal that using outcome and behavior control does not undermine the intrinsic motivation to perform the outsourced NPD tasks, whereas clan control stimulates intrinsic motivation. Finally, post-hoc analyses indicate that supplier mechanical compliance is critical to understand the relationship of outcome and clan controls with project performance in NPD outsourcing. The NPD project performance is curtailed by outcome control via supplier mechanical compliance, but clan control improves NPD project performance by curtailing mechanical compliance. Overall, the study improves our understanding of the behavioral consequences of controls.

4.1 INTRODUCTION

NPD outsourcing helps organizations to gain access to the complementary specialized knowledge of suppliers (Carson, 2007; Quinn, 2000). In NPD outsourcing, suppliers are usually required to develop a particular component of a product or technology that underlies the component of the outsourcing organization's product, but at times they are also needed to deliver the complete product or technology (Carson, 2007; Lawson et al., 2015; Stanko and Calantone, 2011). The idiosyncratic expertise of suppliers, such as innovative capabilities, engineering skills, technological knowledge, help them to perform the outsourced NPD tasks (Carson, 2007; Stanko and Calantone, 2011). Suppliers that are also intrinsically motivated are better able to perform the outsourced tasks because intrinsic motivation enhances creative behavior and problem-solving capabilities and that are necessary as well for the completion of NPD tasks (Amabile, 1997; Burroughs et al., 2011). Therefore, a lack of use of idiosyncratic expertise by suppliers and their lower intrinsic motivation can greatly impact the completion of outsourced tasks (Carson, 2007; Tiwana and Keil, 2007).

Research has shown that organizations can use organizational controls to direct and motivate suppliers to behave in a desired manner (Carson, 2007; Sihag and Rijsdijk, 2019). Scholars have, however, made implicit observations in prior research that controls can induce varied behavioral responses in external partners, especially the ones that differ from those that are desirable. For example, Tiwana and Keil (2007) have noted that a client's use of explicit procedures in outsourced projects could sometimes lead its suppliers to dutifully follow the specified procedures and discourage them from effectively applying their idiosyncratic expertise due

to fear of non-compliance. Further, Grewal et al. (2013) observed that the use of controls by a subsidiary of multinational corporation can also inhibit foreign distributor's motivation to perform the outsourced tasks. Extrapolating these observations to NPD outsourcing makes things even more complicated considering that organizations outsource their tasks to leverage suppliers' idiosyncratic expertise and also need their suppliers to be intrinsically motivated to perform the outsourced NPD tasks (Carson, 2007; Tiwana and Keil, 2007). Organizational controls in NPD outsourcing therefore could also lead to behaviors that differ from those needed for completion of outsourced NPD tasks, which partially explains why organizations that outsource their NPD tasks sometimes fail short of inducing desired behaviors. Scholars and practitioners therefore need to understand the relationship of organizational controls with their behavioral consequences for effective governance of outsourced NPD tasks. In particular, there is a need to examine whether organizational controls in NPD outsourcing can influence a supplier to adhere to the specified prescriptions such that it sometimes does not use its own idiosyncratic expertise, and also restrict the intrinsic motivation of the supplier.

To address this knowledge gap, this study examines the following research question: *what are the effects of various organizational controls on supplier mechanical compliance and intrinsic motivation?* Supplier mechanical compliance refers the extent to which a supplier sometimes adheres to specified prescriptions without using its own idiosyncratic expertise and effective way of working, whereas intrinsic motivation refers to the intent of a supplier to perform a task in order to experience satisfaction and enjoyment inherent in the task (Tiwana and Keil, 2007; Van Yperen and

Hagedoorn, 2003). Our definition of supplier mechanical compliance is distinct from the term supplier compliance discussed in the extant inter-organizational literature. While supplier compliance describes a supplier's adherence to the prescriptions specified by the outsourcing organization (B. Jiang, 2009; Payan and McFarland, 2005), supplier mechanical compliance encompasses the notion that a supplier sometimes can become reluctant to use its own idiosyncratic expertise and the most effective way of working so as to comply with outsourcing organization's prescriptions (Tiwana and Keil, 2007).

Researchers have generally recommended that to better understand the behavioral implication of controls, one should take into account the perspective of those on whom the controls are exercised (Long et al., 2011; Long and Sitkin, 2018). This perspective would help scholars to better understand how those that are subjected to controls perceive the controls they encounter and stimulate their behavioral responses, such as compliance and intrinsic motivation, to them (Korsgaard et al., 2010; Long, 2010; Weibel, 2010). As such, the aforementioned research question is therefore examined from suppliers' perspective.

This study uses SDT as the theoretical lens to explain how organizational controls can influence supplier mechanical compliance and intrinsic motivation. SDT explains the different regulatory processes that underlie the mechanisms that influence extrinsic and intrinsic motivation (Gagné and Deci, 2005; Ryan and Deci, 2000b). Specifically, SDT specifies that the regulatory processes range from passive compliance based on the avoidance of non-compliance to external prescriptions (extrinsic motivation) to active commitment based on the inherent enjoyment and interest (intrinsic

motivation) (Ryan and Deci, 2000b). SDT details the different factors that promote or reduce compliance and intrinsic motivation (Deci and Ryan, 2002; Ryan, 1995). Using SDT, this study explains how controls that involve adherence with explicit outcomes and procedures emphasize compliance, but diminish intrinsic motivation. In contrast, controls that involve internalization of values, beliefs and norms reduce mechanical compliance, but increases intrinsic motivation.

This study makes several contributions. First, this study contributes to the controls literature by applying SDT and empirically revealing the effects of various organizational controls on supplier mechanical compliance and intrinsic motivation. In doing so, the study extends the body of research on controls in inter-organizational context and NPD tasks as that has mostly focused either on the effectiveness of controls in the outsourcing context or in-house NPD projects (Sihag and Rijsdijk, 2019). Second, our study complements and extends the controls research that has looked at behavioral responses to controls in intra-organizational settings (e.g., Boss et al., 2009; Ramaswami, 1996). Although this research provides important empirical insights (e.g., Boss et al., 2009; Ramaswami, 1996), but it does not capture the characteristics of an inter-organizational setting that involves weaker managerial authority (Choudhury and Sabherwal, 2003). Due to relatively weak managerial authority, a supplier, unlike an employee in an organization, has relatively more discretion of not following the measures and procedures specified by the outsourcing organization.

4.2 THEORETICAL BACKGROUND

4.2.1 Organizational Controls

Organizational controls refer to the process that can be applied by a controller (i.e., one who exercises control) to align a controllee's (i.e., one over whom the control is exercised) behaviors with its own interests (Sihag and Rijsdijk, 2019; Turner and Makhija, 2006). In outsourcing, the controller is usually the outsourcing organization (henceforth as clients) and the controllee is the supplier that is responsible for performing the outsourced tasks (Tiwana, 2008; Tiwana and Keil, 2007). The extant research on organizational controls that is based on Ouchi's (1979, 1980) seminal work has examined fundamentally three different controls: *outcome, behavior*, and *clan.* Outcome control involves a controller evaluating a controllee based on achievement of specified outputs (Tiwana and Keil, 2007; Turner and Makhija, 2006). Behavior control involves a controller assessing a controllee based on adherence to specified procedures (Cardinal, 2001; Turner and Makhija, 2006). Despite the differences in the ways in which controllees are evaluated in outcome and behavior controls, both of them direct behaviors by evaluating adherence with documented measures. In contrast, clan control involves a controller using socialization mechanisms to promulgate desired behaviors among controllees. Clan control operates through development of shared norms, values, and beliefs (Kirsch et al., 2010; Turner and Makhija, 2006).

Controls can differ along various dimensions, such as formality, target, motivation, and informational and social prerequisites (Cardinal et al., 2010; Korsgaard et al., 2010; Tiwana and Keil, 2009). This study builds on

the motivational dimension to conceptualize the behavioral mechanisms that underlie various controls. Research and theory suggest that various controls operate through distinct motivational mechanisms to facilitate cooperative behavior (Korsgaard et al., 2010; Weibel, 2010). While controls that involve external contingency mechanisms emphasize adherence with explicit outputs and procedures, controls that involve social influence mechanisms emphasize internalization of values, norms, and beliefs (Cardinal et al., 2004; Korsgaard et al., 2010). As such, outcome and behavior controls facilitate cooperative behavior based on extrinsically motivated behavior through compliance with external regulations and clan control based on intrinsic motivation due to internalization of values, norms, and beliefs (Korsgaard et al., 2010; Weibel, 2007, 2010). Next, we define the compliance and intrinsic motivation constructs used in the study.

4.2.2 Supplier Mechanical Compliance and Intrinsic Motivation

In outsourcing, a supplier sometimes might pursue compliance to specified measures in a mechanistic manner. That is, a supplier might follow a client's prescriptions even though the prescribed measures and rules does not completely fit with the thinking and how it usually does its work. To represent this view of compliance, we use the term *supplier mechanical compliance* and conceptualize it as the extent to which a supplier sometimes adheres to a client's prescriptions without using its own idiosyncratic expertise and effective way of working (Tiwana and Keil, 2007). This definition differs from the concept of compliance discussed in the extant literature. Compliance has been defined as one actor following the

instructions of the other actor (e.g., O'Reilly and Chatman, 1986; Payan and McFarland, 2005).

Studies that have focused on compliance in intra-organizational context have used the term "obedience to authority" based on Milgram's (1974) work (e.g., Brief et al., 2000; Krackow and Blass, 1995). Obedience to authority is defined as an individual doing what it's being told to do by a managerial authority (Blass, 1999). Further, in the control literature, Boss et al. (2009) have discussed the notion of compliance by employing the concept of 'mandatoriness', which refers to the extent to which an individual perceives that conformance with policies and procedures that are specified by the organizational management is necessary. The individual follows the specified policies and procedures because of the perceived managerial authority of organizational management (Boss et al., 2009). We, however, believe the terms "obedience", "authority", and "mandatoriness" do not fully represent our notion of compliance for several reasons. First, there is relatively less direct managerial authority that exists in an outsourcing context because suppliers are generally not direct employees of clients (Choudhury and Sabherwal, 2003). Therefore, unlike an employee in an organization, a supplier has relatively higher discretion of not obediently following the policies and procedures specified by the client. Second, the organizational separation between the client and supplier can make the monitoring of specified outcomes and procedures relatively difficult. Therefore, the supplier's perception related to the conformance with policies and procedures is necessary may be lower.

Intrinsic motivation refers to the intent of carrying out a task to experience the satisfaction and enjoyment that are integral to the task (Ryan

and Deci, 2000a; Van Yperen and Hagedoorn, 2003). The construct intrinsic motivation has been largely researched at the individual level. In this study, we examine the intrinsic motivation of a supplier and that refers to the intent of a supplier to perform a task in order to experience satisfaction and enjoyment inherent in the task. Morgeson and Hofmann (1999) assert that the constructs that have different structures (i.e., at different levels) can perform similar functions. They define function as "the causal outputs or effects of a given construct" (Morgeson and Hofmann, 1999, pg. 254). Therefore, the intrinsic motivation construct in this study at organizational level (i.e., supplier) serves the same function as the intrinsic motivation construct at an individual level. That is because, just like an individual's intrinsic motivation, the supplier's intrinsic motivation captures the willingness of a supplier to perform a task in order to experience satisfaction and enjoyment inherent in the task. Therefore, even though the structure of the intrinsic motivation of a supplier in our study is different from the structure of the intrinsic motivation of an individual, both of them serve the same function.

4.2.3 Self-Determination Theory

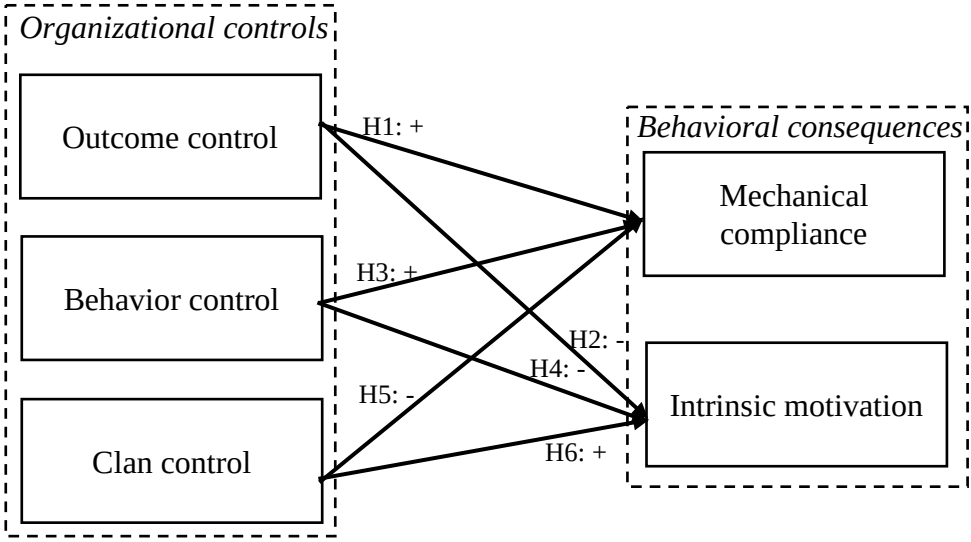
SDT postulates that behaviors can be motivated either through external regulation or through internalization of values (Gagné and Deci, 2005; Ryan and Deci, 2000b). While mechanisms that involve satisfying an external contingency motivates compliance, whereas mechanisms that focus on internalization of values enhance intrinsic motivation. Further, SDT recognizes three factors that play a critical role in influencing internalization of values: *autonomy*, *competence*, and *relatedness* (Deci and Ryan, 2002;

Ryan, 1995). Autonomy indicates the degree to which individuals perceive that they have the freedom to select their own behaviors (Ryan and Deci, 2000b). Competence refers to the feeling of individuals that is associated with the opportunity to apply and exhibit their capabilities (Deci and Ryan, 2002). Relatedness reflects the individuals' feelings of connectedness with others and concerns their sense of being in unity with others (Ryan, 1995). Some scholars have also applied cognitive evaluation theory (CET) to study intrinsic motivation in inter-organizational relationships (e.g., Chae et al., 2017). Although CET is based on SDT, CET does not discuss the relatedness dimension and, as such, does not focus on the relational aspect between the two actors involved in a relationship (Gagné and Deci, 2005).

