5-2-2012

DO FORMAL CONTROLS ENHANCE THE EFFECTS OF INFORMAL CONTROLS ON IS OFFSHORING PROJECT PERFORMANCE?

Martin Wiener
University of Erlangen-Nuremberg

Ulrich Remus
University of Canterbury

Magnus Mähring
Stockholm School of Economics

DO FORMAL CONTROLS ENHANCE
THE EFFECTS OF INFORMAL CONTROLS ON
IS OFFSHORING PROJECT PERFORMANCE?

Wiener, Martin, University of Erlangen-Nuremberg, Lange Gasse 20, 90403 Nuremberg, Germany, martin.wiener@wiso.uni-erlangen.de

Remus, Ulrich, University of Canterbury, Kirkwood Village KJ01, Christchurch 8140, New Zealand, ulrich.remus@canterbury.ac.nz

Mähring, Magnus, Stockholm School of Economics, Saltmätargatan 13-17, 113 83 Stockholm, Sweden, magnus.mahring@hhs.se

Abstract

While research on information systems (IS) project control has advanced considerably over the last decade, knowledge about the performance effects of particular combinations of control modes is still limited. In this study, we add an important piece to the puzzle of control effects and control mode interaction. We do so by examining the impact of informal control on project performance as well as whether formal controls moderate the effectiveness of informal control in IS offshoring projects. We conducted a quantitative study with data from 46 projects involving 16 client firms from a wide range of industries. Our results suggest that clan control in combination with outcome control positively influences project performance. In contrast, the exercise of clan control alone does not increase performance. Our study thus offers an important contribution towards uncovering the links between formal and informal control modes. It also highlights the importance of carefully tuning control portfolios in IS offshoring projects. Restrictions and requirements for how clan control can be leveraged in the offshore context are discussed.

Keywords: IS outsourcing/offshoring, IS project control, portfolio interactions, project performance.

1   Introduction

Information systems (IS) offshoring represents a global phenomenon (King and Torkzadeh 2008). At the heart of this vast economic and organizational activity are the people who manage the interaction between clients and offshore vendors. One core task on the client side is to effectively control how vendors carry out and deliver IS offshoring projects (Choudhury and Sabherwal 2003; Prifling et al. 2008; Tiwana 2010). Here, organizational control is about influencing and motivating individuals to behave in a manner consistent with organizational objectives (Jaworski 1988; Ouchi 1979). This task becomes partly different and arguably more challenging when the controller and the controllee are in different organizations far removed from each other (Dibbern et al. 2008; Wiener and Stephan 2010).

Studies on IS project control have evolved from an early focus on the antecedent conditions of control choices (Kirsch 1996, 1997) to an increasing attention being placed on the effects of exercising control (Gopal and Gosain 2010; Tiwana 2010; Tiwana and Keil 2009). In spite of these advances, however, our understanding of how IS projects are controlled, why certain combinations of control forms are chosen, and how different combinations of control activities impact project outcomes, is still limited. Specifically, prior literature is inconclusive regarding the influence of different control forms on IS project performance (Tiwana and Keil 2009), and largely neglects the important relationship between informal control and performance (Liu et al. 2008). This is particularly true for distant IS offshoring projects. For instance, while previous studies widely agree on the importance of informal clan control for the success of complex, internal IS projects (e.g., Kirsch 2004; Kohli and Kettinger 2004), studies show inconsistent results with regard to the effectiveness of clan control in the offshoring context (cf. Gopal and Gosain 2010; Tiwana 2010).

In addition, while control in practice is usually executed through the use of a combination or portfolio of formal and informal control mechanisms (Choudhury and Sabherwal 2003; Kirsch 1997), the issue of portfolio-level interactions between these mechanisms remains underexplored (Tiwana 2010): "*This is problematic in practice because when managers use both formal and informal control mechanisms without understanding how they interact, they [may] diminish each other's benefits*" (pp. 88-89). Recent studies provide empirical evidence that the use of informal control influences the effectiveness of formal controls (cf. Rijsdijk and van den Ende 2011; Tiwana 2010). However, the other side of the coin, i.e., the influence of formal controls on the effectiveness of informal control, has so far not been empirically tested, although a study suggests that formal controls may facilitate clan control as well as increase its effectiveness (Chua et al. 2007).

In this study, we set out to contribute to the literature on IS offshoring project control and in particular to our understanding of how different control forms interact. We do so by studying the role of informal control and the understudied aspect of whether formal controls may moderate the performance effects of informal control. Here, we focus on the control activities carried out at the client-vendor interface, i.e., the important control relationship between the client project manager (controller) and the vendor project manager (controllee). In IS offshoring, both the client and vendor project manager take on key roles as they act as boundary spanners or 'middlemen' between the involved organizations (Mahnke et al. 2008) and are responsible for managing the client-vendor relationship. Our study has the potential to help shed light on the elusive nature of informal controls, which are often seen as ambiguous and complicated to deploy in interorganizational settings. Specifically, we ask the following two research questions:

1. Does informal control impact the performance in IS offshoring projects?
2. How do formal controls alter the relationship between informal control and performance?

The paper is organized as follows: We first introduce (organizational) control theory and review prior literature, further clarifying the theoretical gap in previous research. Based on our review, we present the research model and hypotheses. Next, we describe the research methodology and test the proposed hypotheses. The paper closes with a discussion of research implications and study contributions.

