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# Organizational Controls and Performance Outcomes: A Meta-Analytic Assessment and Extension

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**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, behaviour, 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, behaviour, 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.

**Keywords:** complementarity, inter-organizational, level of analysis, meta-analysis, organizational controls, task type

## 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

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controls, or when controls are used inappropriately, controllees are assumed to act in ways that favour 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, behaviour, and clan (Ouchi, 1979; Turner and Makhija, 2006). Outcome and behaviour controls focus on the specification and evaluation of desired task outcomes and behaviours. Clan controls involve socialization and input (e.g., selection and training) mechanisms for influencing controllees' behaviour (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 et al., 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, behaviour, 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 behaviour 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 (e.g., Eisenhardt, 1985; 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, behaviour, 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: (1) How do organizational controls affect performance, and (2) Do controls *substitute* or *complement* one another's effects? To investigate these questions, we need to meta-analyse 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 artefacts, 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 matters. 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.

## **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*, *behaviour*, and *clan*.<sup>1</sup> Controllers (who exercise control) can use outcome, behaviour, and clan controls to motivate the controllees (those over whom the control is exercised) to achieve the desired performance (Kirsch, 1996; Tiwana, 2008).

### **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' behaviour 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 behaviour 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 behaviour 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, behaviour 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' behaviour involves substantial time and cost (Eisenhardt, 1985). Despite these disadvantages, researchers assert that behavior control involves dynamic involvement from controllers as

they need to actively provide input on the behaviours 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, behaviour control motivates controllees to follow the specified procedures and achieve the desired performance. In line with these arguments, we propose that:

*Hypothesis 1b:* Behaviour 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).<sup>2</sup> 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 behaviours (Kirsch et al., 2010). Unlike outcome and behaviour control, clan control relies on common values and norms to put pressure on controllees to conform to acceptable behaviours (Barker, 1993; Kirsch et al., 2010). As such, clan control helps to guide controllees toward actions and behaviours 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 behaviour 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.

### **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, behaviour, 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, p. 22). They contend that exercising multiple organizational controls simultaneously creates redundancies and inefficiencies, thus weakening the impact of individual controls on performance. For example, Rijdsdijk and van den Ende (2011) postulate that using clan control and behaviour control as complements is 'inefficient', because clan control weakens the positive influence of behaviour control on performance 'as both types of controls are relatively communication-intensive' (Rijdsdijk and van den Ende, 2011, p. 876). Clan control can replace behaviour control as both perform the same function of reducing the ambiguity surrounding the behaviours 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 behaviour 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 behaviour 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 behaviours (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, p. 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., 2015, 2016). 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 behaviour 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 behaviours and the effectiveness of behaviour control is thereby increased. Further, the communication between controller and controllee while behaviour control is being exercised can also facilitate interpersonal relationships between them, and this can establish conditions that are favourable for effective clan control (Choudhury and Sabherwal, 2003; Kirsch, 2004).

Scholars also argue that exercising outcome and behaviour 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 behaviours and at the same time reduces their tendency to show ineffective behaviours. 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, behaviour, and clan controls weaken one another's effects on performance.

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

## METHODS

### 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’, ‘behaviour 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 labelled differently but have identical measures and constructs that are labelled 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 I 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