Although SDT is an individual-level theory, the theory can be employed at an inter-organizational level because an organization can be considered as a social actor whose actions can be attributed to individuals that constitute the organization (King, Felin, and Whetten, 2010). Whetten et al. (2009) claim that a theory can be vertically borrowed, that is, a theory meant for individual level of analysis can be used for organizational level of analysis when an organization can be considered as a social actor.

We use SDT to contend that outcome and behavior control can enhance supplier mechanical compliance because they rely on adherence with external contingency and undermine intrinsic motivation as they can thwart some of the factors needed for internalization of values; whereas clan control not only reduces supplier mechanical compliance, but also facilitates intrinsic motivation because it emphasizes internalization of values for regulating behaviors. Figure 4.1 presents the theoretical model that is examined in this study.

Figure 4.1: Theoretical model based on SDT



4.3 HYPOTHESES DEVELOPMENT

4.3.1 Outcome Control, Supplier Mechanical Compliance, and Intrinsic Motivation

In outcome control, clients specify the outputs that suppliers need to accomplish. Such outputs in NPD outsourcing can include predetermined budgets, project cycle time, and delivery milestones. Once clients have specified the outputs, they monitor and evaluate their suppliers on the basis of the achievement of the specified outputs (Gopal and Gosain, 2010; Tiwana and Keil, 2009). Suppliers usually have limited discretion in changing or adjusting the outputs afterwards (Tiwana, 2010). According to SDT, such imposed outputs can lead to the perception of external regulation and therefore can result in compliance (Ryan and Deci, 2000b).

Further, outcome control function as a market based mechanism because the controllees (i.e., suppliers) are evaluated based on achievement of outputs (Long et al., 2011). SDT indicates that pressurized evaluations can also be perceived as satisfying the external demand (i.e., outputs) and therefore can result in compliance such that the work is mostly performed to achieve some specified outcomes (Ryan and Deci, 2000b). That could discourage suppliers, at times, from applying their own knowledge and putting their own ideas forward if the ideas do not contribute towards the achievement of specified outputs. Snell (1992, pg. 296) also notes that outcome control can sometimes stimulate "myopic behavior" in controllees such that they become overly focused on specified goals by excluding other unspecified important outcomes. In sum, clients' use of an outcome control can sometimes induce its suppliers to behave in such a manner that they simply follow specified outputs to the exclusion of their own idiosyncratic expertise. Thus, we hypothesize

> *H1: Outcome control is positively associated with supplier mechanical compliance.*

Outcome control does not require that clients closely monitor the actions of their suppliers as they can easily gather information from the outputs of suppliers for judging whether they met the specified outputs or not (Tiwana, 2010). It therefore follows a hands-off approach, that is, clients need not be actively engaged with suppliers for effectively exercising outcome control (Anderson and Oliver, 1987; Tiwana and Keil, 2009). Such a disengagement could lead to suppliers feeling disconnected from their clients and therefore can hurt suppliers' sense of connectedness. SDT

maintains that a low feeling of relatedness has an adverse effect on intrinsic motivation (Deci and Ryan, 2002). Outcome control can therefore undermine the intrinsic motivation of suppliers.

Outcome control although allows little or no discretion to suppliers for selecting their own goals, the hands-off approach of outcome control allows suppliers to select their own behaviors (Aulakh and Gencturk, 2000; Turner and Makhija, 2006). Outcome control, therefore does not fully limit suppliers' independence in making their own choices and, as such, does not completely weaken their sense of autonomy. However, as outcome control involves evaluation of suppliers against the specified outputs, it institutes a strong extrinsic incentives system (Tiwana, 2010). Such extrinsic incentives can be seen by suppliers as a means to achieve the specified goals rather than as an opportunity to apply their capabilities. The suppliers are therefore less likely to be satisfied with their expectation of showcasing their capabilities and that in turn can undermine suppliers' feeling of competence. According to SDT, mechanisms that thwarts feelings of competence diminishes intrinsic motivation (Deci and Ryan, 1985). Extant research on intrinsic motivation also indicates that evaluation contingent on extrinsic incentives impair intrinsic motivation because it weakens the feeling of autonomy and competence (Deci, Koestner, and Ryan, 1999). Overall, outcome control is expected to undermine the intrinsic motivation of suppliers and we therefore hypothesize:

H2: Outcome control is negatively associated with supplier's intrinsic motivation.

4.3.2 Behavior Control, Supplier Mechanical Compliance, and Intrinsic Motivation

Behavior control involves clients specifying the methods and procedures that they expect their suppliers to follow while performing the outsourced tasks (Choudhury and Sabherwal, 2003; Tiwana and Keil, 2009). In NPD outsourcing, clients can specify processes such as product development methodologies and procedures. Suppliers are evaluated based on how well they adhered to the specified methods and procedures while carrying out the outsourced tasks (Tiwana, 2010). SDT indicates that evaluation contingent on directives can be perceived as an external regulation and can result in performing a task to only satisfy the external contingencies (Ryan and Deci, 2000b). Therefore, evaluation of suppliers based on specified processes and methods can lead to extrinsically motivated behavior in suppliers such that they perform the task in a manner that adheres with the specified contingencies (i.e., methods and procedures).

Tiwana (2010) also suggests that imposing strict procedural guidelines can constrain suppliers from applying their own idiosyncratic knowledge due to the fear of non-compliance. Even if behavior control relies on detailed and comprehensive procedural guidelines, such guidelines are more likely to be at a macro level (i.e., general product development methodologies) rather than at a micro-level (i.e., detailed design and manufacturing processes). Suppliers can, therefore, for a positive evaluation, become too much focused on adhering to the specified macro-level guidelines to the exclusion of their own expertise at micro-level. Kerr (1975) also notes that organizations usually emphasize procedures that are highly

visible and can be easily measured, but ignores the procedures associated with task that are not visible and that promotes behaviors with a too much focus on following the emphasized procedures.

Clients generally evaluate their suppliers either by directly monitoring their adherence to prescribed methods and procedures or through the reports provided by the suppliers (Choudhury and Sabherwal, 2003; Tiwana, 2010). According to SDT, such demanding evaluations contingent on external regulations can stimulate compliance. Further, Tiwana and Keil (2007) argues that monitoring suppliers' adherence to the prescribed procedures can also imply a lack of trust and that can stimulate suppliers to sometimes exhibit compliance with the specified procedures even though that is not how they usually work. In sum, we expect behavior control to foster supplier mechanical compliance and that leads use to hypothesize:

> *H3: Behavior control is positively associated with supplier mechanical compliance.*

The specification of procedures in behavior control limits the independence of suppliers to select their own methods and procedures. Behavior control therefore thwarts a supplier's sense of relative independence (Das and Teng, 1998). Specifying procedures can also signal a supplier that it's client does not trust the supplier to be competent enough to completed the outsourced tasks without its guidance (Tiwana, 2010). As such, the use of behavior control by clients can send negative signals to suppliers related to its perceived autonomy and competence to perform the outsourced development tasks. According to SDT (Ryan and Deci, 2000a),

failure to recognize competence and provide autonomy to select own behaviors for completion of tasks hampers intrinsic motivation.

Behavior control, unlike outcome control, promotes dialogue between clients and suppliers due to the dynamic involvement of clients as they need to monitor and evaluate the suppliers against specified procedures (Choudhury and Sabherwal, 2003). As such, suppliers feel connected with their clients. However, due to the formal aspect of monitoring and evaluation in behavior control, the supplier can feel less connected to the client at an interpersonal level and therefore the supplier's feeling of relatedness may not be fully met.

Moreover, in behavior control, since clients evaluate their suppliers based on their adherence to specified procedures, it relies on extrinsically rewarding mechanisms. Such an emphasis limits the independence and self-decision capability of suppliers that is inherently required for completion of outsourced tasks, especially in new product development (Carson, 2007). As behavior control involves monitoring of suppliers' behaviors (Choudhury and Sabherwal, 2003), research suggests that monitoring often reduces autonomy and send signals of distrust (Ghoshal and Moran, 1996). For example, Falk and Kosefeld (2006) in their principal agent game demonstrate that agents reduced their efforts to perform the tasks and felt less motivated when principal monitored their behaviors. The agents perceived controlling by principal as a signal of distrust and a reduction in autonomy to make their own choices. Overall, we expect behavior control to hinder a supplier's autonomy and competence, and not completely fulfill its need for relatedness. Consequently, behavior control undermines the intrinsic motivation of a supplier and as such, we hypothesize:

H4: Behavior control is negatively associated with supplier's intrinsic motivation.

4.3.3 Clan Control, Supplier Mechanical Compliance, and Intrinsic Motivation

Clan control involves socialization mechanisms that facilitate promulgation of shared values, norms, and beliefs between clients and suppliers (Tiwana, 2010; Wiener, Remus, Heumann, and Mähring, 2015). Examples of such socialization mechanisms include social events, off-site meetings, joint trainings, and lunch or dinner trainings (Choudhury and Sabherwal, 2003; Kirsch, 2004). These socialization mechanisms make clients and their suppliers to interact with each other. The client-supplier interactions allow clients to facilitate development of shared values, norms, and beliefs (Choudhury and Sabherwal, 2003; Wiener et al., 2015). When individuals share values, norms, and beliefs with their leaders, then they perform beyond the "mechanical compliance with the routine directives" prescribed by the leader (Uhl-Bien et al., 2000, pg. 153). We expect a similar behavior from a supplier while performing a client's outsourced NPD tasks due to the common norms and values cultivated by the clan control.

Shared values, beliefs, and norms also fosters identification, that is, the process by which an individual sees himself as one with another individual or group of individuals (Kirsch et al., 2010; Nahapiet and Ghoshal, 1998). According to SDT, identification due to internalizations of values and norms helps one to identify with the objectives of others (Ryan and Deci, 2000b). Therefore, due to shared values, beliefs, and norms, a supplier also identifies itself as a part of the client and, as such, with the client's objectives.

Such an identification helps in fostering trusting relations between a client and its supplier (Das and Teng, 1998; Nahapiet and Ghoshal, 1998). Due to such trusting relations, a supplier is more willing to openly discuss its work with the client (Gopal and Gosain, 2010). As such, a supplier can openly share its ideas and opinion and therefore discuss any inputs related to specified outcomes and procedures without the fear of non-compliance. Clan control therefore does not discourage suppliers from utilizing their idiosyncratic knowledge and thus the following hypothesis:

H5: Clan control is negatively associated with supplier mechanical compliance.

Clan control, unlike outcome and behavior controls, does not rely on evaluation that is contingent on documented outcomes or procedures (Kirsch et al., 2002). Clan control rather provides a broad implicit guide related to acceptable behaviors. Clan control therefore provides the independence to a supplier to select its own behaviors (Das and Teng, 1998). Thus, the use of clan control by the client not only provides the autonomy to a supplier, but also signals a sense of confidence in supplier's ability to carry out the outsourced tasks (Das and Teng, 2001; Tiwana, 2010). Clan control therefore enhances a supplier's feeling of autonomy and competence.

As clan controls also involves participation of suppliers in development of shared understanding and values, they promote social cohesion (Chua et al., 2012). In addition, the client-supplier interactions through socialization mechanisms also result in communication at interpersonal level (Choudhury and Sabherwal, 2003). A supplier therefore feels connected with its client at a relational level when clan control is operating. Clan control therefore

enhances a supplier's feeling of autonomy, competence, and relatedness. According to SDT, an increase in the feeling associated with autonomy, competence, and relatedness help in facilitating intrinsic motivation to a greater degree (Ryan and Deci, 2000b). We therefore hypothesize:

H6: Clan control is positively associated with supplier's intrinsic motivation.

4.4 RESEARCH METHODS

4.4.1 Sample and Data Collection

The buyer-supplier relationship in NPD outsourcing is the focus of this study. The data for hypotheses testing was gathered using a cross-sectional survey design. The REACH (Review and Analysis of Companies in Holland) database was used to find the sample for data collection. The database contains information of all the companies registered at the Chamber of Commerce in the Netherlands and provides information related to them (Wuyts et al., 2015). Therefore, there is less likelihood of some segment of the population missing out and therefore coverage bias is less likely to be an issue (Blair and Zinkhan, 2006).

The REACH database consists of both clients and supplier organizations. For this study, the responses on survey measures were only gathered from managers belonging to supplier organizations because the study aims to analyze the hypothesized relationships from suppliers' perspective as mentioned in the introduction section. Using the two-digit U.S. standard industrial classification (SIC) codes, we focused on the following six industries because suppliers functioning in them are heavily involved in NPD projects: 28 (Chemicals and Allied Products), 30 (Rubber

and Miscellaneous Plastic Products), 35 (Industrial and Commercial Machinery and Computer Equipment), 36 (Electronic and Other Electrical Devices and Components, except Computer Equipment), 37 (Transportation Equipment), 38 (Measuring, Analyzing and Controlling Instruments; Photographic, Medical and Optical Goods; Watches and Clocks Manufacturing).

Within these six industries, a list of 1502 organizations having more than 50 employees was used for approaching the managers in supplier organizations. These managers were then asked if they could think of an NPD project that has been completed recently and has been outsourced to them recently by a client organization. The recently completed outsourced NPD projects were solicited to prevent any survey recall issues. The number of supplier organizations that had been involved in an outsourced project and agreed to participate in the survey was 152. The survey questionnaire was then send to the key informants in the supplier organizations who were knowledgeable about the outsourced project. The response rate was 75% based on 114 valid responses received. The average tenure of the respondents was 12.61 years and the average project duration was 14.5 months. As suggested by Carson (2007), we made sure that the client organization that has outsourced the NPD project did not own any equity position in the supplier.