2 Theoretical Background

2.1 Control theory

Consistent with prior studies in organization design (Eisenhardt 1985), information systems (Kirsch 1996, 1997), and marketing (Jaworski 1988), this paper views control broadly as any attempt to ensure that individuals' behaviors are aligned with organizational objectives. A control situation typically involves a controller, the person exercising control, and a controllee, the control target (Kirsch 2004).

Control modes can generally be categorized into formal and informal control modes (Jaworski 1988; Ouchi 1979). With regard to formal control, prior literature suggests two types: behavior and outcome control (Eisenhardt 1985; Ouchi 1979). Informal control is also of two types: clan (Ouchi 1980) and self-control (Henderson and Lee 1992; Kirsch 1996). Each control mode can itself be implemented through multiple control mechanisms, which are combined into a so-called portfolio of controls. While behavior control seeks to influence the process to achieve defined goals or outputs, outcome control focuses on the outputs (both interim and final) regardless of the process (Kirsch 1997). Clan control motivates behavior that relies on shared values and norms as well as the degree to which all members of a group are committed to achieving shared goals (Ouchi 1980). In contrast, self-control is solely reliant on an individual's ability to monitor and control its own actions (Henderson and Lee 1992).

Our study focuses on the interplay between formal control, which usually dominates the portfolio in (offshore) outsourced projects (Choudhury and Sabherwal 2003), and informal clan control. This focus is in line with prior studies that widely recognize the importance of clan control (Cardinal et al. 2004; Singh 2008), particularly in driving complex IS projects (e.g., Kirsch 1997, 2004; Kohli and Kettinger 2004). Against this background, clan control seems to be the more broadly accepted form of informal control (Tiwana and Keil 2009).

By contrast, we excluded informal self-control from the study scope for the following reasons: First, self-control is often regarded as different from the other three control modes because it is exercised by the controllee herself, partly functioning as a substitute for control exercised by the controller (Tiwana and Keil 2009). Second, self-control can be regarded as less of a strategic tool for managers (Gopal and Gosain 2010) as they can only promote or request its use (Kirsch 1996; Kirsch et al. 2002). Third, social requirements for realizing self-control are more difficult to fulfill in interorganizational projects. In fact, self-control in IS outsourcing projects is found to have a negative influence on performance by leading to an increased risk of vendor opportunism (Tiwana and Keil 2009).

2.2 IS offshoring project control

The growing interest in control issues in the IS offshoring context is not surprising as these projects pose unique challenges to implementing control in terms of how the client measures, evaluates, and rewards the vendor (Kirsch 2004). Especially distance challenges resulting from cultural, geographic, linguistic, and time zone differences between client and offshore vendor complicate the selection and application of appropriate control mechanisms (Kirsch 2004; Wiener and Stephan 2010; Winkler et al. 2008). Quite recently, several studies have tackled the important relationship between control and IS (offshore) outsourcing project performance (e.g., Tiwana 2010; Tiwana and Keil 2009; Gopal and Gosain 2010), answering calls for more research in this area (Kirsch et al. 2002). Most of these studies focus on formal controls and their impact on offshore project performance. For example, Prifling et al. (2008) suggest that outcome control seems to be particularly effective for tackling problems arising from cross-cultural differences. Tiwana (2008) finds that systems development modularity lowers the need for process-based but not for outcome-based control, and that both formal modes independently enhance performance. Tiwana (2010) shows that formal behavior control—but not outcome control—independently enhances project ambidexterity (in terms of project alignment and adaptiveness).

Other researchers emphasize the complementing role of different types of control (e.g., Cardinal et al. 2004; Kirsch 1997, 2004), arguing that both formal and informal control together will result in higher

performance than only formal or informal control alone (Ouchi 1980; Henderson and Lee 1992). For example, Zhang et al. (2007) find that the use of informal control enhances the effectiveness of formal control in global project teams. Also Mishra and Dillon (2008) conclude that formal mechanisms fall short if informal aspects are not taken into account. Mao et al. (2008) support this conclusion by showing that clients need to focus on goal setting (i.e., outcome control) and cultural blending (i.e., clan control) with vendors in order to control offshore projects. Tiwana (2010) refines these findings by showing that informal and formal control can simultaneously be complements and substitutes: While informal control mechanisms strengthen the effectiveness of behavior control, they weaken the effectiveness of outcome control.

Studies on control interactions are mainly motivated by prior research showing that control portfolios in IS offshoring projects are dominated by formal control, in particular outcome control (Choudhury and Sabherwal 2003), while informal (clan) control is more used as supplement for formal (outcome) control (Kirsch et al 2002; Gopal and Gosain 2010). In other words, these studies focus on the interaction effects of informal control on the relationship between formal controls and performance, thus focusing on only one side of the coin. However, there is also growing awareness that informal control may play an important role in offshore project success. Kirsch (2004) and Kohli and Kettinger (2004) argue that clan control is often essential for the success of complex IS projects. It also seems that contract-driven formal controls complement informal control (Goo et al. 2009), and that other mechanisms of formal control may also enhance the impacts of informal control (Chua et al. 2007). However, instituting clan control is challenging since there is often insufficient time for clan control to emerge naturally. Thus, development of social capital has been identified as a means for providing a conductive environment for clan control to develop (Chua et al. 2007; Kirsch et al. 2010).