Table I. Definition of study constructs and representative measures

<i>Construct</i>	<i>Definition and representative measures</i>
Outcome Control	<p><i>Construct Definition:</i> 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).</p> <p><i>Representative Measures:</i> Our company establishes specific and clear performance objectives for the service provider (Stouthuysen, Slabbinck, and Roodhooft, 2012); The client placed significant weight on accomplishing project goals (Tiwana, 2008).</p>
Behaviour Control	<p><i>Construct Definition:</i> Control where the controller specifies appropriate behaviours, explicit procedures, or rules for the controllee, and monitors and evaluates controllees based on their performance relative to specified behaviours or procedures (Cardinal, 2001; Turner and Makhija, 2006).</p> <p><i>Representative Measures:</i> The project followed documented processes for software development (Gopal and Gosain, 2010); Upper management specified procedures used by the team (Bonner et al., 2002).</p>
Clan Control	<p><i>Construct Definition:</i> 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 behaviours (Cardinal et al., 2010; Kirsch et al., 2010).</p> <p><i>Representative Measures:</i> There was a strong community feeling between myself and the team members (Rijdsdijk 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).</p>
Performance	<p><i>Construct Definition:</i> Multi-dimensional measures that include self-reported evaluations and archival records of goal accomplishments.</p> <p><i>Representative Measures:</i> Adherence to schedules, overall effectiveness, overall efficiency (Tiwana and Keil, 2007); Customer satisfaction, market share, profitability (Baldauf et al., 2001b).</p>

studies were independent and had no overlapping samples. Our sample contained nine sets of studies that had overlapping samples.<sup>3</sup> 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.<sup>4</sup> 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. The literature search and selection process are illustrated in Figure 1.

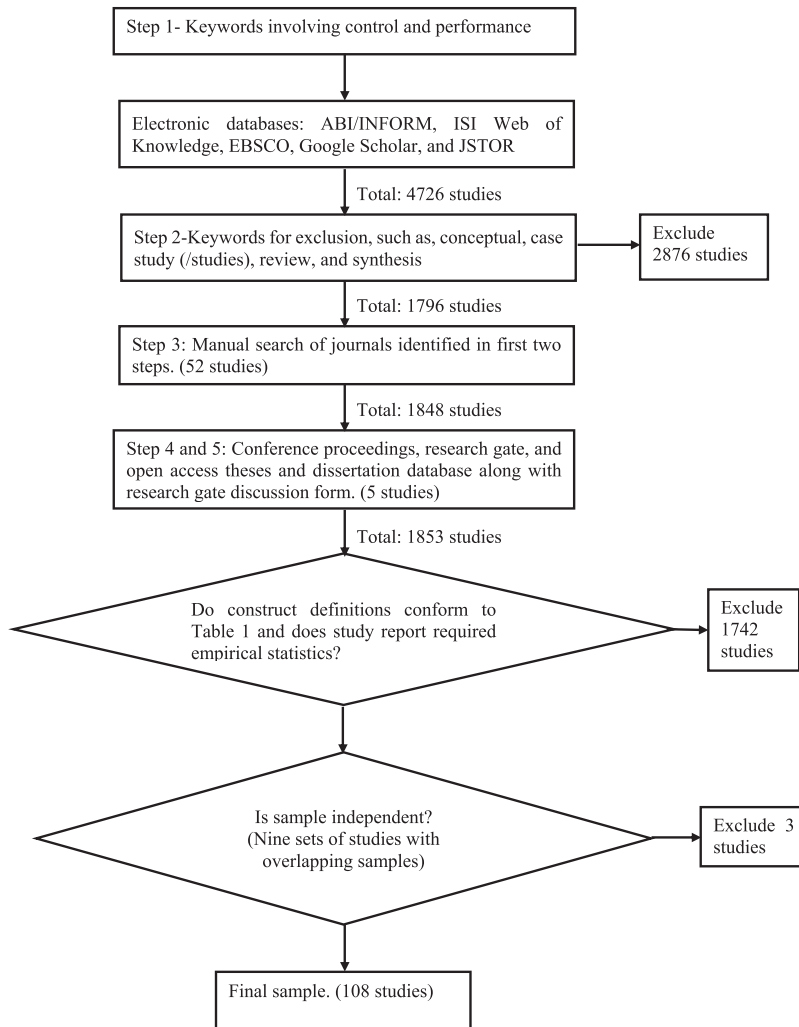


Figure 1. Literature search and selection process

## 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, behaviour,

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.