4.4.2 Measures

The survey constructs were developed using standard survey and psychometric scale development procedures. The items used for each construct were populated from existing instruments after carefully examining

organizational controls and intrinsic motivation literatures. Each item was measured using a seven-point Likert-type scale. Five management scholars assessed the face validity of the construct items. A pilot study with six product development managers was conducted to further refine and finalized the items and to ensure that all the items were understandable and clear. The questionnaire was finally administered to the full sample.

The organizational controls literature has used various scales for the measurement of control constructs (e.g., Bonner, Ruekert, and Walker, 2002; Kirsch, 1996; Snell, 1992). Using this extant literature, the items from mature scales were compiled to measure outcome, behavior, and clan control. Outcome control consists of seven-items that are adapted from Snell (1992b), Kirsch (1996), Bonner et al. (2002), and Atuahene-Gima and Li (2006). Behavior control comprises of six-items and they are adapted from Snell (1992b), Bonner et al. (2002), and Carson (2007). The six-items for clan control are adapted from Kirsch (1996) and Kirsch et al. (2002). The measures for supplier mechanical compliance are self-developed but based on Tiwana and Keil (2007) and consists of six-items. Intrinsic motivation consists of five-items adapted from Van Yperen and Hagedoorn (2003).

We controlled for relationship specific variables to ensure the robustness of results, namely *relationship duration* and *previous projects*. Respondents were requested to provide information on these variables during the survey. We controlled for relationship duration – the number of years the supplier had been working with the client- as clients and suppliers with relatively longer duration of relationship can influence the behavioral aspects of the relationship between clients and their suppliers, such as compliance and motivation of the suppliers (Carey, Lawson, and Krause, 2011; Chae et

al., 2017). Also, the number of previous projects that has been executed together by a client and supplier can potentially influence the relationship functioning as it can facilitate development of shared norms and trust (Gopal and Gosain, 2010; Wagner, 2012). As such, the prior working experience in working together can influence the supplier's mechanical compliance to controls and their motivation. We, therefore, controlled for previous projects that a client had executed with the supplier. Appendix 4.1 contains the constructs with final items. Table 4.1 provides the mean, standard deviations, and correlations of all the variables examined in this study.

4.4.3 Construct Validity and Reliability

We performed several assessments for unidimensionality, reliability, and validity. First, we tested each item for normality and linearity to ensure that the data is consistent with the assumptions of multivariate analyses. The skewness and kurtosis values for all the observed items were below the accepted levels of 2.0 and 7.0 respectively. The Mahalanobis distance was also computed for possible outlier distortion. The results confirmed that there was no significant outlier in the data.

Second, we conducted an exploratory factor analysis (EFA) using maximum likelihood with promax rotation along with confirmatory factor analysis (CFA) to assess the unidimensionality of all constructs. The EFA analysis indicates that five factors underlie the data. All the construct items

Table 4.1: Descriptive statistics and correlations

		Mean (SD)	1	2	3	4	5	6	7	8
1	Outcome control	4.43 (1.28)	**0.709**	0.449**	0.586**	0.131	0.172	-0.054	-0.079	0.00
2	Behavior control	2.74 (1.30)	0.427**	**0.807**	0.264**	0.209	0.031	0.024	0.102	-0.017
3	Clan control	4.96 (1.20)	0.570**	0.235**	**0.757**	-0.129	0.385**	0.030	-0.098	-0.038
4	Supplier mechanical compliance	2.80 (1.17)	0.097	0.178	-0.173	**0.686**	-0.246*	0.180	0.240*	-0.050
5	Intrinsic motivation	5.84 (0.85)	0.140	-0.007	0.361**	-0.295**	**0.837**	-0.128	-0.160	-0.072
6	Previous projects	9.29 (21.27)	-0.095	-0.014	-0.008	0.148	-0.172	**NA**	0.499**	0.00
7	Relationship duration (years)	9.38 (9.49)	-0.121	0.067	-0.141	0.210*	-0.205*	0.479**	**NA**	0.138
8	Software Platform (marker variable)	0.65 (0.48)	-0.039	-0.057	-0.078	-0.091	-0.114	-0.039	0.104	**NA**

Note: sample size =114. The diagonal represents the average variances extracted. Items below the diagonal are the inter-construct correlations. **Correlation is significant at the .001 level (two-tailed). *Correlation is significant the 0.05 level (2-tailed).

loaded onto their designated construct factors with factor loadings greater than 0.30, the conservative cut-off level (Guadagnoli and Velicer, 1988; Hair et al., 2006). The five factors account for 68.7% of the total variance in the data.

Third, we assessed the five-factor measurement model with a confirmatory factor analysis (CFA) using the maximum likelihood (ML) approach in AMOS 22. The fit indices along with squared multiple correlation values were carefully examined to determine an inadequate item and model fit. The squared multiple correlation assesses the degree to which an observed item is useful for measuring the latent construct and its value should be greater than 0.30 (Kim, 2014). The squared multiple correlation values for all the items were greater than 0.30 except for three items of outcome control and one item of clan control (see Appendix 4.1). The final constructs with all the items are presented in Appendix 4.1. After dropping the items, the CFA results suggest overall good fitting measurement model (χ^2 /df = 1.60, RMSEA = 0.07, SRMR = 0.08, CFI = 0.92, IFI = 0.92, and TLI = 0.90).

The construct reliability and convergent validity of the constructs were assessed using Cronbach's alpha (α), composite reliability (CR), and average variance extracted (AVE) values. Appendix shows the Cronbach's alpha, CR, and AVE values of all the constructs. All the constructs have Cronbach's alpha above the desired value of 0.70. The CFA results were used to calculate the CR and AVE values. The CR and AVE values for all the constructs are above the desired level of 0.70 and 0.50 respectively, except for supplier mechanical compliance (Fornell and Larcker, 1981; Hair et al.,

2006). One item of supplier mechanical compliance did not load well on the construct and was therefore dropped (See Appendix 4.1).

The discriminant validity was assessed using the following two methods. First, we performed chi-square test for all the constructs in pairs to assess if the freely estimated model performed better than the restricted model (i.e., correlation fixed at 1) (Bagozzi et al., 1991). A significant difference in the chi-square values of the restricted and free estimated model indicates that the two constructs are different. The chi-square differences were significant for all the 10 pairs. Second, we compared the square root of AVE for each construct with the bivariate correlation coefficients between the construct and another construct. A measurement model displays an acceptable level of discriminant validity when the value of square root of AVE is greater than the value of correlation coefficient between the construct and another construct (Fornell and Larcker, 1981). A shown in Table 4.1, all the square roots of AVE are greater than the corresponding correlation coefficients. Taken together, these results provide evidence for the sufficient reliability, convergent validity, and discriminant validity of the constructs.

4.4.4 Potential Biases

We checked for common method bias as we use self-reported data from a single respondent for both dependent and independent variables (Podsakoff et al., 2003). We conducted CFA with single-factor technique to assess potential common method bias. The fit for single-factor model (χ^2 /df = 1.95, RMSEA = 0.09, SRMR = 0.18, CFI = 0.85, IFI = 0.86, and TLI = 0.83) was considerable poorer than the five-factor model (χ^2 /df = 1.60, RMSEA = 0.07,

SRMR = 0.08, CFI = 0.92, IFI = 0.92, and TLI = 0.90). The chi-square difference between the single-factor and five-factor model is also significant ($\Delta\chi^2$ (9) = 107.20, $p < 0.001$), thereby, indicating that the measures do not suffer from common method bias.

We further assessed common method bias using marker variable technique (Lindell and Whitney, 2001). A marker variable is a variable that is theoretically unrelated to at least one variable in the study. We used software platform (see Appendix 4.1) as the marker variable as it is theoretically unrelated to the predictor variables (Tiwana, 2008). Using the lowest absolute correlation (r = 0.039) between the marker variable and other variables, the adjusted correlations for all the variables were computed. The correlations did not change substantially after the adjustment as can be seen in Table 4.1.

We also assessed the potential multicollinearity issues. Following Mason and Perreault's (1991) suggestion, each independent variable was regressed on the other independent variable to detect linear relationships between them. The R-square values between the independent variables did not exceed the R-square value for the overall model, suggesting multicollinearity is not an issue.

4.5 ANALYSIS AND RESULTS

4.5.1 Hypothesized Effects Results

The proposed hypotheses as shown in Figure 4.1 were examined by using path analysis modelling approach involving co-variance based structural equation modelling (SEM) with maximum likelihood (ML) estimation in

AMOS. The hypotheses were tested using SEM approach because it allows to covary the independent variables that are highly correlated with each other and therefore helps to control for the potential multicollinearity effects. A single indicator was used in the path analysis for each of the constructs. The use of single indicator reduces the sampling error's influence on the parameter estimates because it helps in minimizing the variance shared by the indicator of each construct (Landis et al., 2000). The fit indices values indicate that the model shown in Figure 4.1 fits the data very well: χ^2/df = 1.69; SRMR = 0.07, CFI = 0.96, IFI = 0.97, TLI = 0.90, and RMSEA = 0.07 (90% confidence interval: 0.00,0.153).

The path estimates for the hypothesized relationships are presented in Table 4.2. Hypothesis 1, which examines the relationship between outcome control and mechanical compliance, received empirical support. The path coefficient for this path is significant ($\beta = 0.235$, $p < 0.05$). We do not find support for Hypothesis 2 that predicts that outcome control is negatively associated with intrinsic motivation. The standardized path coefficient for outcome control-intrinsic motivation relationship is not significant ($\beta = -0.100$, n.s.). The results do not support Hypotheses 3 and 4 as the estimates of the paths leading from behavior control to mechanical compliance ($\beta = 0.147$, n.s.) and intrinsic motivation ($\beta = -0.060$, n.s.) are not significant. The results provide support for Hypotheses 5 and 6 as the path estimates for clan control- mechanical compliance ($\beta = -0.304$, $p < 0.05$) and clan control-intrinsic motivation ($\beta = 0.411$, $p < 0.05$) are significant and in the expected direction.

Table 4.2. Path analysis: Standardized Parameter Estimates

	Standardized coefficient	Proposed Effect	Result
Hypothesized Relationships			
H1: Outcome control → mechanical compliance	0.235*	Positive	Positive
H3: Behavior control → mechanical compliance	0.147	Positive	Non-significant
H5 Clan control → mechanical compliance	- 0.304**	Negative	Negative
H2: Outcome control → intrinsic motivation	-0.100	Negative	Non-significant
H4: Behavior control → intrinsic motivation	-0.060	Negative	Non-significant
H6: Clan control → intrinsic motivation	0.411**	Positive	Positive
Control Relationships			
Previous projects → mechanical compliance	0.005		
Relationship duration → mechanical compliance	0.009		
Previous projects → intrinsic motivation	-0.006		
Relationship duration → intrinsic motivation	-0.010		
Variance explained (R^2) mechanical compliance	0.166		
Variance explained (R^2) intrinsic motivation	0.123		

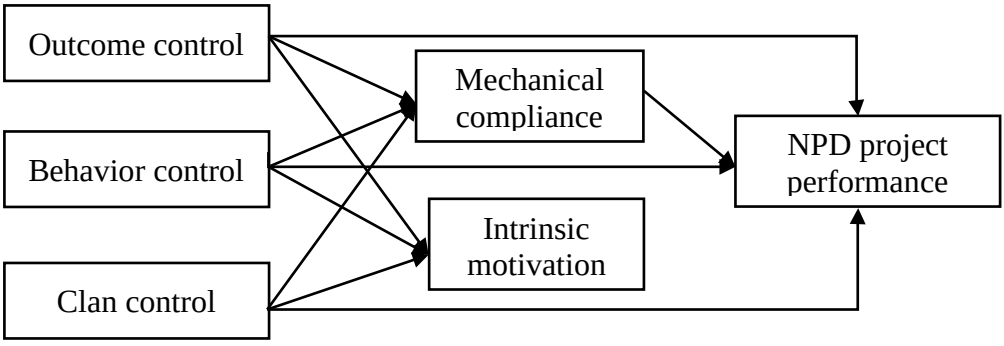
Notes: $^{\dagger}p < 0.10$, $^{*}p < 0.05$; $^{**}p < 0.01$; $^{***}p < 0.001$ (all two-tailed test). Significance levels are based on bootstrapped, bias-corrected confidence intervals.

4.5.2 Post-hoc Analyses: NPD Project Performance

A post-hoc analyses involving NPD project performance was tested to better understand the relationship between organizational controls and their behavioral consequences, supplier mechanical compliance and intrinsic

motivation. Therefore, the variable NPD project performance was added to the model shown in Figure 4.1. NPD project performance is defined here as the extent to which the project is successful in relation to five project objectives: timing, budget, quality, technical performance, and general satisfaction (Bonner et al., 2002; Lawson et al., 2015). For the post-hoc analysis, the paths of three organizational controls, supplier mechanical compliance and intrinsic motivation with NPD project performance were considered. The fit indices values indicate that the model that estimates paths for organizational controls-NPD project performance and supplier mechanical compliance-NPD project performance as shown in Figure 4.2 fits the data very well: χ^2/df = 1.49; SRMR = 0.05, CFI = 0.90, IFI = 0.98, TLI = 0.97, and RMSEA = 0.05 (90% confidence interval: 0.00,0.138).

Figure 4.2: Post-hoc analyses model



The bootstrapping option was used to perform the path analysis. Bootstrapping is a nonparametric statistical method that repeatedly samples from the available dataset with replacement and is particularly useful for small samples as it helps to avoid the problems caused by asymmetric and

non-normal sampling distributions (Preacher and Hayes, 2004). The path analysis results indicate that the path estimates for the relationship between three organizational controls and intrinsic motivation remained the same. The results also indicate that the path estimate for supplier mechanical compliance-NPD project performance is significant ($\beta = -0.187$, $p < 0.05$).

