

# Conceptualizing Control Configurations: A Control Theory Perspective on Outsourced Information Systems Development

*Full Paper*

## **Subasinghage Maduka Nuwangi**

Business Information Systems Department  
Auckland University of Technology  
Auckland, New Zealand  
Email: [maduka.subasinghage@aut.ac.nz](mailto:maduka.subasinghage@aut.ac.nz)

## **Darshana Sedera**

Department of Business Technology and Entrepreneurship  
Swinburne Business School  
Melbourne, Australia  
Email: [darshana.sedera@gmail.com](mailto:darshana.sedera@gmail.com)

## **Shirish C. Srivastava**

Information Systems and Operations Management  
HEC, Paris, France  
Email: [srivastava@hec.fr](mailto:srivastava@hec.fr)

## **Abstract**

Past research on information systems development outsourcing (ISD-outsourcing) has found control theory to be a useful perspective for examining the co-ordination between the client and the vendor. Research on ISD-outsourcing has uncovered two distinct control mechanisms: structural and process control mechanisms. The structural control mechanism describes “what”, that is, the structure of the control mode, whereas the process control mechanism explains “how”, that is the process through which the control mode is enacted. Although the control literature discusses structural and process control mechanisms, it does not describe the ways in which control mechanisms can be combined for ensuring project success. Grounded in case study data from fifteen interviews in eight ISD-outsourcing projects, we conceptualise five control configurations describing the different combinative patterns of control mechanisms within and across control modes. Then, we identify the relationship between control configuration types and ISD-outsourcing project success.

**Keywords** ISD, Outsourcing, Control, Project Success

## 1 INTRODUCTION

There has been a substantial interest in Information System Development outsourcing (ISD-outsourcing) in both academia and practice (Gregory et al. 2013; Srivastava and Teo 2012b; Summation Technologies 2013). ISD-outsourcing continues to remain the most popular type of IT outsourcing, with strong and continuous growth in such initiatives (Remus and Wiener 2012; Willmott 2012). However, more often than not, several outsourced ISD projects have failed to deliver the projected paybacks, primarily due to the lack of coordination amongst the comprising entities (clients and vendors) and their partially congruent objectives (Nakatsu and Iacovou 2009; Sedera et al. 2014; Tiwana and Keil 2009). Most firms outsourcing their ISD, attempt to minimize such performance impediments by experimenting with coordination and control mechanisms between the client and the vendor (Choudhury and Sabherwal 2003; McBride 2008).

Control theory (Kirsch 1996; Ouchi 1979) is one of the theories that has been widely used to explain the regulatory mechanisms governing the relationship between the client and the vendor in the ISD-outsourcing context (Narayanaswamy and Henry 2005; Nuwangi 2016; Srivastava and Teo 2012b; Tiwana 2010). Such a control involves a controller (an individual or group of individuals representing the client organization) who monitors and evaluates the performance of a controllee (an individual or group of individuals representing the vendor organization) (Kirsch 1996; Narayanaswamy and Henry 2005). Prior control literature discusses factors such as outcome measurability (Kirsch 1996; Kirsch 1997), behavior measurability (Kirsch 1997), and the choice of control mode (such as outcome, behavior, clan, and self-control modes) in ascertaining project performance (Kirsch 1996; Srivastava and Teo 2012b; Tiwana 2009). Despite the wealth of studies, Choudhury et al. (2003) and McBride (2008) highlighted that companies in general, lack a thorough understanding of appropriate control mechanisms for complex outsourcing projects.

Extending the Control Theory, Srivastava and Teo (2012b) introduced the structural and process control mechanisms. The structural control mechanism is about “what” operates the control mode or the structure of the control mode (e.g. what outcomes and behaviors), whereas the process control mechanism explains “how” it is controlled, or the process through which the control mode is enacted (e.g. the processes used to attain the desired outcomes and behaviors)<sup>1</sup>. In general, past research identify that ISD-outsourcing projects fail to deliver their intended benefits, primarily due to inappropriate control mechanisms (Nakatsu and Iacovou 2009; Tiwana and Keil 2009). Rather than operationalizing a single process control mechanism, contemporary ISD-outsourcing projects use multiple process control mechanisms simultaneously. Although the control literature discusses process control mechanisms, it does not describe the configurations in which different process mechanisms can combine. These combinative configurations of process control mechanisms in a client-vendor relationship can be described as control configurations. We argue that in order to better leverage the control perspective, control configurations should be monitored so as to govern the client-vendor coordination efficiently, resulting in better project outcomes (Gopal and Gosain 2010; Srivastava and Teo 2012a; Srivastava and Teo 2012b). Monitoring control configurations provides an early clue to the condition of projects that can help companies minimize ISD-outsourcing project failures. In general, companies are not able to observe the control configurations until the project “goes live”<sup>2</sup>. In most cases, such observations are too late to solve problems and can only be a learning for future work. A proactive approach where the ISD-outsourcing partners implement the appropriate control configuration will enhance the likelihood of project success.

Thus, the primary objectives of this paper are to 1) identify the control configurations through which different process control mechanisms manifest in client-vendor relationships, and 2) to identify the relationship between control configurations and ISD-outsourcing project success. This research enables us to better understand the nature of controlling in contemporary ISD-outsourcing and provide insightful findings to researchers and practitioners alike to improve the efficiency and effectiveness of the outsourcing process.