In summary, the literature review suggests two interesting avenues for further research. First, the link between informal clan controls and IS project performance is still not well understood, in particular in distant project settings. Prior research shows mixed results whether clan control increases or decreases the performance of offshoring projects. For instance, Gopal and Gosain (2010) find that collaborative culture—a specific manifestation of clan control—enhances project quality but reduces efficiency. Second, although recent research shows increasing interest in clan control (Gopal and Gosain 2010; Kirsch et al. 2010; Tiwana 2010), the potentially important moderating effect of formal controls on the link between clan control and project performance remains largely neglected (cf. Chua et al. 2007).

3   Research Model and Hypotheses

Our research model considers the direct relationship between informal (clan) control and IS offshoring project performance as well as the moderating effect of formal control modes on this relationship (see Figure 1). By also distinguishing between the two different modes of formal control, i.e., outcome and behavior control, the model addresses a shortcoming in most prior empirical work on control portfolio interactions (Tiwana 2010). In the following, the main hypotheses are developed.
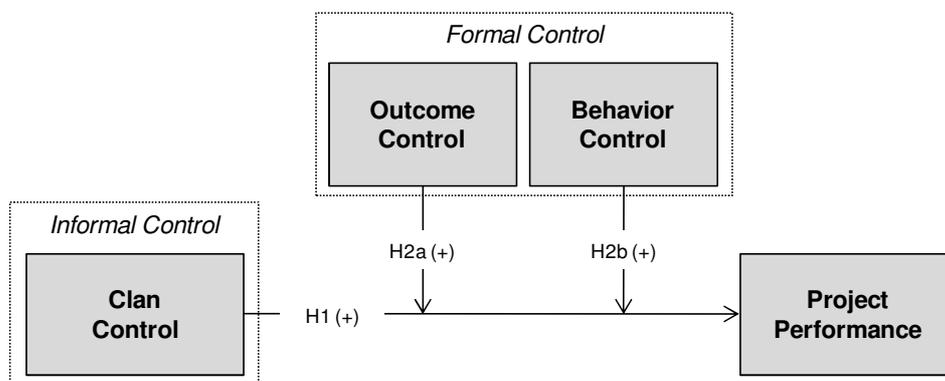

Figure 1.   Research Model

3.1   Informal control and project performance

In control theory, a clan is defined as a group of individuals who are dependent on one another and have a great deal of shared goals, norms, and values (Kirsch 1997; Ouchi 1979, 1980). Here, in line with prior research in the IS outsourcing context (e.g., Choudhury and Sabherwal 2003), we assume that both the client and vendor project manager are part of a clan-like pattern, which is characterized by ambiguous performance measurement, congruent goals, and common objectives (Singh 2008).

From the client (controller) perspective, clan control is exercised through actions and mechanisms that promote a shared understanding of goals, norms, and values (Kirsch 1997), or identify and enforce acceptable behaviors through shared experiences and rituals (e.g., regular meetings) (Kirsch 1996). Broadly speaking, clan control facilitates cooperation between project actors, and thus is expected to positively affect group and project performance. This is particularly true for IS offshoring projects. Here, building up and reinforcing a collaborative team culture is key for achieving the desired project goals: This culture recognizes each member's unique skills and competencies; it also provides 'space' where group members are able to openly discuss issues and questions, and freely share resources and ideas (Gopal and Gosain 2010). In a collaborative culture, team members are more open about their own deficiencies and therefore more likely to ask for help; they are also more open to expose their individual work outcomes, expecting constructive critique. As a result, communication speed and quality is improved, which in turn leads to less errors and rework—important determinants of project success (Liu et al. 2008).

In particular, clan control is effective in complex, multi-stakeholder (Kirsch 2004; Kohli and Kettinger 2004) and vendor-based IS projects (Chua et al. 2007), and particularly successful in situations where behavior is hard to specify (Kirsch 1996). The positive impact of clan control on project performance is also confirmed by literature investigating success factors for IS offshoring projects. Indeed, some of the mechanisms used for enabling clan control are regarded as 'critical success factors' for offshore projects. These include mechanisms such as mutual site visits (Rai al. 2009, Rajkumar and Mani 2001) as well as regular face-to-face meetings with the offshore vendor (Remus and Wiener 2009). Such mechanisms provide solidarity and regularity among project team members (Kirsch et al 2010) and are required for ensuring a continuous communication flow and bilateral knowledge transfer as well as creating a partnership-like relationship (Remus and Wiener 2009). Thus we suggest:

Hypothesis 1: Greater use of informal clan control enhances IS offshoring project performance.

3.2   Moderating effect of formal control

As noted above, control interaction effects are important because, in practice, control is not executed through a single control mode but rather through a portfolio of modes and mechanisms (Choudhury and Sabherwal 2003; Kirsch 1997). Here, the combination of both formal and informal control modes is likely to result in higher performance than only formal or informal modes alone (Henderson and Lee 1992; Tiwana 2010). For example, Poppo and Zenger (2002) observe that elaborate formal contracts facilitate 'relational governance', i.e., the reliance on relationship building as a basis for governance. They also find that greater relational governance leads to higher contractual complexity, and that both of these mutual influences in turn enhance exchange performance. Goo et al. (2009) examine service level agreements (SLAs) in IS outsourcing relationships and provide support for Poppo and Zenger's (2002) findings concerning the complementarity of formal and relational governance. They further suggest that the use of well-structured, comprehensive SLAs leads to an increased level of relational governance, reflected by relational norms, harmonious conflict resolution, and mutual dependence. However, while the above-mentioned studies describe the general nature of the relationship as well as how contractual controls reduce uncertainty and agency behavior, they do not focus on specific control modes.