Table 4.3 presents the detailed standardized coefficient estimates for the total, direct, and indirect effects of outcome, behavior, and clan control on NPD project performance via supplier mechanical compliance. The direct effect of outcome control on NPD project performance is not significant ($\beta = -0.086$, n.s.). In contrast, the indirect effect of outcome control on NPD project performance through supplier mechanical compliance is negative and significant ($\beta = -0.044$, $p < 0.05$), suggesting an indirect-only mediation (Zhao et al., 2010). The direct and indirect effects of behavior control on NPD project performance are not significant. Supplier mechanical compliance therefore does not mediate the relationship between behavior control and NPD project performance. Concerning clan control, the analysis demonstrates that the path estimates for the direct ($\beta = 0.295$, $p < 0.01$) and indirect ($\beta = 0.057$, $p < 0.01$) effects of clan control on NPD project performance via supplier mechanical compliance are positive and significant. As such, supplier mechanical compliance mediates the relationship between clan control and NPD project performance.

Table 4.3. Standardized Direct and Indirect Effects (Bootstrapping two-tailed test)

	Total Effect	LL 95% CI	UL 95% CI	Direct Effect	LL 95% CI	UL 95% CI	Indirect Effect Through Mechanical Compliance	LL 95% CI	UL 95% CI
Outcome control → NPD project performance	-0.130	-0.332	0.125	-0.086	-0.286	0.178	-0.044*	-0.0148	-0.001
Behavior control → NPD project performance	-0.025	-0.241	0.545	0.002	-0.210	0.215	0.010	-0.028	0.005
Clan control → NPD project performance	0.352**	0.131	0.545	0.295**	0.075	0.490	0.057**	0.001	0.153

Notes: *p < 0.05;**p < 0.01; ***p < 0.001 (all two-tailed test). LL = Lower Limit, UL = Upper Limit

4.6 DISCUSSION AND IMPLICATIONS

Organizational controls that are exercised by clients to direct and motivate suppliers to behave in a desired manner can have varied behavioral consequences. Using SDT, this study examines the relationship of organizational controls (outcome, behavior, clan) with their behavioral consequences (supplier mechanical compliance and intrinsic motivation). The results provide support for the assertion that outcome control increases mechanical compliance from suppliers, but clan control reduces supplier mechanical compliance. The results also show that while the intrinsic motivation of the suppliers is enhanced by clan control, it is not undermined by outcome and behavior control as often implicitly asserted in the literature. Post-hoc analyses reveal that mechanical compliance from suppliers have a direct influence on reducing NPD project performance such that while outcome control minimizes NPD project performance via supplier mechanical compliance, clan control enhances NPD project performance by reducing supplier mechanical compliance. Overall, this study has several implications for the extant literature and practice.

4.6.1 Theoretical Implications

First, the key contribution of this study to the NPD outsourcing literature is investigation of the relationship of organizational controls with their behavioral consequences using SDT. While prior control research has often implicitly discussed the behavioral implications of controls in outsourcing projects (e.g., Tiwana, 2010; Liu, 2015), the results of this study provide empirical insights related to these relationships. In doing so, the study

complements and extends the controls research in inter-organizational settings that has often focused on the performance consequences of organizational controls (Liu, 2015; Sihag and Rijsdijk, 2019).

Second, another key contribution of this study is to empirically investigate the notion of compliance, suggested by Tiwana and Keil (2007), as one of the behavioral consequences of controls, by putting forth the term 'supplier mechanical compliance'. The results of this study reveal that outcome control facilitates mechanical compliance from suppliers. In that sense, the results suggest that clients who place emphasis on following specified outputs and evaluating suppliers based on achievement of specified outputs can sometimes discourage their suppliers from utilizing their own complementary knowledge. As such, outcome control can, at times, result in suppliers' actions that are geared towards the achievement of specified outcomes by excluding their own idiosyncratic knowledge and better judgement (Tiwana, 2008; Tiwana and Keil, 2007). Clan control, on the other hand, attenuates mechanical compliance due to promulgation of shared values, norms, and understanding as that helps to create an environment where suppliers can openly discuss their work with the clients (Gopal and Gosain, 2010). Therefore, this study provide support for the notion of supplier mechanical compliance that represents the concept of compliance involving adherence to specified measures in a mechanistic manner and, as such, extends the relatively simple view of compliance often discussed in the control literature.

The results do not provide support for the assertion that emphasizing behavior control is associated with supplier mechanical compliance. This is contrary to what is typically suggested in the literature that behavior control

promotes too much focus on the adherence to specified procedures as it involves close supervision (Ramaswami, 1996; Turner and Makhija, 2006). A possible explanation for the lack of support could be the way in which information is collected for the evaluation of specified procedures and rules. Even though both outcome and behavior control involve evaluation against specified measures, the information required for evaluation of a supplier's adherence to specified outcomes and behaviors is collected through distinct mechanisms (Tiwana and Keil, 2009).

The information for evaluation of outcomes can be directly gathered through output reports from a supplier, whereas the information for a supplier's adherence to specified procedures is gathered through both process reports and direct monitoring (Choudhury and Sabherwal, 2003; Tiwana, 2010). The relatively low involvement of suppliers in direct gathering of outputs from suppliers' reports as compared to the high interactions between clients and their suppliers during collection of process reports and direct monitoring could make suppliers feel relatively less participative in the outcome control. Therefore, suppliers can perceive that they have a relatively lower chance of explaining the conditions associated with achievement of various outputs and that can result in a supplier complying with client's prescriptions and not utilizing its idiosyncratic knowledge due to fear of non-compliance. Future research, however, needs to further explore this explanation.

Third, our research contributes to the body of research on controls and NPD outsourcing by explicitly studying the relationship between the three organizational controls (outcome, behavior, clan) and intrinsic motivation of suppliers. The findings do not provide support for the prediction that outcome

and behavior controls diminish suppliers' intrinsic motivation. As such, these findings refine the common assertion in the control and NPD literature that outcome and behavior controls can thwart intrinsic motivation (e.g., Carson, 2007; Osterloh and Frey, 2000). However, it is important to note that the direction of impact of outcome and behavior control on intrinsic motivation is negative. While future studies are needed to further understand the relationship of outcome and behavior control with a supplier's intrinsic motivation, a possible explanation for the current findings could be that the negative effects of outcome and behavioral control on intrinsic motivation are alleviated by their positive influence on intrinsic motivation via other mechanisms. Weibel (2010) has also pointed out that while exercising controls, employing mechanisms such as participation in development of control mechanisms and constructive feedback can promote intrinsic motivation (Kluger and DeNisi, 1996; Sitkin et al., 1994).

Finally, the post-hoc results point out that supplier mechanical compliance is paramount to understand the relationship of organizational controls with project performance in NPD outsourcing. The results show that when suppliers behave in a mechanistic manner that minimizes the performance of NPD projects. Further, the results point out that the mechanical compliance from suppliers because of outcome control is transformed into lower NPD project performance. In contrast, clan control improves NPD project performance by reducing supplier mechanical compliance. In general, the supplier mechanical compliance plays a critical role in influencing the project performance in NPD outsourcing.

Overall, this study provides support for the recent discussion in the controls research that various controls evoke distinct behavioral responses

and therefore operate in fundamentally different ways on the behaviors of those that are subjected to them (Korsgaard et al., 2010; Sihag and Rijsdijk, 2019).

4.6.2 Managerial Implications

For managers, our research demonstrates that they must consider behavioral consequences of control as they design and exercise various organizational controls. In particular, client managers should direct their effort towards addressing mechanical compliance from suppliers as that can jeopardize the project performance in NPD outsourcing. This study highlights that client managers should be careful in emphasizing compliance with the specified outputs as that can lead to suppliers sometimes not using their own idiosyncratic expertise. However, client managers should emphasize development of common values, norms, and understanding as that diminishes mechanical compliance from suppliers and also intrinsically motivates them to perform the outsourced NPD tasks. Studies have also shown that suppliers that are intrinsically motivated are willing to cooperate with clients above and beyond the financial benefits (Brown et al., 1995; Chae et al., 2017). In sum, managers should avoid mechanisms that reinforces suppliers' behaviors that are not desired by the clients, such as mechanical compliance, and, at the same time, should employ managerial tools that facilitates the intrinsic motivation of the suppliers.

4.7 LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

Despite the contributions made by this study, it also has limitations that needs to be addressed by future research. The first limitation is that similar to other studies that look at client-supplier relationships in the outsourcing context (e.g., Gopal and Gosain, 2010; Tiwana and Keil, 2007), this study is limited by a relatively small sample size. The second limitation is that we do not investigate the longitudinal behavioral consequences of controls as we used cross-sectional data for investigating our hypotheses. That is, future research needs to examine how behavioral responses to control changes based on the evolution of suppliers' behaviors over time. It is possible that the behaviors of suppliers that are initially motivated by contingent rewarding can evolve to a point where the behaviors are finally motivated by internalization of values (Korsgaard et al., 2010) and that could lead to lower supplier mechanical compliance because of the high intrinsic motivation of the suppliers.

Three possible future research areas can be explored. First, future research could explore whether our model and findings hold in inter-organizational settings of other types of tasks (e.g., marketing, logistics, and services). Second, controllees with different motivational orientations can respond differently to the behavioral responses of controls (Korsgaard et al., 2010). Future research can therefore examine the influence of different motivational orientation of controllees (i.e., suppliers) on our findings. Third, as monitoring suggests distrust and therefore undermines intrinsic motivation (Falk and Kosfeld, 2006), new working styles, such as flexible working and

virtual teams, may change the nature of monitoring (discrete vs continuous) and therefore intrinsic motivation of the controllees. Therefore, future research needs to investigate the interplay among controls, the nature of monitoring, and controllees' intrinsic motivation.

4.8 CONCLUSION

The overall key contribution of this study is that it examines often discussed but untested premises that outcome, behavior, and clan control can lead to varied behavioral consequences. Using SDT, the study investigates the influence of outcome, behavior, and clan control on supplier mechanical compliance and intrinsic motivation. The results shows that outcome control encourages suppliers to comply with a clients' prescribed outputs such that the suppliers, at times, do not use their own idiosyncratic expertise, but behavior control does not facilitate mechanical compliance. Clan control, however, reduces such a compliance from suppliers. Additionally, clients' use of clan control intrinsically motivates suppliers to perform the outsourced NPD tasks. The post-hoc analysis point out that while exercising outcome control can lead to lower NPD project performance as it facilitates mechanical compliance from suppliers, clan control enhances NPD project performance by reducing mechanical compliance. Overall, the findings suggest that clients should be careful in exercising controls to manage its suppliers and should try to circumscribe the potential pitfalls, if any, of controls.

CHAPTER 5

GENERAL DISCUSSION

5.1 SYNOPSIS

Managers exercise controls to facilitate desired behaviors from organizational employees and external partners in order to achieve the desired organizational objectives (Das and Teng, 1998; Turner and Makhija, 2006). Even though, control research has seen a spurt in the recent past, there are several critical research issues in the controls literature that needs to be addressed, especially the effectiveness of outcome, behavior, and clan control. This dissertation therefore examined ***what are the behavioral and performance consequences of outcome, behavior, and clan control*****?** To address this research question, the dissertation focused on the following two research objectives: First, to assess the relationship between the three organizational controls (outcome, behavior, clan) and various performance outcomes along with their performance effects in combination, in general. Second, to investigate the performance and behavioral consequences of the three organizational controls in NPD outsourcing.

As discussed in Chapter 1 of this dissertation, the empirical evidence related to the effectiveness of outcome, behavior, and clan control remains equivocal. These mixed findings provided a major motivation to meta-analyze the relationship between the three organizational controls and performance outcomes in Chapter 2 (Study 1). Chapter 2 (Study 1) also examined whether and how the three controls interact with each other to improve the performance outcomes. Chapter 2 (Study 1) therefore accumulates empirical research on organizational controls—performance

relationships and provides insights related to research questions that are more closer to the general population (Combs et al., 2011; Eden, 2002).

The findings from the meta-analytic study coupled with critical research gaps in the controls literature provide the basis to conduct the subsequent empirical studies in Chapters 3 (Study 2) and 4 (Study 3). Both the studies in Chapters 3 and 4 focus on the NPD outsourcing context because of the following reasons: (a) while flexibility is essential for the completion of outsourced NPD tasks, but that can be at odds with the main aim of outsourcing organizations to exercise controls, that is, external partners' exhibiting alignment with outsourcing organizations' needs, (b) controls can also have varied behavioral consequences, such as discouraging external partners' sometimes from utilizing their idiosyncratic knowledge and inhibiting their intrinsic motivation (Grewal et al., 2013; Tiwana and Keil, 2007). Since both effective utilization of idiosyncratic knowledge and intrinsic motivation are also essential for the completion of NPD tasks (Amabile, 1997; Carson, 2007; Tatikonda and Rosenthal, 2000), outsourcing organizations face the challenge of exercising right type of controls, and (c) the lack of formal managerial authority over the external partners and also the lack of knowledge of external partners' processes associated with transformation of inputs into outputs makes the effective governance of outsourced tasks challenging for the outsourcing organizations (Tiwana and Keil, 2009).

Chapter 3 (Study 2) focuses on supplier flexibility, which is the willingness of suppliers to respond flexibly to the changing requirements of organizations, because the outsourcing organizations depend on supplier flexibility to deal with evolving requirements in NPD projects (Ivens, 2005;

Noordewier et al., 1990). To facilitate flexible suppliers' behaviors, the outsourcing organizations need both cooperation (alignment of interests) and coordination (alignment of actions) from suppliers (Gulati et al., 2005). As organizational controls have been recognized as mechanisms that facilitate cooperation (e.g., Turner and Makhija, 2006) and KIMs have been highlighted as mechanisms that facilitate coordination (De Luca and Atuahene-Gima, 2007), Chapter 3 investigates the influence of controls and KIMs on supplier flexibility. Chapter 3 also studies the influence of supplier flexibility on NPD project performance because increased flexibility from suppliers can help the outsourcing organizations to efficiently use the supplier resources to respond to the changes in project requirements (Narayanan and Narasimhan, 2014).