---

<sup>1</sup> ISD-outsourcing projects function under the broad framework of a formally agreed upon contract that describes the structure of the project (expected outcomes or behaviors). ISD-outsourcing partners can decide the process control mechanism, which they use to achieve the expected outcomes and behaviors. For example, they may decide to follow the contract very closely or they may rely more on the ongoing relationship and mutual trust to decide about emergent operational situations.

<sup>2</sup> Go-live is when the information system is implemented after the completion of information system development.

## 2 CONTROL THEORY

The review of literature presented here evaluates prior work in order to provide the background of the key concepts, provides a summary of the current understanding of control theory in relation to the ISD-outsourcing projects, and identifies gaps that shape the focus of this research.

Control Theory (Kirsch 1996; Ouchi 1979) is widely used in the ISD-outsourcing domain to explain controlling mechanisms between outsourcing partners (Choudhury and Sabherwal 2003; Nuwangi et al. 2018; Nuwangi et al. 2013; Tiwana 2010). According to Choudhury et al. (2003), prior studies on control theory have mainly focused on; 1) examining a specific control mode (e.g. outcome, behavior and clan control) (Henderson and Lee 1992; Kirsch 1996) or 2) exploring the factors (e.g. project characteristics and relationship characteristics) influencing exercise of control (Kirsch 1997; Rao et al. 2007). Considering the wealth of knowledge from past studies, we do not intend to discuss the theoretical fit of the existing control theory modes and structures for ISD-outsourcing in this paper. Such discussions are available on choice of control mechanisms (Choudhury and Sabherwal 2003; Rustagi et al. 2008), project performance improvement through control mechanisms (Gopal and Gosain 2010; Srivastava and Teo 2012b; Tiwana and Keil 2009), amount of control for ISD-outsourcing project success (Remus and Wiener 2012; Rustagi et al. 2008) and portfolio of controls in ISD-outsourcing projects (Choudhury and Sabherwal 2003). In a recent extension to control theory, Srivastava and Teo (2012b) introduced the concept of structural and process control mechanisms explicating the nuances of relationship governance between client and vendor in the ISD-outsourcing context. The structural control mechanism describes “what” operates control mode, whereas the process control mechanism explains “how” client-vendor relationship is regulated (see figure 1). Existing formal and informal controls were re-defined as structural control mechanisms. The formal control is a performance evaluation strategy, where either outcomes or behaviors are measured, evaluated and rewarded (Eisenhardt 1985). The formal control mode can be further subdivided into outcome-based and behavior-based modes (Kirsch 1996). The outcome-based mode includes formally specified expected outcomes (Eisenhardt 1985; Ouchi 1979), whereas the behavior-based mode includes formally specified appropriate behaviors (Eisenhardt 1985; Kirsch 1997). In ISD-outsourcing context, client and outsourcing partners utilize several documents to specify expected outcomes and behaviors. Those documents include business requirement specifications, project plans, project milestones and design documents (Choudhury and Sabherwal 2003). The informal control differs from formal control in that it is based on social or people strategies (Jaworski 1988). The informal control consists of clan and self-control modes. According to Ouchi (1980), clan control includes common values and beliefs within a group of individuals, who share a set of common goals. On the other hand, self-control comprises of self-imposed norms (Manz and Angle 1986). According to Kirsch (1997), organizations implement controlling mechanisms that typically includes a mix of formal and informal control modes. According to Srivastava and Teo (2012b), the process control mechanism includes three governance mechanisms: 1) mechanistic governance, 2) relational governance, and 3) self-governance. Mechanistic governance in ISD-outsourcing, describes the coordination between the client and the vendor by strict adherence to a contract<sup>3</sup>. Relational governance focuses on the shared values, beliefs, rituals and the ongoing relationship between the client and the vendor, rather than following the contract very closely. Self-governance occurs when there is little or no coordination between the client and the vendor as the task is self-monitored by the vendor.

In general, organizations utilize different process control mechanism combinations according to the situation of their projects. Although the Control Theory literature discusses process control mechanisms individually, it does not describe different types of process control mechanism combinations. We term these combinations as control configurations. We argue that lack of understanding of control configurations could lead to ISD-outsourcing project failures. For example, even though contracts of some ISD-outsourcing projects are lack of contract specificity<sup>4</sup>, only mechanistic governance is used for project execution. Utilization of mechanistic governance for the projects with lack of contract specificity can lead to project failures. Therefore, ISD-outsourcing organizations should use control configurations appropriately to ensure the project success.

---

<sup>3</sup> Contract specifies the expected outcomes and behaviors of the project. In ISD-outsourcing context, formal documents such as business requirement specifications, project plans, project milestones and design documents are considered as contracts between client and outsourcing partners.

<sup>4</sup> Contract specificity: the explicitness of details specified in the contract.