Using the definitions of three control constructs provided in Table I and focusing also on how the control constructs were measured, we categorized the organizational controls of the various studies into outcome, behaviour, 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 I. 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. Behaviour controls consisted of construct labels such as process control, behaviour-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 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 labelled 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, behaviours, 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 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.<sup>5</sup> 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.

## Meta-Analytic Procedures

To test Hypotheses 1a, 1b and 1c, we applied a random-effects model to compute the sample-size-weighted mean estimates ( $\bar{r}$ ) and the reliability-corrected mean estimates ( $\bar{r}_c$ ) 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 behaviour 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 modelling (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 modelling program AMOS.

Testing Hypotheses 2a and 2b required us to assess the complementary vs substitution effects on performance of the three organizational controls: *outcome*, *behaviour*, and *clan*.<sup>6</sup> 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, behaviour, 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 (see 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).

## RESULTS

### Organizational Controls and Performance

We first tested the main effects of organizational controls on performance. Table II 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 ( $r_c = 0.24$ ;  $CI95\% = 0.19-0.29$ ), behaviour ( $r_c = 0.26$ ;  $CI95\% = 0.23-0.30$ ), 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 II). 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, 2000a 2000b). The Egger rank correlation test also did not show any indication of bias in the data (Egger et al., 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.

Table II. Meta-analytic descriptives for the organizational controls–performance relationships

Organizational controls	k	N	r	r <sub>c</sub>	SE	CI95%	CrI95%	Q	I <sup>2</sup>	f <sub>sn</sub>	m	r <sub>tesf</sub>	Tests for publication bias				
													Trim and Fill	Egger			
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<sub>c</sub> = sample size and reliability-corrected correlation; SE = standard error of r; CI95% = confidence interval; CrI95% = credibility interval; Q = Cochran's homogeneity test statistic; I<sup>2</sup> = scale-free index of heterogeneity; f<sub>sn</sub> = fail-safe number; m = missing number of studies; r<sub>tesf</sub> = trim and fill correlation; p = p value. \*, \*\* p < 0.05, \*\*\* p < 0.001.

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

### Organizational Controls: Substitutes or Complements?

Table III presents the meta-analytic correlations matrix employed in our path analysis. Figure 2 shows the results. The overall measurement model has a good fit to the data. The fit indices of the model are  $\chi^2(4) = 135.03$ ,  $p < .001$ ; CFI = 0.98; TLI = 0.95; AGFI = 0.98; RMSEA = 0.06; and SRMR = 0.03. The results in Figure 2 show that outcome and behaviour control ( $r_c = 0.53$ , 95% C.I. = 0.51-0.55), behaviour 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, behaviour, 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 behaviour and clan control is 0.134 ( $= 0.53 \times 0.10 + 0.37 \times 0.22$ ), 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 (see Cao and Lumineau, 2015). As such, we can infer that performance is improved because behaviour and clan control complement outcome control. Similarly, the total effect for behaviour control is 0.245 ( $= 0.10 + 0.53 \times 0.10 + 0.42 \times 0.22$ ) and clan control is 0.299 ( $= 0.22 + 0.37 \times 0.10 + 0.42 \times 0.10$ ), and that is greater than their individual direct path estimates (0.10 and 0.23

Table III. Meta-analytic correlation matrix<sup>a</sup>

	<i>Outcome control</i>	<i>Behaviour control</i>	<i>Clan control</i>	<i>Performance</i>	<i>Firm size</i>
Outcome Control	1.00	76 (15924)	50 (8943)	91 (19038)	25 (3938)
Behaviour 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

<sup>a</sup>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.