Kirsch et al. (2010) stress the importance of trust-based clan control in IS development projects and find that various forms of social capital (structural, relational, and cognitive) can be used to develop

clan control. Chua et al. (2007) also point to the importance of clan control and the role of social capital in providing the basis for enacting clan control. Interestingly, their in-depth case study provides indications that formal controls are instrumental in building social capital and thus promoting clan control: *"We observed that formal controls served as catalysts to build, deploy and sustain social capital. They also made it easier for corporate to leverage on existing social capital to accelerate the emergence of clan control."* (p. 12).

Against this backdrop, we hypothesize that formal modes of control (behavior and outcome control) can be used to build social capital, which in turn strengthens the effectiveness of clan control. This happens because formal controls specify processes, procedures and goals, thereby fostering interaction between actors and ultimately building social capital. For example, Chua et al. (2007) observe that controllers alter established software development tools, work processes, and workplace practices—typical behavior controls—to increase interactions between project team members. Similarly, outcome controls can be employed to encourage and reward team members for shaping and enacting shared norms, thereby developing clan control (Chua et al. 2007). Consequently, the deployment of formal behavior and outcome control facilitates the effective use of of clan control. We thus hypothesize:

Hypothesis 2: Greater use of formal (a) behavior control and (b) outcome control strengthens the extent to which clan control enhances IS offshoring project performance.

4   Research Methodology

4.1   Data collection

To test the hypothesized relationships, we used control and performance data collected through a study of 46 offshore projects from 16 client organizations conducted over a five-month period in 2010. The client firms represented multiple industries (e.g., aerospace, energy, healthcare, and manufacturing). All of these firms operated from German-speaking countries. The examined projects varied in terms of focus, size, and vendor. The great majority of the projects dealt with applications development/testing (38). The project size ranged from very small (less than 24 person months) to very large (600 or more person months), with a dominance of larger projects. 42 projects involved large-scale vendors, while only four projects involved SME vendors. 28 projects were executed with third party offshore vendors or global IT service providers, 17 with an offshore subsidiary of the client firm, and one with a joint venture. Only one vendor was located in a nearshore country (Slovakia). By contrast, more than 90 percent of the projects involved Indian vendors.

Consistent with prior research on IS project control (e.g., Tiwana and Keil 2009), we asked the client project manager (controller) to report on her exercise of behavior, outcome, and clan control within the examined project as well as to evaluate project performance (in terms of cost, time, and quality). Our analysis focused on the client perspective for three major reasons: (1) in the first place, it is the client project manager who controls the vendor project manager to ensure that project outcomes are of value to her firm (Choudhury and Sabherwal 2003); (2) vendor managers tend to overestimate project performance (Snow et al. 2007); and (3) clients and vendors may have a very different definition of what constitutes the performance or success of a project (DeLone and McLean 2003).

The dataset is based on a convenience sample. For inclusion in the sample, IS offshoring projects either had to be completed for not more than twelve months, or had to be underway for at least three months and already reached a critical project milestone. This criterion ensured that included projects had progressed to a reasonable maturity (Rustagi et al. 2008) and that relevant activities had recently occurred (Ko et al. 2005). To identify suitable projects, we contacted 18 management executives of client and vendor firms who were professional acquaintances of one of the authors. 14 of them (twelve client and two vendor executives) agreed to support our study. These 14 executives identified a total of 48 client project managers. In all, 46 of these managers filled in our questionnaire, resulting in a response rate of 96 percent. All respondents had significant IS (offshoring) experience and were in charge of an offshore project or an independent sub-project within a large-scale offshore arrangement.

To minimize non-response error, we made several contacts with the target population (Dillman 1999). Furthermore, follow-up communications with the four non-participating executives as well as the wide range of responses to our survey items indicate a low risk of non-response bias (Rustagi et al. 2008). For all items, the difference between minimum and maximum values was 3 or even 4 scale points, the latter referring to the maximum possible range.

4.2 Construct measures

All constructs were measured reflectively with multiple items. To measure the three control modes of control analyzed in this study, we adopted Kirsch et al.'s (2002) items for clan, behavior, and outcome control. Project performance was measured using four items derived from prior research (Banker and Kemerer 1992; Kirsch 1996; Kumar and Bjorn-Andersen 1990). The measurement items of the latent variables are shown in Table 1. All items are rated on five-point Likert scales using "strongly agree" and "strongly disagree" anchors.