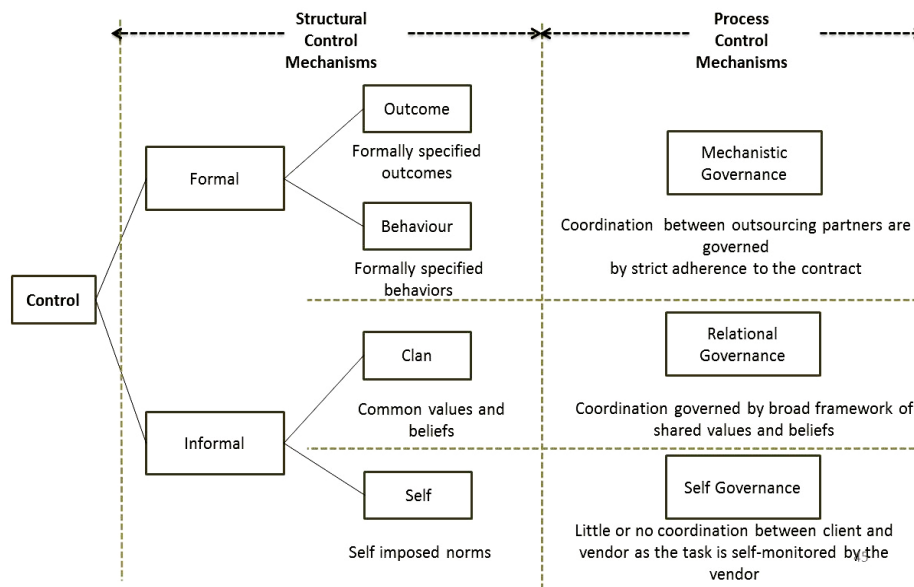


Figure 1. Structural and Process Control Mechanisms

### 3 RESEARCH METHODOLOGY

This study has a qualitative research design. The qualitative case study approach is recognized as appropriate for research that explores complex environments (Klein and Myers 1999) and contemporary events (Benbasat et al. 1987). The case organization was selected using the criterion sampling strategy (Patton 2002). First, the organization should be involved in multiple ISD projects to provide flexibility in data collection. Second, the organization must be sufficiently large, with a standard hierarchy of employment. This enables collecting data from team members at different levels of employment. Following the application of these criteria, Company A was selected as the case organization. Company A was a medium sized ISD company, engaging in stock market-related ISD. The company dealt with multiple exchanges, which had multiple asset classes such as equities, securities lending and borrowing<sup>5</sup>. The company specializes in developing IS solutions for capital markets, with more than 25 capital market clients all over the world. Those solutions provide the ability to trade using multiple assets and manage securities lending and borrowing. Fifteen (15) semi-structured interviews each lasting between 20-30 minutes were conducted with the employees from eight (8) ISD-outsourcing projects of Company A. The sampling technique is non-probability, purposive and employed the 'snowball technique' (interview participants were appropriate opinion leaders of the research topic) (Minichiello et al. 1995). At the beginning of the interview, the participants were informed about the objective of the study. At the end, participants were asked to suggest other employees who are knowledgeable about the control mechanisms in projects. Participants were diverged as new employees were converged to the sample in the interview process, according to recommendations from previous participants (Patton 2002). All the interviews were recorded, with additional notes taken whenever necessary. The interview data was supplemented with the business requirement specifications and other internal documents such as quality assurance documents (test cases and test scenarios) and change request documents. Those documents increased the understanding of different types of control configurations in projects.

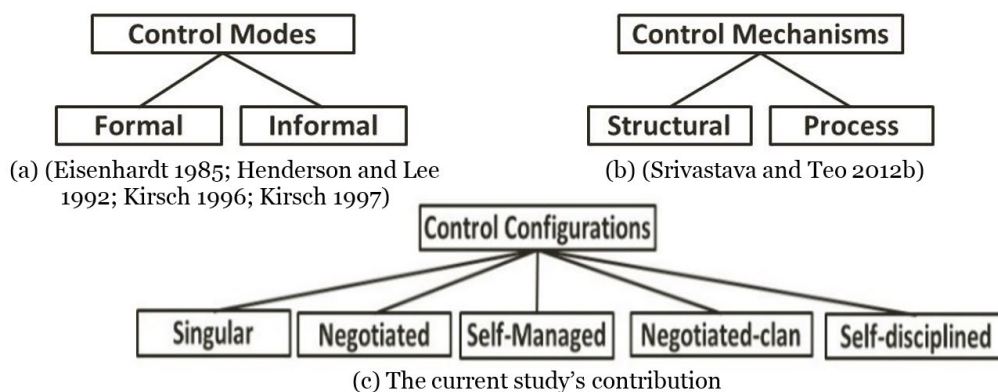
Following the guidelines of Eisenhardt (1989), data analysis was performed in tandem with the data collection to take advantage of the flexibility that the case study affords. The emergent concepts in one interview were verified in the subsequent interview until the state of theoretical saturation was reached, which is the point where it is possible to comprehensively explain the findings of the case study (Eisenhardt 1989; Sedera et al. 2001). Theoretical saturation was identified when the incremental learning was minimal during the interviews. The structural and process control mechanisms formed the initial set of themes through which we analysed the interview data. In the early interviews, we recognized some emerging concepts about the control configurations. While some of the emerging concepts were verified by the case evidence, some were revised or disconfirmed. Replication logic was utilized, where the logic of treating each case study as an experiment with each case serving to confirm or disconfirm the findings (Eisenhardt 1989). Herein, the cases which confirm emergent relationships improve the

<sup>5</sup> For a wider discussion of the above concepts see for example Senarath and Copp (2015), Senarath (2016) and Senarath (2017).

richness, depth and validity of the relationships (Patton 2002), whereas cases which disconfirm the relationships were used to refine and extend the theory.