Chapter 4 (Study 3) focuses on the relationship of organizational controls with their behavioral consequences, namely, supplier mechanical compliance and intrinsic motivation. Supplier mechanical compliance refers to the extent to which a supplier adheres to the specified prescriptions without sometimes using its own idiosyncratic expertise, whereas intrinsic motivation refers to the intent of a supplier to perform tasks for the external partner in order to experience satisfaction and enjoyment inherent in the task (Chae et al., 2017; Tiwana and Keil, 2007). Chapter 4 uses self-determination theory (SDT) (Deci and Ryan, 1985; Ryan and Deci, 2000b) to assert that outcome and behavior control that draw on extrinsic motivation can induce supplier mechanical compliance, but undermine intrinsic motivation. On the other hand, clan control that draws on intrinsic motivation reduces mechanical compliance, but enhances intrinsic motivation.

Overall, the results of three studies allows us to better understand the performance and behavioral consequences of the three organizational controls. The following sections provide a brief summary of the main findings of each individual study, the theoretical contributions made by this dissertation, the managerial implications of the overall findings, and a discussion on the limitations and directions for future research.

5.2 SUMMARY of MAIN FINDINGS

5.2.1 Findings from Chapter 2 (Study 1)

The results reveal that outcome, behavior, and clan controls are generally positively related to performance, but the strength of three controls with each performance outcome differs partly depending on the type of performance outcome. The positive performance effects of the three controls did not differ for different types of performance data and various organizational settings and level of analysis. However, the effectiveness of controls varies partly depending of the type of task that is being controlled. The results show that behavior controls are more effective for tasks involving routine procedures and identifiable steps for each activity such as IS development and sales than for NPD and HRM tasks that involve higher level of complexity and a more diverse knowledge (Colbert, 2004; McCarthy et al., 2006). The results also provide support for the complementary perspective, that is, one control increases the effectiveness of the others.

5.2.2 Findings from Chapter 3 (Study 2)

The results demonstrate that both outcome and clan controls are effective in fostering flexible behaviors from suppliers, but exercising behavior control and KIMs do not help organizations to facilitate supplier flexibility. The results also show that supplier flexibility is important for achieving the desired project performance as an increase in supplier flexibility is associated with high levels of NPD project performance. Post-hoc analyses reveal that supplier flexibility mediates the relationship of outcome and clan controls with NPD project performance. Concerning outcome control, the post-hoc analyses also show that it functions as a double-edged sword because the performance benefits achieved via supplier flexibility are balanced by the direct negative performance consequences of outcome control.

5.2.3 Findings from Chapter 4 (Study 3)

The results show that outcome control promotes supplier mechanical compliance, whereas behavior control is not associated with mechanical compliance. Clan control, on the other hand, reduces mechanical compliance from suppliers. Both outcome and behavior control do not have any influence on the intrinsic motivation of the suppliers to carry out the outsourced tasks. The results also demonstrate that exercising clan control is beneficial as it fosters intrinsic motivation in the suppliers to perform the outsourced NPD tasks. Additionally, post-hoc analyses suggest that NPD project performance is diminished by outcome control via supplier mechanical compliance, but clan control enhances NPD project performance by reducing mechanical compliance from suppliers.

5.3 THEORETICAL CONTRIBUTIONS

Each individual chapter already discusses the theoretical contributions of each individual study. This section therefore only discusses the overall theoretical contributions of this dissertation to the organizational controls, NPD, and outsourcing literature.

5.3.1 Organizational Controls Literature

This dissertation offers several key contributions to the controls literature. First, the traditional research on controls (e.g., Eisenhardt, 1985; Ouchi, 1979) has emphasized "singular" view of control where "singular control equates to a theoretical and empirical focus on one type of control" (Cardinal et al., 2017, pg. 25). However, contemporary research on controls suggests to move beyond the "singular" view of control towards the "holistic" view that focuses on multiple control types (Cardinal et al., 2017, 2004; Long et al., 2002; Rijsdijk and van den Ende, 2011). As all the three empirical studies in this dissertation theorize and empirically examine multiple types of controls (outcome, behavior, clan), this dissertation represents another crucial stepping stone in the development of "holistic" approach towards organizational controls (Cardinal et al., 2017). The results of Chapter 2 (Study 3) provides support for the complementarity perspective on organizational controls and show that, in general, outcome, behavior and clan control interact to increase the efficacy of one another. However, considering the three way interaction between the outcome, behavior and clan control in Chapter 3 (Study 2) and Chapter 4 (Study 3) neither improved the model fit nor had a significant influence on NPD project performance.

Although the support for the complementarity finding in meta-analytic study was not found in the two subsequent empirical studies, but that does not indicate that controls do not have a complementary impact on performance. In fact, this incongruent result provides support for the previous observation of Cardinal, Sitkin, Long, and Miller (2018) that while examining interactions between controls is important to advance controls research, but interaction models only consider simpler and fewer aspects of controls functioning. Therefore, a configurational analyses of control is needed to understand how outcome, behavior, and clan control levels can be balanced and which controls need to be blended to exhibit the right levels and combinations of various control types that should be exercised for managing complex settings (Cardinal et al., 2017, 2010). For example, Kreutzer and Lechner (2010) research focusing on the combination and levels of controls that are needed for managing strategic initiatives needs to be further investigated to clarify the aforementioned issue.

Second, the findings of this dissertation reveal that the magnitude of the relationship between one control and various outcomes is either bigger or smaller than the other controls. Chapter 2 (Study 1) shows that the direct effects of outcome, behavior, and clan controls on each type of outcome (i.e., rational goal, adaptability, process, and human relations outcomes) differ in strength, depending partially on the type of outcome. The findings from Chapter 3 (Study 2) and Chapter 4 (Study 3) also demonstrate that the magnitude of the relationship between the three controls and various outcomes (supplier flexibility, supplier mechanical compliance, intrinsic motivation, and NPD project performance) varies. As such, these findings contribute to the controls literature by suggesting that outcome, behavior, and

clan controls are distinct from each other and each of them have its own behavioral and performance ramifications. Given that similar controls are also exercised in different types of tasks that span organizational boundaries (e.g., information systems development projects, logistics, services) or contexts (e.g., clients and vendors, headquarters and subsidiaries) (Brenner and Ambos, 2013; Saldanha, Miller, Shane Hunt, and Mello, 2014; Stouthuysen et al., 2012; Tiwana, 2010), future research should explore whether the models examined in Chapter 3 (Study 2) and Chapter 4 (Study 3) also hold in different tasks and contexts.

The differential performance effects in the three empirical studies also indicate that organizational controls influence performance through multiple paths. In particular, the results from Chapter 3 (Study 2) and Chapter 4 (Study 3) indicate that outcome and clan control operate through multiple paths to influence NPD project performance. These results therefore provide support for the observation made in Chapter 2 (Study 1) that there are different factors that act as mediators of the control-performance relationships. Moreover, the results related to the difference in efficacy of controls diverge from the traditional control literature that has emphasized the perspective that the feasibility of exercising controls is the determining factor in controls' effectiveness (Kirsch, 1996). This feasibility perspective has highlighted that the three factors: outcome measurability, behavior observability, and knowledge of the transformation process, determine the effectiveness of exercising controls in a particular setting. Recent studies has, however, provided evidence that controls can also be exercised in settings with low levels of outcome measurability and behavior observability (Brenner and Ambos, 2013; Kreutzer et al., 2016). As such, the findings of

this dissertation extends this research stream by suggesting that relationship of organizational controls with performance is also dependent on other factors. However, as suggested in Chapter 3 (Study 2), it is conceivable that the three feasibility factors can interact with various mediation mechanisms to exert differential effects on the organizational controls-performance relationships. Due to the complexity of modeling this phenomenon in the models examined in Chapter 3 (Study 2) and Chapter 4 (Study 3) along with small sample size, an empirical investigation on this issue could not be performed. Future research therefore could help to further shed light on this issue.

Third, the findings of the three empirical studies suggest that the effectiveness of controls partly depend on the type of task that is being governed. In particular, the findings from all the three studies indicate that even though exercising behavior control generally is beneficial for achieving the desired performance, it does not contribute towards the achievement of desired NPD project performance or does not have significant behavioral implications in NPD tasks. Chapter 4 (Study 3) also reveals the dark side of the outcome control as it can discourage the supplier sometimes from using its own idiosyncratic knowledge to carry out the outsourced NPD tasks and as a result can lead to lower NPD project performance. Given this finding, the empirical result found out in Chapter 3 (Study 2) that outcome control has a direct negative influence on NPD project performance is reasonable. Additionally, considering that NPD tasks usually involve higher levels of complexity and the actions within a system usually depend on the complexity involved within that system (McCarthy et al., 2006), future research should

explore how complexity influences the effectiveness of controls in NPD tasks.

5.3.2 New Product Development (NPD) Literature

This dissertation also has implications for the NPD literature. A first key contribution of this dissertation to the NPD literature is that it provides insights concerning the relationship between controls and flexibility. NPD research suggests that flexibility is essential for accommodating the requirements that emerge over the course of the NPD project (e.g., Tatikonda and Rosenthal, 2000). However, that can be at odds with the primary objective of control that is following specified outputs and procedures (Turner and Makhija, 2006). The findings of Chapter 3 (Study 2) shows that outcome and clan control facilitate supplier flexibility and provide support for the notion in the literature that both control and flexibility are needed for achieving the desired performance (Bonner et al., 2002; Tatikonda and Rosenthal, 2000). However, behavior control does not have any influence on supplier flexibility and the meta-analytic results in Chapter 2 (Study 1) also suggest that behavior control is generally not effective for NPD tasks. Further, both Chapter 3 (Study 2) and Chapter 4 (Study 3) reveal that outcome control can have negative behavioral and performance implications and therefore can also have a dark side. We encourage future research to explore the conditions under which each type of control facilitates supplier flexibility. Future research should also explore whether and how controls facilitate flexible behaviors in project team members for NPD tasks that are carried out within organizational boundaries.

A second key contribution of this dissertation is that it highlights the importance of further increasing the understanding related to the dissimilar consequences of controls in the NPD context. The results of the two empirical studies in Chapter 3 (Study 2) and Chapter 4 (Study3) demonstrate that the relationship of outcome, behavior, and clan control with different outcomes can be contrasting to each other. For example, outcome and clan control increases supplier flexibility, but behavior control does not have any effect on supplier flexibility. Similarly, outcome control increases supplier mechanical compliance, whereas behavior control is not associated with mechanical compliance and clan control reduces mechanical compliance. Therefore, future research should further explore the mechanisms that underlie the functioning of the three controls, such as learning orientation, effective information flows, fairness judgements (Cardinal et al., 2017; Long et al., 2011).

5.3.3 Outsourcing Literature

This dissertation also contributes to the outsourcing literature. The first contribution of this dissertation to the outsourcing research is that contrary to the popular opinion in the literature that clan control can be less effective in the outsourcing context due to the organizational culture differences (Choudhury and Sabherwal, 2003; Tiwana and Keil, 2009), the findings from Chapter 3 (Study 2) and Chapter 4 (Study 2) reveal that clan control is effective in governing outsourcing tasks. These findings further support the meta-analytic finding in Chapter 2 (Study 1) that clan control is also effective in inter-organizational settings. Control research has repeatedly argued that

it is difficult to realize the social requirements for effectively exercising clan control, such as detecting adherence or non-compliance with shared values and norms (Choudhury and Sabherwal, 2003; Tiwana and Keil, 2009). Future research therefore should focus on improving our understanding of how clan control is exercised in the outsourcing context and explore how social requirements related to the clan control are realized in the context of outsourcing.

The second key contribution is that this dissertation extends the outsourcing literature by investigating the behavioral implications of the three controls in the context of outsourcing. Research investigating controls in the outsourcing context has mainly focused on the effectiveness of controls (Cardinal et al., 2017). Using SDT, Chapter 4 (Study 3) argues that outcome, behavior, clan control can either enhance or diminish supplier mechanical compliance and intrinsic motivation considering whether each type of control increases or decreases the feeling of autonomy, competence, and relatedness. The results reveal contrasting findings as outcome control can lead to mechanical compliance such that suppliers sometimes do not use their idiosyncratic knowledge for which the organization had outsourced its tasks, but behavior control does not facilitate supplier mechanical compliance. Clan control is effective in reducing such a mechanical compliance from suppliers. Further, the results do not provide support for the assertion that both outcome and behavior control destroy intrinsic motivation, but shows that exercising clan control is beneficial for intrinsically motivating the supplier to perform the outsourced tasks. Therefore, these results suggest that different controls can have distinct behavioral implications in the outsourcing context. Future research should empirically examine the direct relationship between

outcome, behavior, clan control and the three drivers of intrinsic motivation: autonomy, competence, and relatedness to provide a clearer picture related to the mechanisms that underlie the behavioral consequences of the organizational controls.

5.4 MANAGERIAL IMPLICATIONS

The findings of this dissertation offer important insights for practitioners. First, managers should not rely on a single type of control to achieve the various performance outcomes in a particular context. Managers should use multiple types of controls to govern various tasks. The key take-away from all the empirical studies in this dissertation is that managers should prioritize those mechanisms that facilitates development of shared values, norms, and understanding to achieve greater performance benefits. However, this is not to suggest that managers should ignore those mechanisms that promotes benefits in exchange for work, but should exercise caution while exercising these controls to achieve their maximum potential.

Second, the findings of this dissertation suggest that managers cannot employ “one-size-fits” all configurational approach for managing different types of tasks. Managers should alter their control portfolio depending on the type of task that is being controlled. However, mangers can expect similar performance results if they exercise outcome and clan control across various type of tasks. Since behavior control can be less effective for tasks that involve high complexity and can potentially have no behavioral implications in tasks that span organizational boundaries, managers should be extra careful in exercising behavior control as they are costly to exercise.

Third, and finally, the findings of this dissertation suggest that NPD managers can facilitate flexible behaviors in suppliers to deal with emerging requirement by exercising outcome and clan controls. Doing so, NPD project managers can effectively manage the incorporation of the requirements that emerge over the course of NPD projects in the outsourced NPD tasks. The findings also suggest that the argument that specifying outcomes and behaviors destroy intrinsic motivation is not entirely valid. However, NPD managers should be careful in using outcome control to govern outsourced NPD tasks because as it can sometimes influence suppliers to not use their own idiosyncratic knowledge and way of working.