Construct	Label	Measurement item	Reference(s)
Behavior control (BC)	BC1	I expected the vendor to follow an agreed written sequence of steps toward the accomplishment of project goals	Kirsch et al. (2002)
	BC2	I assessed the extent to which existing written procedures and practices were followed during the development process	
Outcome control (OC)	OC1	I placed significant weight upon project completion to my satisfaction	Kirsch et al. (2002)
	OC2	I used pre-established targets as benchmarks for the vendor's performance evaluations	
	OC3	I placed significant weight upon project completion within budgeted costs	
	OC4	I evaluated the vendor's performance by the extent to which project goals were accomplished, regardless of how the goals were accomplished	
	OC5	I placed significant weight upon timely project completion	
Clan control (CC)	CC1	I placed a significant weight on understanding the project team's goals, values, and norms	Kirsch et al. (2002)
	CC2	I actively participated in project meetings to understand the project team's goals, values, and norms	
	CC3	I attempted to understand the project team's goals, norms, and values	
	CC4	I attempted to be a "regular" member of the project team	
Project performance (PP)	PP1	The project deliverables met the requirements	Banker and Kemerer (1992), Kirsch (1996), Kumar and Bjorn-Andersen (1990)
	PP2	The project deliverables were completed on time	
	PP3	The project deliverables adhered to IS standards	
	PP4	The project deliverables were completed within budgeted costs	

Table 1.   Operationalization of Constructs

Measures were pretested and refined, using a convenience sample of five IS (project) managers as well as six academic experts with expertise in IS offshoring and survey design. Following the pretest, we selected a long-term IS offshoring collaboration as the site for our pilot study. This collaboration involved a multinational client organization that has offshored IS services to an Indian vendor. A total of eleven respondents participated in the pilot study. The pilot resulted in minor adaptations in the wording of some measures. Respondents in the pilot study were not in the main sample.

To test the hypotheses, we divided our research model into two sub-models, one for the moderating effect of behavior control (*model A*) and one for the moderating effect of outcome control (*model B*) on the relationship between clan control and project performance. This ensured sufficient statistical power in the structural models. The respective measurement models exhibited item reliability verified

through an analysis of item loadings using the PLS path weighting scheme. One clan and two outcome control items were removed from the models due to loadings lower than 0.4 (Hulland 1999). All remaining items loaded above Nunnally's (1978) recommended threshold of 0.6, except for one behavior control item (0.553). This item has been used in several prior studies (e.g., Kirsch et al. 2002) and was retained to maintain the theoretical coverage of its original measure (Tiwana 2010). The measurement models also showed adequate construct reliability, which was indicated by composite reliability measures ranging from 0.65 (behavior control) to 0.88 (project performance) (Fornell and Larcker 1981). Furthermore, each construct shared more variance with its assigned items than with any other construct, establishing discriminant validity for all scales (Hulland 1999). Patterns of item to construct loadings and cross-loadings were acceptable.

Previous literature notes the influence of project size (Pressman 2001) and prior interactions (Ethiraj et al. 2005) on project performance. Hence, we included two control variables in our analysis. Both variables were estimated by asking the project sponsors to categorize the volume of the IS offshoring project (proxy for project size), and to indicate the client organization's experience with the offshore vendor (proxy for prior interactions) on three-point Likert scales.

5 Data Analyses and Results

Model A and B were transformed into a structural equation model, using the software SmartPLS 2.0 with a bootstrap size of 1,000. Partial least squares (PLS) is an appropriate choice in situations where the emphasis is on prediction (Gefen et al. 2011). In addition, the core of the PLS estimation method "is remarkably stable even at low sample sizes" (p. A3).

To estimate the structural models, we applied an hierarchical approach (Carte and Russell 2003): In step 1, we analyzed the project performance effects of the control variables, we then added the main constructs (i.e., clan control as well behavior control and outcome control, respectively) in step 2, and finally the respective interaction terms in step 3. For modeling the interaction terms, we standardized all indicators reflecting the main and moderator constructs (Chin et al. 1996). This approach lowers the correlation between the product indicators and their individual components, and thus helps avoid computational errors. The results are presented in Table 2.

			Model A: Behavior control				Model B: Outcome control			
	Step 1 Control variables		Step 2a Main constructs		Step 3a Interaction terms		Step 2b Main constructs		Step 3b Interaction terms	
Construct	*ß*	*t*	*ß*	*t*	*ß*	*t*	*ß*	*t*	*ß*	*t*
Prior interactions	-0.17	0.90	-0.13	0.85	-0.13	0.88	-0.09	0.72	-0.10	0.93
Project size	-0.25	1.41	-0.18	0.88	-0.15	0.87	-0.14	1.12	-0.07	0.67
Clan control			-0.17	0.78	-0.22	1.09	-0.13	0.64	-0.11	0.70
Behavior control			0.11	0.44	0.18	0.75				
Outcome control							**0.43***	**3.78**	**0.34**	**3.03**
Clan x behavior control					0.32	0.92				
Clan x outcome control									**0.42***	**4.25**
R² (%)	8.5		10.1		21.4		26.6		43.1	
Δ R² (%-point)	—		1.6		11.3		18.1		16.5	
Notes: Significant results in boldface. * p < 0.05, ** p < 0.01, *** p < 0.001; two-tailed test.										

Table 2.   Effects on Project Performance

The control variables (step 1) were nonsignificant and accounted for 8.5 percent of the variance in IS offshoring project performance. Of the main constructs (step 2), only outcome control (β = 0.43, t-value = 3.78, p < 0.001) was positive and significant, suggesting that this control mode independently

enhances project performance[1]. The effects of behavior and clan control were nonsignificant. Thus, H1 is not supported. In step 3, behavior control did not significantly affect the relationship between clan control and IS offshoring project performance. Therefore, H2a is also not supported. By contrast, the interaction term between clan control and outcome control was positive and significant ($\beta = 0.42$, t-value = 4.25, $p < 0.001$), supporting H2b. Model A explained 21.4 percent and model B 43.1 percent of the variance in offshore project performance.