## 4 RESULTS AND DISCUSSION

In general, organizations execute different combinations of process control mechanisms (see Table 1). We have recognized that probability of executing some of the combinations are less likely than the others. We identified five types of control configurations in ISD-outsourcing projects; 1) singular configuration, 2) negotiated configuration, 3) self-managed configuration, 4) negotiated-clan configuration, and 5) self-disciplined configuration (see figure 2). Those configuration types were identified according to the level (high, medium and low) of each process control mechanism (mechanistic governance, relational governance and self-governance). When locus of control is with the particular process control mechanism, it is considered as ‘High’. ‘Medium’ is when a process control exists, but the locus of control is with another process control mechanism. ‘Low’ is when the process control mechanism does not exist / or very less compared to other process control mechanisms. We argue that better understanding of these configurations would increase the ISD-outsourcing project success.



*Figure 2: The current study's contribution to control theory*

A “singular configuration” is where only one process control mechanism is highly prominent compared to other two process control mechanisms. We observed three combinative patterns of singular configurations; 1) ‘high’ mechanistic governance with ‘low’ relational and ‘low’ self-governance (see row 1 in table 1), 2) ‘high’ relational governance with ‘low’ mechanistic and ‘low’ self-governance (see row 4 in table 1), and 3) ‘high’ self-governance with ‘low’ mechanistic and ‘low’ relational governance (see row 7 in table 1). As ISD-outsourcing projects highly depend on contract, configurations should either have ‘high’ or ‘medium’ level of mechanistic governance. It is unlikely to have ‘low’ mechanistic governance, where the ISD-outsourcing projects do not / rarely follow a contract. Therefore, from the three combinations mentioned above, while the first combination (‘high’ mechanistic governance with ‘low’ relational and ‘low’ self-governance (see row 1 in table 1) is likely to occur, other two are unlikely to take place in ISD-outsourcing projects. First combinative pattern (‘high’ mechanistic governance with ‘low’ relational and ‘low’ self-governance (see row 1 in table 1) is when projects are governed strictly adherence to the pre-specified contract without / fewer amendments to contract based on vendor suggestions. Moreover, in this instance self-governance by the vendor is low. For example, client maintains detailed contracts and wants the vendor to follow contract very closely. In those projects, the change request documents are utilized to manage the changes to the initial client requirements. Even after the project goes live, clients request additional functionalities (onwards and upwards) of the information system. These requests will also be managed through the change request documents.

A “negotiated configuration” occurs with ‘high’ mechanistic governance, ‘medium’ relational governance and ‘low’ self-governance (see row 2 in table 1). Although client wanted vendor to follow contracts very closely, vendor was able to discuss with client and amend contracts during project execution. R1 explained the negotiated configuration in terms of time estimations: “We agree upon certain time lines. But, if it is really unfair, either party can speak and get it extended”. Negotiated configuration is crucial for the success of an ISD-outsourcing project.

“Self-managed configuration” is observed when mechanistic governance is ‘high’, relational governance is ‘low’ and self-governance is ‘medium’ (see row 3 in table 1). Since there is no/very less amendments to the contract based on vendor suggestions, vendor has to work extra hours to achieve the targets specified in the contract. Most of the respondents explained that they work extra hours to meet the

deadlines. According to R1; “We are working in a tight deadline; definitely we have to make some arrangements by working extra hours”.

“Negotiated-clan” configuration was observed with ‘medium’ mechanistic governance, ‘high’ relational governance and ‘low’ self-governance (see row 5 in table 1). In this instance, project is highly governed by broad framework of shared values and beliefs, with medium adherence to pre-specified contract. For example, the client utilizes relational governance to manage day-to-day operations with quick decisions. Examples of this approach were reported in the interviews. Sometimes they experience a high negotiated-clan configuration in ISD-outsourcing projects.