5.5 LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

While each study in this dissertation discusses its own limitation, the findings of this dissertation should also be viewed in the light of following limitations. First, the cross-sectional nature of the data in Chapter 3 (Study 2) and Chapter 4 (Study 3) limits us to make causality claims or to assess the dynamics of controls during the different stages of NPD projects. Future research should therefore conduct longitudinal and panel data studies to uncover the dynamic nature of organizational controls during the various stages of NPD projects. Second, the self-reported scales were used to capture the dependent variables in Chapter 3 and Chapter 4. Scholars have suggested that using objective scales can help in significantly reducing the issues related to single informant bias and, as such, is more reliable than self-reported scales (Ketokivi and Schroeder, 2004). Although our meta-analysis indicates that overall the

effectiveness of organizational controls does not vary between self-reported and objective (archival) data for various performance outcomes, but we still encourage empirical studies involving archival data. Third, the data in Chapter 3 and Chapter 4 were collected from respondents in the Netherlands. Future research could examine organizational controls in NPD outsourcing in other countries because cultural differences can lead to different controls being viewed differently by the ones over whom the controls are exercised (Cardinal et al., 2017).

In addition to addressing the aforementioned limitations, future research can also explore the following research areas. First, research has shown that risks, such as complexity and requirements risks, can also have an influence on the effectiveness of controls (Keil et al., 2013; Liu, 2015). Therefore, future research can introduce various risks in the empirical models that are examined in Chapter 3 (Study 2) and Chapter 4 (Study 3) to investigate if there is a change in the effectiveness of each control. Second, different types of controller-controllee relationships can influence the use of controls in a particular context depending on the type of interactions and dependence between the controller and controllee (Choudhury and Sabherwal, 2003; Kirsch and Choudhury, 2010). Therefore, future research can investigate how controller-controllee relationship structure influences the effectiveness of controls. Third, different leadership styles, such as transformational, transactional, and laissez-faire, can have distinct behavioral influences (Deluga, 1990). Given that leadership styles can also affect the control choices of managers (Kleine and Weißenberger, 2014), future research can explore the effect of leadership styles on the behavioral and performance implications of the organizational controls.

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Appendix 2.1. Studies used in the meta-analysis

S. No.	Study	Organizational Controls Construct Labels			Performance Outcome Labels				Performance Data	Organizational Setting	Task Type	Level of Analysis
		Outcome Control	Behavior Control	Clan Control	Rational-Goal	Process	Adaptability	Human Relations				
1	Aulakh and Gencturk (2000)	Output Control	Process Control	Social Control	Economic Performance	Agent Compliance	Flexibility		Self-Reported	Both*	Sales	Firm
2	Aulakh et al. (1996)	Output Control	Process Control	Social Control	Partnership Performance				Self-Reported	Inter-organizational	Sales	Firm
3	Babakus et al. (1996)		Behavior Control		Sales, Organizational Effectiveness, Outcome Performance, and Behavior Performance				Self-Reported	Intra-organizational	Sales	Business Unit and Individual
4	Baldauf et al. (2001a)		Behavior Control		Sales Unit Effectiveness, Behavioral Performance, and Outcome Performance				Self-Reported	Intra-organizational	Sales	Business Unit and Individual
5	Baldauf et al. (2001b)		Behavior Control		Sales Unit Effectiveness			Satisfaction with the Salesforce	Self-Reported	Intra-organizational	Sales	Business Unit and Individual
6	Baldauf et al. (2002)		Behavior Control		Sales Unit Effectiveness, Behavior Performance, and Outcome Performance				Self-Reported	Intra-organizational	Sales	Business Unit and Individual
7	Banker et al. (1996)	Performance Incentives (outcome-based)	Monitoring (behavior-based)		Sales, Customer Satisfaction Index, and Profit				Self-Reported and Archival	Intra-organizational	Sales	Firm
8	Bazyar et al. (2013)			Bilateral Control (Clan)	NPD Performance (shortened design time)				Self-Reported	Inter-organizational	NPD	Firm
9	Bello and Gilliland (1997)	Output Control	Process Control		Export Channel Performance				Self-Reported	Inter-organizational	Sales	Firm
10	Bonner et al. (2002)	Output Control	Process Control		Project Performance				Self-Reported	Intra-organizational	NPD	Project Team
11	Carbonell and Rodriguez-Escudero (2011)	Output Control	Process Control	Professional (Clan) Control	NPD Speed				Self-Reported	Intra-organizational	NPD	Project Team
12	Carbonell and Rodriguez-Escudero (2013)	Output Control	Process Control	Professional (Clan) Control	NP (new product) Performance			Job Satisfaction	Self-Reported	Intra-organizational	NPD	Project Team
13	Cardinal (2001)	Output Control Mechanisms	Behavior Control Mechanisms	Input Control Mechanisms			Innovation Outcomes		Archival	Intra-organizational	NPD	Firm
14	Challagalla and Shervani (1996)	Output Control	Activity and Capability Controls		Sales Performance			Satisfaction with Supervisor	Self-Reported	Intra-organizational	Sales	Business Unit
15	Cho and Son (2016)	Outcome Control			Process Performance and System Performance				Self-Reported	Inter-organizational	IS	Project Team

S. No.	Study	Organizational Controls Construct Labels			Performance Outcome Labels				Performance Data	Organizational Setting	Task Type	Level of Analysis
		Outcome Control	Behavior Control	Clan Control	Rational-Goal	Process	Adaptability	Human Relations				
16	Chou et al. (2015)		Behavior Control					Commitment	Self-Reported	Inter-organizational	Service	Firm
17	Evans et al. (2007)	Output Control	Process and Capability Control		Outcome Performance			Job Satisfaction	Self-Reported	Intra-organizational	Sales	Individual
18	Fang et al. (2005)	Outcome Control	Activity and Capability Controls		Outcome Performance and Behavior Performance				Self-Reported	Intra-organizational	Sales	Individual
19	Flaherty et al. (2007)	Output Control	Process Control,	Professional (Clan) Control	Individual Performance				Self-Reported	Intra-organizational	Sales	Individual
20	Flaherty and Pappas (2012)	Output Control		Professional (Clan) Control	Business Unit Performance and Selling Performance				Self-Reported	Intra-organizational	Sales	Business Unit and Individual
21	Florez et al. (2012)	Output Control	Process Control	Social Control	Overall Performance				Self-Reported	Inter-organizational	Sales	Firm
22	Gencturk and Aulakh (1995)	Output Control	Process Control		Relative Performance and Satisfaction				Self-Reported	Both*	Sales	Firm
23	Goebel and Weißenberger (2017)	Results Control	Action Control	Cultural and Personnel (Input) Controls	Organizational Performance	Control Effectiveness		Organizational Commitment	Self-Reported	Intra-organizational	Managerial Tasks	Firm
24	Goldbach and Benlian (Goldbach and Benlian, 2015)			Clan Control	App Quality				Archival	Both*	App Development	Individual
25	Goodale, Kuratko, Hornsby and Covin (2011)		Process Control Formality				Innovation Performance		Self-Reported	Intra-organizational	Innovation	Business Unit
26	Gopal and Gosain (2010)	Outcome control-quality, Outcome control-efficiency	Behavioral Control	Collaborative	Quality and Project Efficiency				Self-Reported	Intra-organizational	IS	Firm
27	Grewal et al. (2013)	Output Control	Process Control		Foreign Distributor (subsidiary) Performance				Self-Reported	Intra-organizational	Sales	Business Unit
28	Guenzi et al. (2014)	Output Control	Process Control	Professional (Input) Control	Sales Unit Effectiveness				Self-Reported	Intra-organizational	Sales	Business Unit
29	Gupta et al. (1994)		Bureaucratic Control		Performance				Self-Reported	Intra-organizational	Audit	Business Unit
30	Haney (2009)	Outcome Control	Behavior Control	Clan Control	Product Performance	Coordination Success			Self-Reported	Intra-organizational	IS	Project Team

S. No.	Study	Organizational Controls Construct Labels			Performance Outcome Labels				Performance Data	Organizational Setting	Task Type	Level of Analysis
		Outcome Control	Behavior Control	Clan Control	Rational-Goal	Process	Adaptability	Human Relations				
31	Henderson and Lee (1992)	Outcome			Efficiency, Effectiveness and Time				Self-Reported	Intra-organizational	IS	Project Team
32	Hernández-Espallardo and Arcas-Lario (2003)	Outcome Control	Behavior Control	Input Control			Responsiveness		Self-Reported	Inter-organizational	Sales	Firm
33	Hernández-Espallardo and Arcas-Lario (2008)	Outcome-based Control	Behaviour-based Control		Economic and Operational Performance				Self-Reported	Inter-organizational	Sales	Firm
34	Hitt et al. (1996)	Financial (Outcome) Control					External and internal innovation		Self-Reported	Intra-organizational	NPD	Firm
35	Huang et al. (2014)			Social Control	Cooperative Performance				Self-Reported	Inter-organizational	Collaborative Tasks	Firm
36	Hultink and Atuahene–Gima (2000)	Outcome Control	Behavior Control		Selling Performance				Self-Reported	Intra-organizational	Sales	Individual
37	Joshi and Randall (2001)	Output Control	Process Control	Professional (Clan) Control	Performance				Self-Reported	Inter-organizational	Sales	Individual
38	Keil et al. (2013)	Outcome Control	Behavioral Control	Clan Control	Process Performance				Self-Reported	Intra-organizational	IS	Project Team
39	Khan et al. (2015)			Formal socialization mechanisms and Informal socialization mechanisms			Knowledge Transfer Efficiency		Self-Reported	Inter-organizational	Assembling	Firm
40	Kihn (2007)	Financial Controls and Nonfinancial Controls	Behavioral Controls		ROI-Short Term Profitability				Archival	Intra-organizational	Managerial tasks	Firm
41	Kim and Takashima (2014)	Outcome-based Control			Strategic and Financial Performance	Cooperation			Self-Reported and Archival	Inter-organizational	Merchandising	Firm
42	Kim and Takashima (2016)	Outcome-based Control	Behavior-based Control		Sales Growth				Archival	Inter-organizational	Merchandising	Firm
43	Kim and Tiwana (2016)	Outcome Control	Process Control	Informal Control and Input Control	Salesperson Performance		Manufacturer Flexibility		Self-Reported	Intra-organizational	Sales	Firm and Individual
44	Kim and Tiwana (2017)	Outcome Control	Process Control	Input Control	Salesperson Performance				Self-Reported	Inter-organizational	Sales	Firm
45	Klein et al. (2006)	Management Outcome Control	Management Behavior Control		Project Performance				Self-Reported	Intra-organizational	IS	Firm

S. No.	Study	Organizational Controls Construct Labels			Performance Outcome Labels				Performance Data	Organizational Setting	Task Type	Level of Analysis
		Outcome Control	Behavior Control	Clan Control	Rational-Goal	Process	Adaptability	Human Relations				
46	Kreutzer et al. (2015)	Outcome Control	Behavior Control	Input Control	Strategic Initiative Performance				Self-Reported	Intra-organizational	Strategic Initiatives	Firm
47	Li et al. (2010)	Outcome Control	Behaviour Control	Clan Control			Endogenous Innovation and Knowledge Exploitation		Self-Reported	Intra-organizational	NPD	Firm
48	Li et al. (2011)	Financial (Output) Control					Endogenous Innovation and Knowledge Exploitation		Self-Reported	Intra-organizational	NPD	Firm
49	Liao (2005)	Output Control	Behavior Control	Input Control	Firm Performance		Innovativeness		Self-Reported	Intra-organizational	Various tasks	Firm
50	Liao (2006)	Output Control	Behavior Control	Input Control	Firm Performance				Self-Reported	Intra-organizational	Various tasks	Firm
51	Liu (2015)	Outcome Control	Behavior Control	Clan Control	System Performance				Self-Reported	Inter-organizational	IS	Firm
52	Liu and Wang (2016)	Outcome Control	Behavior Control	Clan Control	Project Performance				Self-Reported	Intra-organizational	IS	Project Team
53	Liu et al. (2008)		Software Process Standardization as Behavior Control		Project Performance		Software Flexibility		Self-Reported	Intra-organizational	IS	Firm
54	Lovett et al. (2009)	Results Control	Action Control	Cultural Control	Subsidiary Performance				Self-Reported	Intra-organizational	Various tasks	Firm
55	Lukas and Menon (2004)			Informal Control	NPD Speed and New Product Quality				Self-Reported	Intra-organizational	NPD	Project Team
56	Lusch and Jaworski (1991)	Output Control		Social Control	Store Manager Performance				Self-Reported	Intra-organizational	Sales	Individual
57	Maruping (2006)	Outcome Control	Behavior Control	Clan Control	Team Effectiveness			Team Satisfaction	Self-Reported	Intra-organizational	IS	Project Team
58	Maruping et al. (2009)	Outcome Control			Software Project Quality				Archival	Intra-organizational	IS	Project Team
59	Matsuo (2009)	Output-based Control	Behavior-based Control		Sales Performance		Sales Innovativeness		Self-Reported	Intra-organizational	Sales	Business Unit
60	Maurer (2013)	Output Control	Process Control	Clan Control	Relative Performance				Self-Reported	Both*	IS	Various
61	Mellewigt et al. (2011)	Outcome Control	Behavior Control					Satisfaction	Self-Reported	Both*	Sales	Firm
62	Menguc and Barker (2003)	Incentive Pay (Outcome)	Supervisor Monitoring (Behavior)		Organizational Performance				Self-Reported	Intra-organizational	Sales	Business Unit
63	Miao and Evans (2013)	Outcome Control	Activity and Capability Controls		Salesperson Performance				Self-Reported	Intra-organizational	Sales	Individual