To assess the strength of the significant moderating effect of outcome control, we calculated the effect size f^2 as $[R^2_{\text{interaction terms}} - R^2_{\text{main effects}}] / [1 - R^2_{\text{interaction terms}}]$ (Cohen 1988). Effect sizes from 0.02, 0.15, and 0.35 are regarded as weak, moderate, and strong effects, respectively (Chin et al. 1996). Thus, outcome control constitutes a moderate effect ($f^2 = 0.290$) on the relationship between clan control and project performance.

To address the issue of common method bias, we performed Harman's single-factor test (Podsakoff et al. 2003) and Lindell and Whitney's (2001) marker variable test, and tested the pairwise correlations among the principal constructs (Bagozzi et al. 1991). These three tests indicate that our results are not attributable to the measurement method.

6 Discussion

Before discussing the study results and implications, several limitations have to be mentioned. First, our sample size of 46 respondents is relatively small, which potentially could limit the power of the statistical techniques. To ensure sufficient statistical power, we divided our research model in two sub-models. Here, the observation of statistically significant findings indicates sufficient statistical power. The sample size also restricted the number of control variables included in the models. Past research identified several additional factors that influence performance such as close client-vendor ties (Rai et al. 2009) and contract type (Gopal et al. 2003). Although these factors were not in the focus of our study, our model does not suggest that these factors are not relevant. Second, prior research pointed out that R²-values of 0.67, 0.33, and 0.19 are considered substantial, moderate, and weak, respectively (Chin 1998). Model A and B explain 21.4 and 43.1 percent of the variance in IS offshoring project performance, and therefore show a weak and moderate predictive power, respectively. However, due to the low number of exogenous latent variables in both models, the predictive power of the dependent variables is sufficient (Henseler et al. 2009). Finally, most respondents were engaged in IS offshoring projects with Indian vendors. Thus, our results may not be directly applicable to projects involving vendors from other near- and farshore countries.

The results of our study shed light on the complex relationship between informal clan control and IS offshoring project performance. While clan control alone does not show a significant effect on project performance, it does so when combined with formal outcome control. This result supplements and refines Chua et al.'s (2007) finding that formal controls play a critical role in developing, deploying, and sustaining social capital, thereby accelerating the effective institution of clan control. Building on this logic, formal outcome control may not only be important to successfully establish clan control but also to maintain its effectiveness. For example, outcome control mechanisms may trigger regular (informal) feedback rounds that strengthen team spirit and enable pre-checking of deliverables.

Our study results also extend the recent discussion whether formal and informal control modes act as complements or substitutes. While Tiwana (2010) finds that clan control negatively influences the link between outcome control and project ambidexterity, our study, which measures the same interaction effect from a statistical point of view, suggests that the interaction between these two control modes positively influences project performance. This positive interaction effect between outcome and clan

---

[1] Please note that main effects cannot be interpreted in the presence of interaction terms (step 3), where they represent conditional simple effects (Jaccard and Turrisi 2003). Thus, the interpretation of main effects must be restricted to step 2.

control is consistent with Rijsdijk and van den Ende's (2011) finding that clan control increases the influence of outcome control on process performance in product development projects. Therefore, it is possible that these at first glance contradictory results may be attributed to differences in performance measures (project performance vs. ambidexterity). This would suggest the existence of inverse effects of portfolio-level interactions on different performance measures, which clearly indicates a promising avenue for future research.

The results of our study also lend additional support to prior studies that find outcome control to be an effective control mode in IS offshoring projects (Prifling et al. 2008, Tiwana 2008). Tiwana (2008) provides empirical evidence that outcome control independently increases IS project performance and, in contrast to behavior control, cannot be substituted by technological modularity. Prifling et al. (2008) argue that outcome control seems to be particularly effective for tackling problems arising from cross-cultural differences—a major risk factor in offshore relationships. Furthermore, our results show that behavior control does not influence IS offshoring project performance. This is in line with previous literature that "indicates the relative strength of outcome control over behavioral control in ensuring performance" (Gopal and Gosain 2010, p. 18).

In summary, our quantitative study offers an important contribution towards uncovering the portfolio-level interactions of formal and informal control modes. However, further research is needed to better understand joint control effects on project performance. In particular, it would be interesting to explore portfolio dynamics from two interrelated perspectives: One that focuses on the effect of clan control on formal control, and the other that focuses on the effect of formal control on clan control. Integrating both perspectives could shed further light on potential vicious or virtuous cycles in control portfolios.

Apart from contributing to the literature, our work has also practical implications for client managers who seek to improve IS offshoring results. Our findings strongly suggest that informal (clan) control needs to be combined with outcome control in order to better align vendor work activities with client project goals. This implication might be particularly important for practice since client firms are likely to restrict the use of clan control mechanisms for cost reasons (Hartmann et al. 2010). However, it is still unclear how this alignment process works. In particular, future research should investigate how to balance intensity and variety of clan and outcome control mechanisms within a portfolio of controls.

References

Bagozzi, R.P., Yi, Y. and Phillips, L.W. (1991). Assessing Construct Validity in Organizational Research. Administrative Science Quarterly, 36(3), 421-458.

Banker, R.D. and Kemerer, C.F. (1992). Performance Evaluation Metrics for Information Systems Development: A Principal-Agent Model. Information Systems Research, 3(4), 379-400.

Cardinal, L.B., Sitkin, S.B. and Long, C.P. (2004). Balancing and Rebalancing in the Creation and Evolution of Organizational Control. Organization Science, 15(4), 411-431.