	Locus of control	Mechanistic Governance	Relational Governance	Self-Governance	Characteristics of the Configuration	Likelihood	Configuration name
1	Mechanistic Governance	High	Low	Low	<ul style="list-style-type: none"> <li>• Strict adherence to the contract</li> <li>• No / very less amendments to the contract based on vendor suggestions</li> <li>• No/very less self-governance by the vendor</li> </ul>	Likely	Singular
2	Mechanistic Governance	High	Medium	Low	<ul style="list-style-type: none"> <li>• Strict adherence to the contract</li> <li>• Can amend the contract based on vendor suggestions</li> </ul>	Likely	Negotiated
3	Mechanistic Governance	High	Low	Medium	<ul style="list-style-type: none"> <li>• Strict adherence to the contract</li> <li>• No/very less amendments to the contract based on vendor suggestions</li> <li>• No/very less changes to the initial timelines. So, vendor has to work extra hours to achieve targets.</li> </ul>	Likely	Self-managed
4	Relational Governance	Low	High	Low	<ul style="list-style-type: none"> <li>• No/ very less strict adherence to the contract</li> <li>• Project is broadly governed by broad framework of shared values and beliefs</li> <li>• No/very less self-governance by the vendor</li> </ul>	Unlikely	Singular
5	Relational Governance	Medium	High	Low	<ul style="list-style-type: none"> <li>• Medium strict adherence to the contract</li> <li>• Project is broadly governed by shared value and beliefs</li> </ul>	Likely	Negotiated clan
6	Relational Governance	Low	High	Medium	<ul style="list-style-type: none"> <li>• No/ very less strict adherence to the contract</li> <li>• Project is broadly governed by shared values and beliefs.</li> <li>• Task is self-monitored by the vendor</li> </ul>	Unlikely	-
7	Self-governance	Low	Low	High	<ul style="list-style-type: none"> <li>• No strict adherence to the contract</li> <li>• Project is not governed by shared values and beliefs.</li> <li>• Task is self-monitored by the vendor</li> </ul>	Unlikely	Singular
8	Self-governance	Medium	Low	High	<ul style="list-style-type: none"> <li>• Strict adherence to the contract</li> <li>• Project is not governed by shared values and beliefs.</li> <li>• Task is self-monitored by the vendor</li> </ul>	Likely	Self-disciplined
9	Self-governance	Low	Medium	High	<ul style="list-style-type: none"> <li>• No/ very less strict adherence to the contract</li> <li>• Project is governed by shared values and beliefs.</li> <li>• Task is self-monitored by the vendor</li> </ul>	Unlikely	-
10	Mechanistic Relational Self	High	High	High	<ul style="list-style-type: none"> <li>• Strict adherence to the contract</li> <li>• Project is broadly governed by shared value and beliefs.</li> <li>• Task is broadly self-monitored by the vendor</li> </ul>	Unlikely	-
11	-	Low	Low	Low	<ul style="list-style-type: none"> <li>• No strict adherence to the contract</li> <li>• Project is not governed by shared values and beliefs.</li> <li>• Task is not self-monitored by the vendor</li> </ul>	Unlikely	-

*Table 1. Control Configurations*

“Self-disciplined configuration” is with ‘medium’ mechanistic governance, ‘low’ relational governance and ‘high’ self-governance (see row 8 in table 1). For example, client provides high level documents which include expected outcomes/ behaviors from vendors. Then, the client expects vendor to take the

responsibility of providing expected outcomes according to vendor's own procedures. Moreover, we observed self-disciplined configuration in terms of internal releases<sup>6</sup>. R7 stated that they have internal releases before they send the documents to the client. As R7 explained, *"We have lots of internal releases. Then only we provide those documents to the client side"*. The self-disciplined configurations of the vendor company minimize the problems in ISD-outsourcing projects.

Since all ISD-outsourcing projects highly depend on contract, it is unlikely to have a configuration with 'low' mechanistic governance. Therefore, configurations with 'low' mechanistic governance, 'high' relational governance and 'medium' self-governance (row 6 table 1) or 'low' mechanistic governance, 'medium' relational governance and 'high' self-governance, are unlikely to occur in ISD-outsourcing projects. Moreover, it is unlikely that all three configuration types are 'high' (row 10 in table 1) or all are 'low' (row 11 in table 1). We have defined level 'high' when the locus of control is with the particular process control mechanism and 'low' when a particular process control mechanism does not exist / or very less compared to other process control mechanisms. According to the definition, two process control mechanisms could not have 'high' simultaneously. Therefore, it is unlikely to operationalize a control configuration, which has 'high' in all three process control mechanisms. Moreover, ISD-outsourcing projects should be governed by at least one process control mechanism. Therefore, it is impossible to have the level of all three process control mechanisms as 'low'.

### **Identifying the Relationship between Control Configurations and Project Success**

Having identified control configurations, we then explore the relationships between the control configurations and ISD-outsourcing project success. We summarized the comments provided by the respondents regarding different projects and derived the conclusions accordingly (see Table 2). "Status" was categorized into two groups: 1) 'unsuccessful', where the client discontinued or dissatisfied with most of the outcomes of the information system, or 2) 'successful', the client is satisfied with most of the outcomes of the information system. We acknowledge that the level of configuration; 'high', 'medium' and 'low' is a relative indication. Data analysis revealed that ISD-outsourcing projects have different control configurations during the life cycle according to the requirements of the project, meaning that 'high' level of one configuration at the beginning of the project does not ensure or lead to 'high', 'medium' or 'low' of another configuration during final stages of the project. As an example, P3 had a 'high' negotiated-clan configuration as well as 'high' singular configuration as per the requirements of the project in various life cycle stages. According to R14, in project P3 they had 'high' singular configuration: *"Documents..., normally we always use it, when an issue comes or we need to clarify something, we always refer to documents"*. R14 also explained that: *"If we want something urgently, just straightway go to them and ask"*. This indicated that P3 consisted of a 'high' singular configuration as well as a 'high' negotiated-clan configuration as per the requirements. Conclusions were derived by considering configuration types, which were employed in the project at least once during the project life cycle.

The data analysis revealed that all the ISD-outsourcing projects had 'high' self-managed configuration. This indicated that, regardless of the controlling process, all the employees tended to work extra hours to achieve the targets. According to R1, *"We are working in a tight deadline; definitely we have to make some arrangements by working extra hours"*. According to the data analysis, all the ISD-outsourcing projects had 'high' self-disciplined configuration. This indicates although client provides high level documents and overall time estimations to vendors, client expects the vendor to follow their own procedures to provide the expected outcomes. According to R1; *"We have shared them the efforts. We will be doing the effort estimations when they have given a task"*. Moreover, the projects had standard processes like internal releases. According to R7, *"We have lots of internal releases. Then only we provide those documents to the client side"*. Therefore, self-managed configuration and self-disciplined configuration alone do not have an impact on ISD-outsourcing project success.