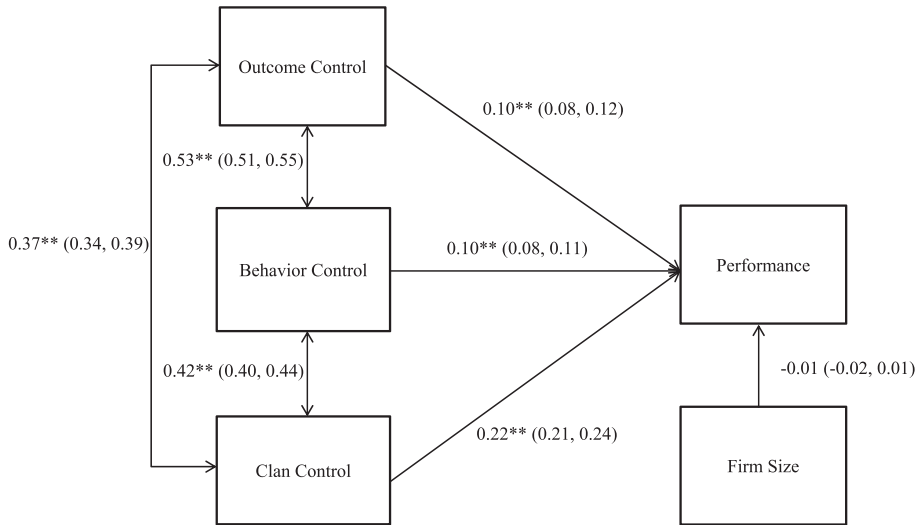


Figure 2. Results of the meta-analytic path analysis

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

respectively). Hence, Hypothesis 2a is not supported, but Hypothesis 2b is supported. Outcome, behaviour, and clan control function as complements.

### 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, behaviour, and clan controls, we performed four path analyses for the rational goal, adaptability, human relations, and process outcomes. As shown in Table IV, 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 behaviour control for each type of performance outcome. The results also indicate that the path estimates of outcome and behaviour control for rational goal outcomes and human-relations outcomes are not significantly different. However, the path estimates of behaviour control are 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 analysed 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. The path estimates for the direct effect of each control on rational goal, adaptability, human relations, and process outcomes are same as the

Table IV. Differential effects of organizational controls on various types of performance outcome

<i>Organizational controls</i>	Types of performance outcome															
	Rational goal				Adaptability				Process				Human relations			
	$\beta$	<i>t</i>	%R <sup>2</sup>		$\beta$	<i>t</i>	%R <sup>2</sup>		$\beta$	<i>t</i>	%R <sup>2</sup>		$\beta$	<i>t</i>	%R <sup>2</sup>	
Outcome Control	0.11	10.39***	25%		0.04	3.42***	10%		-0.15	-10.32***	21%		.05	3.42***	8%	
Behaviour 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%	
<b>Total R<sup>2</sup></b>	0.11				0.13				0.18				0.23			
<b>Z, BC-OC</b>	-1.36				5.15***				15.90***				0.42			
<b>Z, CC-OC</b>	7.72**				9.91***				21.30***				18.90***			
<b>X, CC-BC</b>	8.83**				3.79***				2.84**				17.52***			

$\beta$  = standardized coefficients, *t* = *t* statistic, %R<sup>2</sup> = proportion of total variance explained by each organizational control, *Z* = test for the significance of the difference between the path estimates. \* *p* < 0.05, \*\* *p* < 0.01, \*\*\* *p* < 0.001.

standardized coefficients shown in Table IV. 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, behaviour, 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 V 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 behaviour 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 behaviour 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 behaviour 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 ( $r_c = 0.20, 95\%CI = 0.06-0.34$ ), behaviour ( $r_c = 0.29, 95\%CI = 0.11-0.46$ ), and clan control ( $r_c = 0.30, 95\%CI = 0.16-0.43$ ) are all positively significant.