S. No.	Study	Organizational Controls Construct Labels			Performance Outcome Labels				Performance Data	Organizational Setting	Task Type	Level of Analysis
		Outcome Control	Behavior Control	Clan Control	Rational-Goal	Process	Adaptability	Human Relations				
64	Miller et al. (2013)		Activity Control and Process Control		Operational Performance				Self-Reported	Both*	Logistics	Firm
65	Morris et al. (2015)	Outcome-based Incentives	Process-based Incentives					Trust in Purchasing Manager	Self-Reported	Intra-organizational	Service	Project Team
66	Nagpal (2009)	Outcome Controls		Clan Controls	Business Performance				Self-Reported	Both*	IS	Firm
67	Nakos and Brouthers (2008)		Process Control		International Performance				Self-Reported	Inter-organizational	Sales	Firm
68	Netland et al. (2015)	Output control: employee financial and nonfinancial rewards	Process control: performance reporting and internal audits	Input control: allocation of responsibilities for lean implementation	Operational Performance				Self-Reported	Intra-organizational	Lean implementation	Firm
69	Nidumolu and Subramani (2003)	Standardization of performance criteria and Decentralization of performance criteria	Standardization of methods and Decentralization of methods		Software Development Process Performance				Self-Reported	Intra-organizational	IS	Project Team
70	Nohria and Ghoshal (1994)			Shared Values (Clan)	RoA, RoGR and Average Annual Sales Growth				Archival	Intra-organizational	Various tasks	Firm
71	Panagopoulos and Dimitriadis (2009)		Behavior-based Control		Job Performance			Satisfaction with Supervisor and Organizational Commitment	Archival	Intra-organizational	Sales	Business Unit
72	Panagopoulos et al. (2015)	Output Control	Process Control	Professional (Clan) Control	Firm Financial, Sales Force Behavioral, Customer Relationship and Outcome Performance				Self-Reported and Archival	Intra-organizational	Sales	Firm and Individual
73	Perrone et al. (2003)			Clan Cutlure				Trust in Purchasing Manager	Self-Reported	Inter-organizational	Sales	Firm
74	Piercy et al. (2004)		Behavioral Control		Sales Unit Effectiveness, Behavior Performance, and Outcome Performance				Self-Reported	Intra-organizational	Sales	Business Unit and Individual

S. No.	Study	Organizational Controls Construct Labels			Performance Outcome Labels				Performance Data	Organizational Setting	Task Type	Level of Analysis
		Outcome Control	Behavior Control	Clan Control	Rational-Goal	Process	Adaptability	Human Relations				
75	Piercy et al. (2009)		Sales Manager Behavior-based Control Level		Sales Unit Effectiveness, Behavior Performance, and Outcome Performance				Self-Reported	Intra-organizational	Sales	Individual
76	Piercy et al. (2012)		Sales Manager Control Level (Behavior)		Salesperson Performance				Self-Reported	Intra-organizational	Sales	Business Unit and Individual
77	Rajagopal (2007)		Behavioral Control		Sales Unit Effectiveness, Behavior Performance, and Outcome Performance				Self-Reported	Intra-organizational	NPD	Project Team
78	Rijsdijk and van den Ende (2011)	Outcome Control	Process Control	Clan Control	Project Timeliness, Cost Performance, Product Concept Effectiveness, and Financial Performance				Self-Reported	Intra-organizational	Banking	Firm
79	Rodrigues et al. (2015)	Output Control	Behavior-based Control	Professional (Clan) Control			Learning Orientation		Self-Reported	Intra-organizational	Call Center	Firm
80	Sahadev et al. (2017)	Outcome Control	Activity and Capability Control				Interpersonal and Service Adaptiveness		Self-Reported	Intra-organizational	Logistics	Firm
81	Saldanha et al. (2013)	Output Control	Activity Control	Professional (Clan) Control	Operational Performance and Market Performance				Self-Reported	Both*	Logistics	Firm
82	Saldanha et al (2014)	Output Control	Activity Control		Operational Performance and Market Performance				Self-Reported	Both*	Not Mentioned	Firm
83	Schnatterly (2003)		Policies and Procedures (Behavior)		Past Performance				Archival	Intra-organizational	Sales	Firm
84	Sengün and Wasti (2009)	Output Control		Social Control	Perceived Performance				Self-Reported	Inter-organizational	NPD	Project Team
85	Smets et al. (2013)	Output Control	Process Control		Sales Volume				Archival	Inter-organizational	NPD	Project Team
86	Smets et al. (2016)	Output Control	Process Control	Input Control		Coordination Effectiveness		Cooperative Behavior	Self-Reported	Inter-organizational	NPD	Project Team
87	Snell and Youndt (1995)	Output Control	Behavior Control	Input Control	ROA and Growth in Sales				Archival	Intra-organizational	HRM	Firm
88	Solberg (2006a)	Output Control	Process Control	Clan Control	Performance				Self-Reported	Inter-organizational	Sales	Firm
89	Solberg (2006b)	Outcome Control	Process Control	Clan Control	Performance		Flexibility	Relationship Quality	Self-Reported	Inter-organizational	Sales	Firm
90	Spillecke and Brettel (2013)	Output Control	Activity and Capability Controls		Customer Satisfaction, Market Effectiveness, and Profitability		Innovativeness		Self-Reported	Intra-organizational	Sales	Firm
91	Stouthuysen et al. (2012)	Output Control	Behavior Control	Informal (Clan) Control	Perceived Supplier Performance				Self-Reported	Inter-organizational	Service	Firm

S. No.	Study	Organizational Controls Construct Labels			Performance Outcome Labels				Performance Data	Organizational Setting	Task Type	Level of Analysis
		Outcome Control	Behavior Control	Clan Control	Rational-Goal	Process	Adaptability	Human Relations				
92	Thomas and Ambrosini (2015)	Output Control	Process Control	Professional (Clan) Control	Implementation Performance				Self-Reported	Intra-organizational	Not Mentioned	Firm
93	Tiwana (2008)	Outcome Control	Process Control	Relational Governance (Clan)	Alliance Performance				Self-Reported	Inter-organizational	IS	Project Team
94	Tiwana (2009)	Use of Outcome Controls	Use of Behavior Controls		ISD Inefficiency and Effectiveness				Self-Reported	Intra-organizational	IS	Project Team
95	Tiwana (2010)	Outcome Control	Behavior Control	Clan Control	System Development Ambidexterity				Self-Reported	Inter-organizational	IS	Project Team
96	Tiwana (2015)	Output Control		Clan Control	Market Performance				Self-Reported	Intra-organizational	IS	Firm
97	Tiwana and Keil (2007)	Outcome Control	Process Control	Relational Governance (Clan)	Alliance Performance				Self-Reported	Inter-organizational	IS	Project Team
98	Tiwana and Keil (2009)	Outcome Control	Behavior Control	Clan Control	System Development Performance				Self-Reported	Both*	IS	Firm
99	Voss and Brettel (2014)	Outcome Control	Behavior Control	Professional (Clan) and Input Controls	Firm Performance				Self-Reported	Intra-organizational	HRM	Firm
100	Wallenburg and Schäffler (2014)	Outcome Control		Process Control	Alliance Performance				Self-Reported	Inter-organizational	Logistics	Firm
101	Wiener et al. (2015)			Clan-control Given and Received	Project Efficiency and Project Quality				Self-Reported	Inter-organizational	IS	Project Team
102	Wohlgemuth (2014)	Outcome Control, Behavior Control, Social Control			Performance		Dynamic Capabilities		Self-Reported	Intra-organizational	Various Tasks	Firm
103	Wynstra et al. (2012)	Monetary Quantification of Differences and Detail Gathering as Outcome Control			Development Speed and Product Advantage				Self-Reported	Inter-organizational	NPD	Project Team
104	Yi et al. (2012)	Financial (Outcome) Control					Radical Innovation		Self-Reported	Intra-organizational	HRM	Firm
105	Ylinen and Gullkvist (2014)	Mechanistic (Outcome) Control		Organic (Clan) Control	Project Performance		Innovativeness		Self-Reported	Intra-organizational	NPD	Project Team
106	Yu and To (2008)	Output Control	Behavior Control	Input Control			Capacity for Improvement		Self-Reported	Intra-organizational	HRM	Firm
107	Yu and To (2011)	Output Control	Behavior Control	Input Control	Customer Satisfaction		Responsiveness		Self-Reported	Intra-organizational	HRM	Firm
108	Zhang et al. (2008)	Output Control	Process Control			Intrafirm Coordination	Flexibility		Self-Reported	Inter-organizational	Sales	Firm

Notes: *The categorization 'both' means that the study investigated both intra- and inter-organizational settings.

Appendix 3.1. Measurement Scales

Construct Name	Measures	SFL
Outcome control ($\alpha = 0.79$; CR = 0.80; AVE = 0.49)	To what extent did you influence the external party by setting goals? (1 = strongly disagree, 7 = strongly agree)	
	• We monitored the degree to which the external party achieved specific goals	0.77
	• We evaluated the external party on the degree to which it achieved these specified goals	0.71
	• We strongly emphasized attaining project goals	0.80
	• We assessed the extent to which our organization adhered to predetermined budgets	0.52
	• We set clear goals for the external party concerning the cycle time of the project	0.65
	• We clarified which customer requirements the product should meet[a]	-
	• We used pre-specified technical specifications as a benchmark for evaluations[a]	-
Behavior control ($\alpha = 0.92$; CR = 0.93; AVE =0.73)	To what extent did you control the external party project by specifying the procedures and processes to be followed? (1 = strongly disagree, 7 = strongly agree)	
	• We formulated detailed and comprehensive specifications for the procedures that the external party had to follow	0.78
	• We specified the processes and methods by which the external party had to operate	0.96
	• We monitored whether the external party operated according to prescribed methods	0.89
	• Our evaluations of the external party were strongly based on how well they followed specified processes or procedures	0.86
	• We strongly emphasized that the external party conducted the tasks according to our prescriptions	0.76
	• We determined the actions that the external party had to take during the project[a]	-
Clan control ($\alpha = 0.87$; CR = 0.90; AVE = 0.60)	To what extent did you try to build a sense of unity between the members of your organization and those of the external party? (1 = strongly disagree, 7 = strongly agree)	
	• We tried to achieve a sense of unity among the members of our organization and those of the external party	0.74
	• We ensured that the members of the external party strongly felt part of the project	0.80
	• We put considerable emphasis on achieving shared goals, values, and norms between the members of our organization and those of the external party	0.64
	• There was a strong sense of common spirit between our organization and the external party	0.82

Construct Name	Measures	SFL
	• We tried hard to have good relations with the team members of the external party	0.76
	• There was a bond of trust between our organization and the external party	0.83
Knowledge integration mechanisms (KIMs) (α = 0.77; CR = 0.80; AVE = 0.60)	To what extent did the project use the following methods for capturing knowledge and information and communicating it between your organization and the external party? (1 = strongly disagree, 7 = strongly agree)	
	• Regular formal reports and memos that summarize learning	0.49
	• Formal analyses of problems in the project	0.98
	• Formal analyses of pleasant surprises within the project	0.77
	• Information-sharing meetings[a]	-
	• Face-to-face meetings between members of the different organizations[a]	-
Supplier flexibility (α = 0.90; CR = 0.90; AVE = 0.70)	How would you describe the flexibility of the external party? (1 = strongly disagree, 7 = strongly agree)	
	• They reacted flexibly in response to requests for changes	0.85
	• They were open to revising prior agreements	0.79
	• They had no problems with adapting to changes in the product requirements	0.84
	• They were prepared to adjust initial agreements if this was required by the situation	0.86
	• They would rather work out a new plan than hold on to the original agreements when an unexpected situation arose[a]	-
NPD project performance (Formative construct) (NA)	Please indicate the level of success of the project compared to the project goals for the following project outcomes. (1 = much worse than preset goals, 4 = equal to preset goals, 7 = much better than present goals)	
	• Timing	-
	• Budget	-
	• Quality	-
	• Technical performance	-
	• General satisfaction	-
Geographic proximity (NA)	Was the most important contact of the external party located abroad or in your own country? 0 = Abroad, 1 = Domestic	-
Previous projects (NA)	How many prior projects did you execute together with this external party? …projects	-
Relationship duration (NA)	For how many years has your organization been working together with the external party? …years	-

Construct Name	Measures	SFL
Supplier team members (NA)	How many employees of the external party worked on this project? … employees	-
Product component (NA)	Does the 'product' under development concern a component of a larger system or an independent product? 0 = Component, 1 = Independent product	-
Software platform (as marker variable) (NA)	Was the software platform used during this project Microsoft Windows? 0 = No, another platform, 1 = Yes, Microsoft Windows	-

Notes: SFL = Standardized factor loading, α = Cronbach's alpha, CR = Composite reliability, AVE = Average variance extracted. NA = Not applicable. [a]This item was deleted from further analysis because of its low or cross factor loading.

Appendix 3.2. Dealing with Suppression Effect

Conger (1974, pg. 36) notes that "a suppressor variable is defined to be a variable that increases the predictive validity of another variable (or set of variables) by its inclusion in a regression equation". According to Tzelgov and Henik (1991), a suppression effect occurs because the suppressor variable has either no or very few elements in common with the dependent variable but it shares information with other correlated variables that is irrelevant to the dependent variable. To check for the suppression effect, we used the procedure suggested by Maassen and Bakker (2001). We analyzed different regression models with outcome control and each of the other four predictors of NPD project performance (i.e., behavior control, clan control, KIMs, and supplier flexibility). The analysis reveals that the negative path coefficient between outcome control and NPD project performance became larger and significant when each of the four antecedents were also included as a predictor of NPD project performance in alternative regression models. Therefore, the analysis suggests that when the variance in NPD project performance due to behavior control, clan control, KIMs, and supplier flexibility was accounted for, the remaining variance correlated with outcome control revealed a negative relationship (Cheung and Lau, 2008; Maassen and Bakker, 2001). This indicates that the other predictors were acting as suppressors for outcome control (the suppressed variable) in relation to NPD project performance (cf. Wei, Frankwick, and Nguyen 2012).