While P1, P3 and P8 were successful with 'high' negotiated-clan configuration. Although P7 has 'low' negotiated-clan configuration, it was also successful. This indicates that negotiated-clan configuration alone does not have an impact on ISD-outsourcing project success. Project P3 was successful with 'high' singular configuration and 'high' negotiated configuration. While P1 was successful with 'medium' singular configuration and 'high' negotiated configuration, P7 and P8 were successful with 'high' singular configuration and 'medium' negotiated configuration. All the other projects (P2, P4, P5 and P6) were unsuccessful, as they had 'medium' / 'low' in singular and negotiated configurations. This indicates that from singular and negotiated configuration, least one should be 'high' to make ISD-outsourcing projects a success.

---

<sup>6</sup> Internal releases consist of releasing information system for quality assurance before sending it to the vendor.

Project	Configuration					Status
	Singular	Negotiated	Self-Managed	Negotiated-clan	Self-disciplined	
1	Medium [20]*	High [8]	High	High [14]	High [21]	Successful
2	Medium	Medium [9]	High	High	High	Unsuccessful
3	High [1 / 19]	High [6]	High	High [12/18]	High	Successful [23]
4	Low [3 / 5]	Medium [10]	High	Medium [16/17/26]	High	Unsuccessful
5	Medium [4]	Medium	High	Low	High	Unsuccessful
6	Low	Medium [11]	High	High	High [22]	Unsuccessful [24]
7	High [2/15]	Medium	High	Low [15]	High	Successful
8	High	Medium [7]	High	High [13]	High	Successful

\* Refer appendix 1 for the sample quotations

*Table 2: control configurations and project success*

## 5 DISCUSSION

The goal of the study was to explore the methods to improve ISD-outsourcing project success. Control Theory was selected as the theoretical lens, since it is widely used in ISD-outsourcing domain for explaining the controlling mechanisms for project success. Study results reported that lack of understanding of combinative patterns of process control mechanisms leads to ISD-outsourcing project failures. Five types of control configurations were introduced; 1) singular configuration, 2) negotiated configuration, 3) self-managed configuration, 4) negotiated-clan configuration and 5) self-disciplined configuration. Singular configuration can be observed when only one process control mechanism is highly prominent compared to other process control mechanisms. Negotiated configuration occurs when 1) the client wanted vendor to follow contracts very closely and 2) vendor was able to discuss with client and amend contracts during project execution. Self-managed configuration can be observed when there is no/very less amendments to the contract based on vendor suggestions. Therefore, vendor has to work extra hours to achieve the targets specified in the contract. While Negotiated-clan configuration is about client utilizing relational governance to manage day-to-day operations with quick decisions, self-disciplined configuration is when the client provides high level contract and expects vendor to take the responsibility of providing project outcomes according to vendor's own procedures.

The data analysis revealed: 1) different projects within the same company could have different control configurations, 2) control configurations have a bearing on the ISD-outsourcing project success, 3) self-managed configuration, self-disciplined configuration and negotiated-clan configuration alone do not have an impact on ISD-outsourcing project success, 4) either singular or negotiated configuration should be 'high' to make ISD-outsourcing projects a success, and 5) projects employ various control configurations in different stages of information system development life cycle.

## 6 IMPLICATIONS, LIMITATIONS AND FUTURE RESEARCH

From the theoretical perspective, this research highlighted the inadequacy of the existing Control Theory to manage ISD-outsourcing projects. Accordingly, this research extends Control Theory and make it more applicable for contemporary ISD-outsourcing projects. Proving a theoretical extension to Control Theory, we introduced five types of control configurations in which different process control mechanisms combine; 1) singular configuration, 2) negotiated configuration, 3) self-managed configuration, 4) negotiated-clan configuration and 5) self-disciplined configuration. These control configurations provide better understanding of controlling mechanisms in contemporary ISD-outsourcing projects. Moreover, data analysis revealed relationships between control configuration combinations and ISD-outsourcing project success. By describing the importance of different control configurations in different stages of ISD-outsourcing project lifecycle, our study highlights the need to monitor control configurations throughout project lifecycle.

In addition to implications for research, our study has the potential to influence the practice of ISD-outsourcing. According to the data analysis, ISD-outsourcing projects were not being able to gain the expected outcomes, due to lack of understanding of different types of combinative patterns of process control mechanisms. Proposed control configurations will provide a solution by improving the understanding of combinative patterns of different process control mechanisms. Furthermore, this research highlights the importance of selecting appropriate control configurations throughout project



lifecycle. More importantly, our study emphasizes the need to monitor control configurations throughout project lifecycle to minimize ISD-outsourcing project failures.

There are limitations of the study which reduce its generalizability. First, our emphasis was on the effect of control configurations for the ISD-outsourcing project failures. There can be some other factors (i.e. client requirement volatility, inaccurate budget and time estimations), which cause for ISD-outsourcing project failures. Considering the other factors would provide more accurate theoretical extensions. Second, there can be more combinative patters of different process control mechanisms, which we haven't considered. Future research could examine further about different combinative patters of process control mechanisms. Third, future studies would further explore various control configurations employed in projects based on the stage of the Information System development lifecycle. By doing so, the researchers will be able to provide more insights into which configuration should be used in each stage of Information System development lifecycle.