## DISCUSSION

This meta-analytic study had two primary objectives: (a) to investigate the bivariate relationship between the three organizational controls (outcome, behaviour, and clan) and performance, and (b) to assess whether the three controls increase (complement) or decrease (substitute) one another's performance effects. By analysing 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

Table V. Supplementary analyses: Organizational setting, task type, level of analysis and types of performance outcome

<i>Variable</i>	<i>k</i>	<i>N</i>	<i>r</i>	<i>r<sub>c</sub></i>	<i>SE</i>	<i>CI95%</i>		<i>Q<sub>M</sub></i>	<i>Q<sub>E</sub></i>
<b>Performance Data</b>									
<i>Outcome Control</i>									
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		
<i>Behaviour Control</i>									
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		
<i>Clan Control</i>									
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		
<b>Organizational Setting</b>									
<i>Outcome Control</i>									
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		
<i>Behaviour Control</i>									
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		
<i>Clan Control</i>									
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		
<b>Task Type</b>									
<i>Outcome Control</i>									
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		
<i>Behaviour Control</i>									
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		
<i>Clan Control</i>									
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		

(Continued)

Table V. *Continued*

<i>Variable</i>	<i>k</i>	<i>N</i>	<i>r</i>	<i>r<sub>c</sub></i>	<i>SE</i>	<i>CI95%</i>	<i>Q<sub>M</sub></i>	<i>Q<sub>E</sub></i>
<b>Level of Analysis</b>								
<i>Outcome Control</i>								
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		
<i>Behaviour Control</i>								
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		
<i>Clan Control</i>								
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		
<b>Types of Performance Outcome</b>								
<i>Outcome Control</i>								
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		
<i>Behaviour Control</i>								
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		
<i>Clan Control</i>								
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;  $Q_M$ ,  $Q_E$  statistic for overall moderator model;  $Q_E$ ,  $Q$  statistic for residual heterogeneity. \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .

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 behaviour 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.

### **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 behaviours, 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., 2015, 2016). 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 behaviours 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 behaviours 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., 2004, 2017; 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, p. 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 behaviour controls. This finding diverges from classic controls research that emphasizes clan control as an 'alternative control' that is only effective when outcomes or behaviours 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 behaviour controls rely on behavioural 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 behavioural and performance consequences of these mechanisms.

The finding that behaviour 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, behaviour 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). Behaviour 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 behaviour 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 behaviours are dependent on the complexity involved in a particular system and that these behaviours 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 behaviour control is generally effective, but that its effectiveness decreases due to high system complexity. Therefore, although we find that behaviour control is generally effective for distinct outcomes that span various tasks, the explanation for our finding that behaviour 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.

### **Managerial Implications**

Our meta-analysis suggests that managers can achieve the desired performance outcomes by exercising outcome, behaviour, 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 behaviour 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, behaviour, 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, behaviour 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.



## 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 behaviours, and understand the process associated with transforming inputs into outputs (Kirsch, 1996; Ouchi, 1979). Investigation of outcome measurability, behaviour 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.<sup>7</sup>

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 cancelled out by using more controls due to the high resource requirements and adverse behaviours 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.

## CONCLUSION

The overall objective of this study was to examine the relationship between organizational controls and performance. We found that outcome, behaviour, 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 behaviour 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 analysing 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.

## ACKNOWLEDGMENTS

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## 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 labelled 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 behaviours 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 behaviours.
- [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  $I_r = \frac{\{[(F/N) - (1/k)][k/(k-1)]\}}{0.5}$ , 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  $I_r$  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) analysing 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.

## APPENDIX STUDIES USED IN THE META-ANALYSIS

S. No.	Study	Organizational controls construct labels					Performance outcome labels				Task type	Level of analysis
		Outcome control	Behavior control	Clan control	Rational goal	Process	Adaptability	Human relations	Performance data	Organizational setting		
1	Aulakh and Gencurk (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, Behavioural 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

(Continued)