Carte, T.A. and Russell, C.J. (2003). In Pursuit of Moderation: Nine Common Errors and Their Solutions. MIS Quarterly, 27(3), 479-501.

Chin, W.W. (1998). The Partial Least Squares Approach to Structural Equation Modeling. In Modern Methods for Business Research (Marcoulides, G.A. Ed.), pp. 295-358, Erlbaum, New Jersey.

Chin, W.W., Marcolin, B.L. and Newsted, P.R. (1996). A Partial Least Squares Latent Variable Modeling Approach for Measuring Interaction Effects: Results from a Monte Carlo Simulation Study and Voice Mail Emotion/Adoption Study. In Proceedings of the 17th International Conference on Information Systems, Cleveland, OH, 21-41.

Choudhury, V. and Sabherwal, R. (203). Portfolios of Control in Outsourced Software Development Projects. Information Systems Research, 14(3), 291-314.

Chua, C., Lim, W.K., Soh, C. and Sia, S.-K. (2007). Building Swift Clan Control in Complex IT Projects. In Proceedings of the 2nd International Research Workshop on IT Project Management, Montreal, Canada, Paper 1.

Cohen, J. (1988). Statistical Power Analysis for the Behavioral Sciences. Erlbaum, Hillsdale, NJ.

DeLone, W.H. and McLean, E.R. (2003). The DeLone and McLean Model of Information Systems Success: A Ten-Year Update. Journal of Management Information Systems, 19(4), 9-30.

Dibbern, J., Winkler, J. and Heinzl, A. (2008). Explaining Variations in Client Extra Costs between Software Projects Offshored to India. MIS Quarterly, 32(2), 333-366.

Dillman, D.A. (1999). Mail and Internet Surveys: The Tailored Design Method. Wiley, New York.

Eisenhardt, K.M. (1985). Control: Organizational and Economic Approaches. Management Science, 31(2), 134-149.

Ethiraj, S.K., Kale, P., Krishnan, M.S. and Singh, J.V. (2005). Where Do Capabilities Come From and How Do They Matter? A Study in the Software Services Industry. Strat. Manag. J., 26(1), 25-45.

Fornell, C. and Larcker, D.F. (1981). Structural Equation Models with Unobservable Variables and Measurement Error: Algebra and Statistics. Journal of Marketing Research, 18(3), 382-388.

Gefen, D., Rigdon, E.E. and Straub, D. (2011). An Update and Extension to SEM Guidelines for Administrative and Social Science Research. MIS Quarterly, 35(2), 3-14.

Goo, J., Kishore, R., Rao, H.R. and Nam, K. (2009). The Role of Service Level Agreements in Relational Management of IT outsourcing: An Empirical Study. MIS Quarterly, 33(1), 119-145.

Gopal, A. and Gosain, S. (2010). The Role of Organizational Controls and Boundary Spanning in Software Development Outsourcing. Information Systems Research, 21(4), 960–982.

Gopal, A., Sivaramakrishnan, K., Krishnan, M.S. and Mukhopadhyay, T. (2003). Contracts in Offshore Software Development: An Empirical Analysis. Manag. Science, 49(12), 1671-1683.

Hartmann, R., Wiener, M. and Remus, U. (2011). Dynamics of the Amount of Control in Offshore Software Development Projects. In Proceedings of the 10th International Conference on Wirtschaftsinformatik, Zurich, Switzerland, 424-433.

Henderson, J.C. and Lee, S. (1992). Managing I/S Design Teams: A Control Theories Perspective. Management Science, 38(6), 757-777.

Henseler, J., Ringle, C.M. and Sinkovics, R.R. (2009). The Use of Partial Least Squares Path Modeling in International Marketing. In New Challenges to International Marketing (Sinkovics, R.R. and Ghauri, P.N. Eds.), pp. 277-319, Emerald Group, Bingley, UK.

Hulland, J.S. (1999). Use of Partial Least Squares (PLS) in Strategic Management Research: A Review of Four Recent Studies. Strategic Management Journal, 20(4), 195-204.

Jaccard, J. and Turrisi, R. (2003). Interaction Effects in Multiple Regression. 2nd edition. Sage, Thousand Oaks, CA.

Jaworski, B.J. (1988). Toward a Theory of Marketing Control: Environmental Context, Control Types, and Consequences. The Journal of Marketing, 52(3), 23-39.

King, W.R. and Torkzadeh, G. (2008). Information Systems Offshoring: Research Status and Issues. MIS Quarterly, 32(2), 205-225.

Kirsch, L.J. (1996). The Management of Complex Tasks in Organizations: Controlling the Systems Development Process. Organization Science, 7(1), 1-21.

Kirsch, L.J. (1997). Portfolios of Control Modes and IS Project Management. Information Systems Research, 8(3), 215-239.

Kirsch, L.J. (2004). Deploying Common Systems Globally: The Dynamics of Control. Information Systems Research, 15(4), 374-395.

Kirsch, L.J., Ko, D.-G., Haney, M.H. (2010). Investigating the Antecedents of Team-Based Clan Control: Adding Social Capital as a Predictor. Organization Science, 21(2), 469-489.

Kirsch, L.J., Sambamurthy, V., Ko, D.-G. and Purvis, R.L. (2002). Controlling Information Systems Development Projects: The View from the Client. Management Science, 48(4), 484-498.