## 7 REFERENCES

- Benbasat, I., Goldstein, D. K., and Mead, M. 1987. "The Case Research Strategy in Studies of Information Systems," *MIS Quarterly* (11:3), pp. 369-386.
- Choudhury, V., and Sabherwal, R. 2003. "Portfolios of Control in Outsourced Software Development Projects," *Information Systems Research* (14:3), pp. 291-314.
- Eisenhardt, K. M. 1985. "Control: Organizational and Economic Approaches," *Management Science* (31:2), pp. 134-149.
- Eisenhardt, K. M. 1989. "Building Theories from Case Study Research," *The Academy of Management Review* (14:4), pp. 532-550.
- Gopal, A., and Gosain, S. 2010. "The Role of Organizational Controls and Boundary Spanning in Software Development Outsourcing: Implications for Project Performance," *Information Systems Research* (21:4), pp. 960-982.
- Gregory, R. W., Beck, R., and Keil, M. 2013. "Control Balancing in Information Systems Development Offshoring Projects," *MIS Quarterly* (37:4), pp. 1211-1232.
- Henderson, J. C., and Lee, S. 1992. "Managing I/S Design Teams: A Control Theories Perspective," *Management Science* (38:6), pp. 757-777.
- Jaworski, B. J. 1988. "Toward a Theory of Marketing Control: Environmental Context, Control Types, and Consequences," *Journal of Marketing* (52:3), pp. 23-39.
- Kirsch, L. J. 1996. "The Management of Complex Tasks in Organizations: Controlling the Systems Development Process," *Organization Science* (7:1), pp. 1-21.
- Kirsch, L. J. 1997. "Portfolios of Control Modes and Is Project Management," *Information Systems Research* (8:3), pp. 215-239.
- Klein, H. K., and Myers, M. D. 1999. "A Set of Principles for Conducting and Evaluating Interpretive Field Studies in Information Systems," *MIS Quarterly* (23:1), pp. 67-93.
- Manz, C. C., and Angle, H. 1986. "Can Group Self-Management Mean a Loss of Personal Control: Triangulating a Paradox," *Group & Organization Studies* (11:4), pp. 309-339.
- McBride, T. 2008. "The Mechanisms of Project Management of Software Development," *Journal of Systems and Software* (81:12), pp. 2386-2395.
- Minichiello, V., Aroni, R., Timewell, E., and Alexander, L. 1995. *In-Depth Interviewing: Principles, Techniques, Analysis*, (2nd ed.). Melbourne, Australia: Pearson Education Australia.
- Nakatsu, R. T., and Iacovou, C. L. 2009. "A Comparative Study of Important Risk Factors Involved in Offshore and Domestic Outsourcing of Software Development Projects: A Two-Panel Delphi Study," *Information & Management* (46:1), pp. 57-68.
- Narayanaswamy, R., and Henry, R. M. 2005. "Effects of Culture on Control Mechanisms in Offshore Outsourced It Projects," in: *ACM SIGMIS CPR conference on Computer personnel research*. Atlanta, Georgia, USA: ACM, pp. 139-145.