## APPENDIX Continued

S. No.	Study	Organizational controls construct labels					Performance outcome labels				
		Outcome control	Behavior control	Clan control	Rational-goal	Process	Adaptability	Human relations	Performance data	Organizational setting	Task type
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	Behavior Control	Input Control		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
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	Gencunk and Aulakh (1995)	Output Control	Process Control		Relative Performance and Satisfaction	Self-Reported	Both*	Sales	Firm
23	Goebel and Weifemberger (2017)	Results Control	Action Control	Cultural and Personnel (Input) Controls	Organizational Performance	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 Govin (2011)		Process Control Formality			Self-Reported	Intra-organizational	Innovation	Business Unit
26	Gopal and Gosain (2010)	Outcome control-quality, Outcome control-efficiency	Behavioural 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	Self-Reported	Intra-organizational	IS	Project Team
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		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

(Continued)

**APPENDIX Continued**

		Organizational controls construct labels				Performance outcome labels						
<i>S. No.</i>	<i>Study</i>	<i>Outcome control</i>	<i>Behavior control</i>	<i>Clan control</i>	<i>Rational-goal</i>	<i>Process</i>	<i>Adaptability</i>	<i>Human relations</i>	<i>Performance data</i>	<i>Organizational setting</i>	<i>Task type</i>	<i>Level of analysis</i>
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 Performance				Self-Reported	Inter-organizational	Sales	Individual
38	Keil et al. (2013)	Outcome Control	Behavioural 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	Behavioural Controls		ROI-Short Term Profitability				Archival	Intra-organizational tasks	Managerial	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 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

46	Kreutzer et al. (2015)	Outcome Control	Behaviour Control	Input Control	Strategic Initiative Performance	Self-Reported	Intra-organizational	Strategic Initiatives	Firm
47	Li et al. (2010)	Outcome Control	Behaviour Control	Clan Control		Self-Reported	Intra-organizational	NPD	Firm
48	Li et al. (2011)	Financial (Output) Control				Self-Reported	Intra-organizational	NPD	Firm
49	Liao (2005)	Output Control	Behaviour Control	Input Control	Firm Performance	Self-Reported	Intra-organizational	Various tasks	Firm
50	Liao (2006)	Output Control	Behaviour Control	Input Control	Firm Performance	Self-Reported	Intra-organizational	Various tasks	Firm
51	Liu (2015)	Outcome Control	Behaviour Control	Clan Control	System Performance	Self-Reported	Inter-organizational	IS	Firm
52	Liu and Wang (2016)	Outcome Control	Behaviour Control	Clan Control	Project Performance	Self-Reported	Intra-organizational	IS	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	Behaviour Control	Clan Control	Team Effectiveness	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	Behaviour-based Control		Sales Performance	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	Behaviour Control			Self-Reported	Both*	Sales	Firm
62	Mengue and Barker (2003)	Incentive Pay (Outcome)	Supervisor Monitoring (Behaviour)		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
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

(Continued)

## APPENDIX Continued

S. No.	Study	Organizational controls construct labels				Performance outcome labels				Task type	Level of analysis	
		Outcome control	Behavior control	Clan control	Rational goal	Process	Adaptability	Human relations	Performance data			Organizational setting
66	Nagpal (2009)	Outcome Controls		Clan Controls	Business Performance				Self-Reported	Both*	IS	Firm
67	Nakos and Brighthouse (2008)		Process Control		International Performance				Self-Reported	Inter-organizational	Sales	Firm
68	Neiland 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				Archival	Intra-organizational	Sales	Business Unit
72	Panagopoulos et al. (2015)	Output Control	Process Control	Professional (Clan) Control	Firm Financial, Sales Force Behavioural, Customer Relationship and Outcome Performance			Satisfaction with Supervisor and Organizational Commitment	Self-Reported and Archival	Intra-organizational	Sales	Firm and Individual
73	Perrone et al. (2003)			Clan Culture					Self-Reported	Inter-organizational	Sales	Firm
74	Piercy et al. (2004)		Behavioural Control		Sales Unit Effectiveness, Behaviour Performance, and Outcome Performance				Self-Reported	Intra-organizational	Sales	Business Unit and Individual