Appendix 4.1. Measurement Scales

Construct Name	Measures	SFL
Outcome control ($\alpha = 0.84$; CR =0.83; AVE = 0.56)	To what extent did the external party influence the project by setting goals? (1=strongly disagree, 7=strongly agree)	
	• They monitored the degree to which our organization achieved specific goals	0.82
	• They evaluated our organization on the degree to which it achieved these specified goals	0.87
	• They strongly emphasized attaining project goals	0.69
	• They assessed the extent to which our organization adhered to predetermined budgets	0.59
	• They set clear goals for our organization concerning the cycle time of the project	-
	• They clarified which customer requirements the product should meet[a]	-
	• They used prespecified technical specifications as a benchmark for evaluations[a]	-
Behavior control ($\alpha = 0.92$; CR =0.92; AVE = 0.65)	To what extent did the external party influence the project by specifying the procedures and processes to be followed? (1=strongly disagree, 7=strongly agree)	
	• They formulated detailed and comprehensive specifications for the procedures that our organization had to follow	0.86
	• They specified the processes and methods by which our organization had to operate	0.92
	• They monitored whether we operated according to prescribed methods	0.79
	• Their evaluations of our organization were strongly based on how well we followed specified processes or procedures	0.80
	• They determined the actions we had to take during the project	0.68
	• They strongly emphasized that our organization conducted the tasks according to their prescriptions	0.78
Clan control ($\alpha = 0.88$; CR =0.88; AVE = 0.60)	To what extent did the external party try to build a sense of unity between the members of your organization and those of the external party? Please indicate to what extent you agree with each of the statements below. (1=strongly disagree, 7=strongly agree)	
	• They tried to achieve a sense of unity among the members of our organization and those of their organization	0.73
	• They ensured that the we strongly felt part of the project	0.73
	• They put considerable emphasis on achieving shared goals, values and norms between the members of our organization and those of their organization	0.65
	• There was a strong sense of common spirit between the external party and our organization	0.81

Construct Name	Measures	SFL
	• They tried hard to have good relations with the team-members of our organization	0.85
	• There was a bond of trust between their organization and ours[a]	-
Supplier mechanical compliance (α = 0.82; CR = 0.84; AVE = 0.52)	Please indicate to what extent you agree with each of the following statements on how you complied with the prescriptions of the external party. (1=strongly disagree, 7=strongly agree)	
	• We sometimes complied to prescriptions of the external party against our better judgment	0.70
	• Within this project we sometimes left our expertise unused because our views would not fit those of the external party	0.67
	• The external party's word was law	0.56
	• We conducted certain tasks the way the external party wanted, even though this was not always the most effective way	0.80
	• We were reluctant to bring forward our views because they did not match those of the external party	-
	• We sometimes followed up instructions from the external party, even though we would normally go about it in a different way	0.85
Intrinsic motivation (α = 0.92; CR =0.92; AVE = 0.70)	Please indicate to what extent the members of your organization were intrinsically motivated for this project. (1=strongly disagree, 7=strongly agree) Our employees…	
	• worked on this project enthusiastically	0.87
	• enjoyed performing their tasks	0.90
	• were motivated to solve certain problems with this project	0.84
	• were completely absorbed by their work for this project	0.81
	• enjoyed the new things they learned	0.76
Previous projects	How many prior projects did you execute together with this external party? …projects	-
Relationship duration	For how many years has your organization been working together with the external party? …years	-
Software platform (as marker variable) (NA)	0 =No, another platform, 1 = Yes, Microsoft Windows	-

Notes: SFL = Standardized factor loading, α = Cronbach's alpha, CR = Composite reliability, AVE = Average variance extracted. NA = Not Applicable

[a]This item was deleted from further analysis because of its low or cross factor loading

Summary

Management scholars and practitioners have long acknowledged that organizational controls are an integral part of organizational functioning. Managers exercise organizational controls to direct and motivate employees and external partners to behave in desired ways. Even though controls have been recognized as an important aspect of the managers' organizational life, the behavioral and performance consequences of the three commonly specified prototypical organizational controls (outcome, behavior, clan) remain equivocal. The aim of this dissertation was therefore to improve the understanding about what are the behavioral and performance consequences of outcome, behavior, and clan control. To investigate this research question, the dissertation focused on two research objectives.

The first main objective of this dissertation was to assess the relationship of three organizational controls and various performance outcomes along with their performance effects in combination. The first empirical study meta-analyzes the empirical evidence related to organizational controls-performance relationships. The study shows that outcome, behavior, and clan controls generally enhance performance, with each control having distinct relationships with various performance outcomes. The study also reveals that controls act as complements and that exercising one type of control increases the effectiveness of the others. The meta-analytic study also demonstrates that controls' effectiveness depends partly on the task that is being controlled, in particularly for new product development (NPD) tasks. Further, the meta-analytic sample reveals that controls research on NPD projects that span organizational boundaries remain limited.

The second main objective of this dissertation is to address these critical research gaps in the current literature. Thus, the second and third empirical studies focus on the use of outcome, behavior, and clan controls in NPD outsourcing. Those studies focus on the role of distinctive intervening factors, particularly supplier flexibility in the second study, and on mechanical compliance and intrinsic motivation in the third study.

The second empirical study investigates the influence of the three organizational controls and knowledge integration mechanisms (KIMs) on NPD project performance via supplier flexibility. The study focuses on both cooperation and coordination as both of them are needed to facilitate flexible behavior in external partners. Based on survey data from clients in 109 outsourced NPD projects, the study shows that both outcome and clan controls are important for fostering flexible behaviors from suppliers. Exercising behavior control and KIMs, however, do not help organizations to facilitate supplier flexibility. The study also reveals that an increase in supplier flexibility is associated with high levels of NPD project performance. Post-hoc analyses, however, reveal that outcome control functions as a double-edged sword because it has both beneficial and adverse effects on NPD project performance.

The third study examines behavioral consequences of outcome, behavior, and clan controls in NPD outsourcing. Using self-determination theory, the study posits that controls which draw on extrinsic motivation can induce supplier mechanical compliance and diminish intrinsic motivation. In contrast, controls that involve internalization of values, beliefs and norms reduce mechanical compliance and enhance intrinsic motivation. An empirical investigation based on survey data from 114 suppliers involved in NPD outsourcing demonstrates that outcome control promotes supplier mechanical compliance, but, surprisingly, does not undermine intrinsic motivation of the suppliers. Behavior control is neither associated with mechanical compliance nor intrinsic motivation. Clan control, on the other hand, not only reduces mechanical compliance from a supplier, but also fosters intrinsic motivation in the suppliers to perform the outsourced NPD tasks.

Overall, this dissertation informs managers and scholars about the behavioral and performance consequences of exercising organizational controls, both, in general and NPD outsourcing.

Samenvatting (Dutch Summary)

Wetenschappers en professionals hebben lang erkend dat organisatorische controlemechanismen een integraal onderdeel zijn van het functioneren van organisaties. Managers zetten organisatorische controlemechanismen in om werknemers en externe partners te sturen en te motiveren om zich op de gewenste manier te gedragen. Hoewel organisatorische controlemechanismen worden erkend als een belangrijk aspect van het dagelijkse leven van managers, blijft er onduidelijkheid bestaan over de effecten van drie organisatorische controlemechanismen (outcome, behavior, clan) op gedrag en prestaties. Dit proefschrift richtte zich daarom op het verbeteren van ons begrip van wat de gedrags- en prestatieconsequenties zijn van outcome-, behavior- en clan-controlemechanismen. Om deze onderzoeksvraag te beantwoorden, heeft het proefschrift twee onderzoeksdoelen.

De eerste hoofddoelstelling van dit proefschrift was het beoordelen van de relatie tussen drie organisatorische controlemechanismen en verschillende prestatie-uitkomsten. Het eerste empirische onderzoek vergelijkt het empirische bewijsmateriaal dat verband houdt met organisatorische controlemechanismen – prestatie relaties aan de hand van een meta-analyse. Het onderzoek laat zien dat outcome-, behavior- en clan-controlemechanismen over het algemeen prestaties verbeteren, waarbij elke controlemechanisme een duidelijke relatie heeft met verschillende prestatie-uitkomsten. Daarnaast laat het onderzoek zien dat het combineren van controlemechanismen de effectiviteit van elk controlemechanisme verhoogt. Het meta-analytische onderzoek toont ook aan dat de effectiviteit van controlemechanismen deels afhangt van de taak die onderworpen is aan controle. Dit geldt met name voor NPD-taken. Daarnaast onthult de analyse van de onderliggende onderzoeken dat onderzoek over controlemechanismen ingezet in NPD-projecten die organisatorische grenzen overschrijden beperkt is.

De tweede hoofddoelstelling van dit proefschrift is om deze belangrijke tekortkoming in de bestaande literatuur te adresseren. De tweede en derde empirische studies onderzoeken daarom het gebruik van outcome-, behavior-

en clan-controlemechanismen bij NPD-uitbesteding. Deze onderzoeken richten zich op de rol van onderscheidende interveniërende factoren, leveranciersflexibiliteit in het tweede onderzoek, en mechanische compliance en intrinsieke motivatie in het derde onderzoek.

Het tweede empirische onderzoek bestudeert de invloed van de drie organisatorische controlemechanismen en kennisintegratiemechanismen (KIM's) op de prestaties van NPD-projecten via leveranciersflexibiliteit. De focus ligt hierin op samenwerking als coördinatie omdat beide nodig zijn om flexibel gedrag bij externe partners te faciliteren. Door een survey dataset bestaande uit 109 NPD-projecten te analyseren, toont dit onderzoek aan dat zowel outcome- als clan-controlemechanismen belangrijk zijn voor het stimuleren van flexibel gedrag van leveranciers. Daarentegen helpt het inzetten van behavior-controlemechanismen en KIM's organisaties niet om flexibiliteit van leveranciers te faciliteren. Het onderzoek laat ook zien dat een toename in leveranciersflexibiliteit gepaard gaat met hoge niveaus van NPD-projectprestaties. Post-hoc analyse laat echter zien dat outcome-controlemechanisme zowel gunstige als negatieve effecten heeft op de prestaties van NPD-projecten.

Het derde onderzoek bestudeert gedragsconsequenties van outcome-, behavior- en clan-controlemechanismen bij NPD-uitbesteding. Aan de hand van zelfbeschikkingstheorie stelt het onderzoek dat outcome- en behavior-controlemechanismen voor mechanische compliance van de leverancier kan zorgen, maar intrinsieke motivatie verdringen. Daarentegen vermindert de inzet van clan-controlemechanisme mechanische compliance maar verhoogt tegelijkertijd intrinsieke motivatie. Aan de hand van een empirisch onderzoek gebaseerd op een survey dataset die 114 leveranciers betrokken bij NPD uitbesteding betreft, laat het onderzoek zien dat outcome-controlemechanismen de mechanische compliance van leveranciers bevordert maar verrassend genoeg de intrinsieke motivatie van de leveranciers niet ondermijnt. Behavior-controlemechanismen zij niet geassocieerd met mechanische compliance en intrinsieke motivatie. Het inzetten van clan-controlemechanismen vermindert daarentegen niet alleen de mechanische compliance van een leverancier, maar verhoogt ook de intrinsieke motivatie om de uitbestede NPD-taken uit te voeren.

In het geheel genomen ontwikkelt dit proefschrift belangrijke praktische inzichten en theoretische bijdragen over potentiële gedrags- en prestatieconsequenties van het inzetten van organisatorische controlemechanismen zowel in het algemeen als voor NPD uitbesteding.

About the Author

Vikrant Sihag was born in 1985 in Hisar, Haryana, India. He has a Bachelor of Technology degree in Mechanical Engineering from National Institute of Technology Durgapur, India, with first class distinction, and a Master of Science degree in Supply Chain Management from Malaysia Institute for Supply Chain Innovation. Prior to pursuing his master's degree, he worked at Personal Care Products SBU of ITC Limited (India), where he was primarily responsible for implementing systems and processes and managing improvement initiatives.

Vikrant pursued his doctoral research at the Innovation Management section of the department of Technology and Operations Management at Rotterdam School of Management, Erasmus University. His doctoral research focuses on the behavioral and performance implications of organizational controls. Vikrant's research interests lie at the intersection of organizational controls, new product development, and inter-organizational relationships. He has presented his research at several international management conferences, such as Academy of Management, Innovation and Product Development Management Conference, and International Purchasing and Supply Education and Research Association.

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Portfolio

PUBLICATIONS AND WORK IN PROGRESS

Sihag, V., Rijsdijk, S.A. *"Organizational Controls and Performance Outcomes: A Meta-Analytic Assessment and Extension"*. Journal of Management Studies, 56(1), pp. 91–133. doi: 10.1111/joms.12342.

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CONFERENCE PRESENTATIONS

Sihag, V., Rijsdijk, S.A.. "Supplier Compliance or Motivation? A Self-Determination Theory Perspective of Organizational Controls in New Product Development Outsourcing". *Accepted for presentation as competitive paper in IPSERA (International Purchasing and Supply Education and Research Association) 2019 Conference, Milan, Italy.*

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Organizational controls have been recognized as an important aspect of the managers' organizational life. Managers exercise organizational controls to direct and motivate employees and external partners to behave in desired ways. The extant research on the effectiveness of outcome, behavior, and clan control remains equivocal. This dissertation therefore focuses on two research objectives that aims to improve the understanding related to the behavioral and performance consequences of outcome, behavior, and clan control. The first research objective was to meta-analyze the relationship between the three organizational controls and performance along with their performance effects in combination. The second research objective was to investigate the behavioral and performance consequences of the three organizational controls in NPD outsourcing.

The two research objectives were met by conducting three empirical studies. The first study elucidates the relationships of outcome, behavior, and clan control with various performance outcomes, as well as that they act as complements. The second study reveals the effect of outcome, behavior, and clan control on supplier flexibility in NPD outsourcing, and what effect this has on NPD project performance. The third study examines whether the three organizational controls can influence a supplier to adhere to the specified prescriptions such that it sometimes does not use its own idiosyncratic expertise (supplier mechanical compliance), and also restrict the intrinsic motivation of the supplier in NPD outsourcing.

Collectively, this dissertation informs managers and scholars about the potential behavioral and performance consequences of exercising organizational controls, both, in general and NPD outsourcing.

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