- Nuwangi, S., Sedera, D., and Srivastava, S. C. 2013. "Information Systems Development Outsourcing: The Role of Control Configurations," in: *Thirty Fourth International Conference on Information Systems*. Milan, Italy.
- Nuwangi, S. M. 2016. "The Impact of Modularisation on Information System Development Outsourcing Project Control," in: *Information Systems*. Queensland University of Technology, Australia p. 259.
- Nuwangi, S. M., Sedera, D., and Srivastava, S. C. 2018. "Multi-Layered Control Mechanisms in Software Development Outsourcing," *Pacific Asia Conference on Information Systems*, Yokohama, Japan: Association for Information Systems AIS Electronic Library (AISeL), pp. 1-9.
- Ouchi, W. G. 1979. "A Conceptual Framework for the Design of Organizational Control Mechanisms," *Management Science* (25:9), pp. 833-848.
- Ouchi, W. G. 1980. "Markets, Bureaucracies, and Clans," *Administrative Science Quarterly* (25:1), pp. 129-141.
- Patton, M. Q. 2002. *Qualitative Research & Evaluation Methods*. Sage Publications, Inc.
- Rao, M. T., Brown, C. V., and Perkins, W. C. 2007. "Host Country Resource Availability and Information System Control Mechanisms in Multinational Corporations: An Empirical Test of Resource Dependence Theory," *Journal of Management Information Systems* (23:4), pp. 11-28.
- Remus, U., and Wiener, M. 2012. "The Amount of Control in Offshore Software Development Projects," *Journal of Global Information Management* (20:4), pp. 1-26.
- Rustagi, S., King, W. R., and Kirsch, L. J. 2008. "Predictors of Formal Control Usage in It Outsourcing Partnerships," *Information Systems Research* (19:2), pp. 126-143.
- Sedera, D., Lokuge, S., Krcmar, H., Srivastava, S. C., and Ravishankar, M. N. 2014. "The Future of Outsourcing in the Asia-Pacific Region: Implications for Research and Practice—Panel Report from Pacis 2014," *Communications of the Association for Information Systems* (35:1), pp. 317-331.
- Sedera, D., Rosemann, M., and Gable, G. 2001. "Using Performance Measurement Models for Benefit Realization with Enterprise Systems - the Queensland Government Approach," *European Conference on Information Systems*, Bled, Slovenia: AIS.
- Senarath, S. 2016. "Not So 'Bankruptcy-Remote': An Insight into Sri Lankan Securitization Practices in a Post\_Gfc Context," in: *Multidisciplinary Academic Conference on Management, Marketing and Economics*. pp. 53-60.
- Senarath, S. 2017. "The Dodd-Frank Act Doesn't Solve the Principal-Agent Problem in Asset Securitisation." LSE Research Online: LSE Business Review.
- Senarath, S., and Copp, R. 2015. "Credit Default Swaps and the Global Financial Crisis: Reframing Credit Default Swaps as Quasi-Insurance," *Global Economy and Finance Journal* (8:1), pp. 135-149.
- Srivastava, S. C., and Teo, T. S. H. 2012a. "Aligning Control Structures with Control Processes for Effective Offshore Contract Performance," in: *Pacific Asia Conference on Information Systems (PACIS)*. Ho Chi Minh, Vietnam.
- Srivastava, S. C., and Teo, T. S. H. 2012b. "Contract Performance in Offshore Systems Development: Role of Control Mechanisms," *Journal of Management Information Systems* (29:1), pp. 115-158.
- Summation Technologies. 2013. "Quality Management in Software Development Outsourcing." from <http://www.isummation.com/it-services/it-software-outsourcing-company/quality-management-in-software-development-outsourcing/>
- Tiwana, A. 2009. "Governance-Knowledge Fit in Systems Development Projects," *Information Systems Research* (20:2), pp. 180-197.
- Tiwana, A. 2010. "Systems Development Ambidexterity: Explaining the Complementary and Substitutive Roles of Formal and Informal Controls," *Journal of Management Information Systems* (27:2), pp. 87-126.
- Tiwana, A., and Keil, M. 2009. "Control in Internal and Outsourced Software Projects," *Journal of Management Information Systems* (26:3), pp. 9-44.
- Willmott, D. 2012. "Report: Cios to Accelerate Outsourcing in 2013." Dice: The Carrier Hub for Tech.

## Appendix

R*	P**	P***	Sample Quotation
1	P3	R14	Documents, normally we always use it, when an issue comes or we need to clarify something, we always refer to documents
2	P7	R10	Fist we follow the exact documents. Very rarely have the discussions with them
3	P4	R6	The most difficult thing is defect verifications. Defects which were raised by our client, because there are no proper guidelines.
4	P5	R9	The basic problem that we are having is with the Business Requirement Specification. Business Requirement Specification is not detailed enough to grab all the knowledge
5	P4	R6	They do not provide the exact steps to verify a defect.
6	P3	R13	If we informed them that the particular estimated time is not enough for us, it will take long time, then we can tell them and increase it or decrease it.
7	P8	R15	If there is any decision has been taken due to a phone call, we could always have an email to formalize what we discussed
8	P1	R1	We agree upon certain timelines. But, if it is really unfair, either party can speak and get it extended
9	P2	R2	Normally this is the process. If we have a phone call or whatever we drop a mail According to our discussion, we are doing like this. So, that is safe side for both the parties. Then there will be a tracking
10	P4	R6	We are advised by our senior people we are always trying to have a proof. Sometimes we are calling to our client and we get that clarification after the call we drop a mail "As we discussed you have been agreed to this, so we are doing this according to your clarification". So, they are confirming that.
11	P6	R8	We have to confirm all through email whatever the things they are telling through the calls. We have to send back a mail.
12	P3	R14	If we want something urgently, just straightway go to them and ask
13	P8	R15	It is a matter of phone call to say, "hey you know, this issue? What is the state".
14	P1	R1	We go through the phone calls. We can call directly and get the details easily.
15	P7	R10	First, we follow the documents. Very rarely we have discussions with them.
16	P4	R6	They tell that has been changed and this will be updated in the next document. But until that we can't hold the task.
17	P4	R6	With the trust we do the task at that time before we get that updated document. Sometimes it happens.
18	P3	R3	Reduction of mail sent throughout does not mean that reduction of communication. It is more like now the phone calls becoming more frequent which is more effective than emails
19	P3	R13	Whenever a change happens, there will be a change request document.
20	P1	R1	They don't bother to document every single bit of document.
21	P1	R1	We have shared them the efforts. We will be doing the effort estimations when they have given a task
22	P6	R7	We have lots of internal releases. Then only we provide those documents to the client side
23	P3	R13	Our project is stable
24	P6	R8	I think it is unstable

\*Reference ID, \*\*Project ID, \*\*\*Participant ID

### *Table 3: Sample Quotations*

**Copyright:** © 2019 Nuwangi, S. M., Sedera D. & Srivastava S. C. This is an open-access article distributed under the terms of the [Creative Commons Attribution-NonCommercial 3.0 Australia License](https://creativecommons.org/licenses/by-nc/3.0/australia/), which permits non-commercial use, distribution, and reproduction in any medium, provided the original author and ACIS are credited.