75	Piercy et al. (2009)	Sales Manager Behaviour-based Control Level	Sales Unit Effectiveness, Behaviour Performance, and Outcome Performance	Self-Reported	Intra-organizational	Sales	Business Unit and Individual
76	Piercy et al. (2012)	Sales Manager Control Level (Behaviour)	Salesperson Performance	Self-Reported	Intra-organizational	Sales	Individual
77	Rajagopal (2007)	Behavioural Control	Sales Unit Effectiveness, Behaviour Performance, and Outcome Performance	Self-Reported	Intra-organizational	Sales	Business Unit and Individual
78	Rijsdijk and van den Ende (2011)	Process Control	Project Timeliness, Cost Performance, Product Concept Effectiveness, and Financial Performance	Self-Reported	Intra-organizational	NPD	Project Team
79	Rodrigues et al. (2015)	Behaviour-based Control	Professional Control	Self-Reported	Intra-organizational	Banking	Firm
80	Sahadev et al. (2017)	Activity and Capability Control	Learning Orientation	Self-Reported	Intra-organizational	Call Center	Firm
81	Saldanha et al. (2013)	Activity Control	Operational Performance and Market Performance	Self-Reported	Both*	Logistics	Firm
82	Saldanha et al. (2014)	Activity Control	Operational Performance and Market Performance	Self-Reported	Both*	Logistics	Firm
83	Schnatterly (2003)	Policies and Procedures (Behaviour)	Past Performance	Archival	Intra-organizational	Not Mentioned	Firm
84	Sengun and Wasti (2009)	Output Control	Perceived Performance	Self-Reported	Inter-organizational	Sales	Firm
85	Smets et al. (2013)	Output Control	Sales Volume	Archival	Inter-organizational	NPD	Project Team
86	Smets et al. (2016)	Process Control	Coordination Effectiveness	Self-Reported	Inter-organizational	NPD	Project Team
			Cooperative Behaviour				

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**APPENDIX** *Continued*

S. No.	Study	Organizational controls construct labels				Performance outcome labels				Task type	Level of analysis
		Outcome control	Behavior control	Clan control	Relational-goal	Process	Adaptability	Human relations	Performance data		
87	Snell and Youndt (1995)	Output Control	Behaviour 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 Bretzel (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	Behaviour Control	Informal (Clan) Control	Perceived Supplier Performance			Self-Reported	Inter-organizational	Service	Firm
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 Behaviour Controls		ISD Inefficiency and Effectiveness			Self-Reported	Intra-organizational	IS	Project Team
95	Tiwana (2010)	Outcome Control	Behaviour 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 Kell (2007)	Outcome Control	Process Control	Relational Governance (Clan)	Alliance Performance			Self-Reported	Inter-organizational	IS	Project Team
98	Tiwana and Kell (2009)	Outcome Control	Behaviour Control	Clan Control	System Development Performance			Self-Reported	Inter-organizational	IS	Project Team
99	Voss and Bretzel (2014)	Outcome Control	Behaviour Control	Professional (Clan) and Input Controls	Firm Performance			Self-Reported	Both*	IS	Firm
								Self-Reported	Intra-organizational	HRM	Firm

100	Wallenburg and Schaffler (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, Behaviour Control, Social Control		Performance	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			Self-Reported	Intra-organizational	HRM	Firm
105	Ylinen and Gullkvist (2014)	Mechanistic (Outcome) Control	Organic (Clan) Control	Project Performance	Self-Reported	Intra-organizational	NPD	Project Team
106	Yu and To (2008)	Output Control	Input Control		Self-Reported	Intra-organizational	HRM	Firm
107	Yu and To (2011)	Output Control	Input Control	Customer Satisfaction	Self-Reported	Intra-organizational	HRM	Firm
108	Zhang et al. (2008)	Output Control	Process Control		Self-Reported	Inter-organizational	Sales	Firm

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

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