Ko, D.-G., Kirsch, L.J. and King, W.R. (2005). Antecedents of Knowledge Transfer from Consultants to Clients in Enterprise System Implementations. MIS Quarterly, 29(1), 59-85.

Kohli, R. and Kettinger W.J. (2004). Informating the Clan: Controlling Physicians' Costs and Outcomes. MIS Quarterly, 28(3), 363-394.

Kumar, K. and Bjorn-Andersen, N. A (1990). Cross-Cultural Comparison of IS Designer Values. Communications of the ACM, 33(5), 528-538.

Lindell, M.K. and Whitney, D.J. (2001). Accounting for Common Method Variance in Cross-Sectional Research Designs. Journal of Applied Psychology, 86(1), 114-121.

Liu, S., Keil, M., Rai, A., Zhang, J. and Chen, T. (2008). How User and Requirement Risks Moderate the Effects of Formal and Informal Controls on IT Project Performance. In Proceedings of the 29th International Conference on Information Systems, Paris, France, Paper 153.

Mahnke, V., Wareham, J. and Bjorn-Andersen, N. (2008). Offshore Middlemen: Transnational Intermediation in Technology Sourcing. Journal of Information Technology, 23(1), 18-30.

Mao, J.Y., Lee, J.N. and Deng, C.P. (2008). Vendors' Perspectives on Trust and Control in Offshore Information Systems Outsourcing. Information & Management, 45(7), 482-492.

Mishra, S. and Dhillon, G. (2008). Defining Internal Control Objectives for Information Systems Security: A Value Focused Assessment. In Proceedings of the 16th European Conference on Information Systems, Galway, Paper 210.

Nunnally, J.C. (1978). Psychometric Theory. McGraw-Hill, New York.

Ouchi, W.G. (1979). A Conceptual Framework for the Design of Organizational Control Mechanisms. Management Science, 25(9), 833-848.

Ouchi, W.G. (1980). Markets, Bureaucracies, and Clans. Admin. Science Quarterly, 25(1), 129-141.

Podsakoff, P.M., MacKenzie, S.B., Lee, J.Y. and Podsakoff, N.P. (2003). Common Method Biases in Behavioral Research: A Critical Review of the Literature and Recommended Remedies. Journal of Applied Psychology, 88(5), 879-903.

Poppo, L. and Zenger, T.R. (2002). Do Formal Contracts and Relational Governance Function as Substitutes or Complements? Strategic Management Journal, 23(8), 707-725.

Pressman, R.S. (2001). Software Engineering: A Practitioner's Approach. 5th edition. Hill, New York.

Prifling, M., Gregory, R. and Beck, R. (2008). Project Management Techniques for Managing Cross-Cultural Differences in IT Offshore Outsourcing. In Proceedings of the 14th Americas Conference on Information Systems, Toronto, Canada, Paper 365.

Rai, A., Maruping, L.M. and Venkatesh, V. (2009). Offshore Information Systems Project Success: The Role of Social Embeddedness and Cultural Characteristics. MIS Quarterly, 33(3), 617-641.

Rajkumar, T.M. and Mani, R.V.S. (2001). Offshore Software Development: The View from Indian Suppliers. Information Systems Management, 18(2), 63-73.

Remus, U. and Wiener, M. (2009). Critical Success Factors for Managing Offshore Software Development Projects. Journal of Global Information Technology Management, 12(1), 6-29.

Rijsdijk, S.A. and van den Ende, J. (2011). Control Combinations in New Product Development Projects. Journal of Product Innovation Management, 28(6), 868-880.

Rustagi, S., King, W.R. and Kirsch, L.J. (2008). Predictors of Formal Control Usage in IT Outsourcing Partnerships. Information Systems Research, 19(2), 126-143.

Singh, H. (2008). Watching (Out For) Each Other: The Role of Clan Controls in Managing Project Teams. In Proceedings of the 68th Academy of Management Meeting, Anaheim, CA.

Snow, A.P., Keil, M. and Wallace, L. (2007). The Effects of Optimistic and Pessimistic Biasing on Software Project Status Reporting. Information & Management, 44(2), 130-141.

Tiwana, A. (2008). Does Technological Modularity Substitute for Control? A Study of Alliance Performance in Software Outsourcing. Strategic Management Journal, 29(7), 769-780.

Tiwana, A. (2010). Systems Development Ambidexterity: Explaining the Complementary and Substitutive Roles of Formal and Informal Controls. Journal of Manag. Inf. Sys., 27(2), 87-126.

Tiwana, A. and Keil, M. (2009). Control in Internal and Outsourced Software Projects. Journal of Management Information Systems, 26(3), 9-44.

Wiener, M. and Stephan, R. (2010). Reverse Presentations: Eine kundenorientierte Methode zur Anforderungsvalidierung in der Offshore-Softwareentwicklung. WIRTSCHAFTSINFORMATIK (Business & Information Systems Engineering), 52(3), 133-147.

Winkler, J.K., Dibbern, J. and Heinzl, A. (2008). The Impact of Cultural Differences in Offshore Outsourcing—Case Study Results from German–Indian Application Development Projects. Information Systems Frontiers, 10(2), 243-258.

Zhang, M., Chand, D. and David, G. (2007). Exploring Control Modes in Globally Distributed IT Work Management. In Proceedings of the 13th Americas Conference on Information Systems, Keystone, CO, Paper 181.