ALIGNMENT BETWEEN INTERNAL AND EXTERNAL INFORMATION TECHNOLOGY CONTROL MECHANISMS: AN EXTENDED RESOURCE-BASED VIEW

Jihun Park, Korea University Business School, Seoul, Korea, jihunprk@korea.ac.kr
Jae-Nam Lee, Korea University Business School, Seoul, Korea, isjnlee@korea.ac.kr
Hyun-Sun Ryu, Korea University Business School, Seoul, Korea, hamkkai@korea.ac.kr

Abstract

Given that information technology (IT) is fundamental to a firm’s survival and growth, firms face the critical challenge of integrating, building, and reconfiguring IT resources so as to obtain competitive advantage and superior performance. One major research stream explores methods of organizing internal IT resources to align them with enterprises. Another major research stream examines methods of managing external IT resources through outsourcing. Many of IT research have separately focused on the effects of internal and external IT resource control mechanisms. However, few studies investigated the alignment between internal and external IT control mechanisms. Therefore, this research-in-progress study aims to explore whether firms with a good fit between their internal and external IT control mechanisms are expected to have better firm performance. Based on extended resource-based view, we use mainly three internal IT control mechanisms (i.e., centralized, decentralized, and hybrid) and three external IT control mechanisms (i.e., independent, arm’s-length, and embedded). Results will show that each alignment between internal and external IT control mechanisms can be used to create different theoretical arguments that explain how IT control mechanisms for IT resource allocation are managed in terms of intra- and inter-firm perspectives. This study will also show the most acceptable alignment between internal and external IT control mechanisms on three dimensional firm performances (i.e., operational, market, and innovation performance).

Keywords: IT control mechanism, Resource-based view, Extended resource-based view, Strategic alignment, IT governance, and IT outsourcing
1 INTRODUCTION

With the increasing number of firms continuing to seek ways to create greater value from information technology (IT), firms face the critical challenge of integrating, building, and reconfiguring internal IT resources so as to obtain competitive advantage and superior performance (Brown 1997; Feeny et al. 1998; Sambamurthy et al. 1999). Accordingly, the effective way to control the IT resources of firms has been a critical issue in IT management literature. In addition, few firms have all of the resources needed to compete effectively in the current dynamic landscape. Thus, contemporary environments involve IT value being made by multiple companies in cooperative, platform-based, and relational arrangements where the objective is to co-create value (Grover et al. 2012). A growing body of study focuses on utilizing external resources through strategic alliance.

Two dominant approaches to understanding IT control mechanisms, namely, internal and external approaches, are found in IT literature. The former approach emphasizes the internal aspects of IT resource control in IT government literature (Brown et al. 1994; Sambamurthy et al. 1999; Weill et al. 2004). The central question in this approach is how to organize internal IT resources so as to align them with enterprises (Brown et al. 1994). Based on IT outsourcing research, the latter approach focuses on the external aspects of IT resource control (Lee et al. 2004). This approach stresses an IT governance mechanism that manages a firm’s IT value through outsourcing (Loh et al. 1991). Although IT literature is replete with theoretical and empirical studies of two approaches, previous studies have focused on the effects of internal and external IT control mechanism separately (Brown 1997). In essence, the previous studies treat two approaches as an isolated decision in a situation in which they are inextricably linked to one another and exert an alignment impact on firm performance. Despite the apparent importance of alignment between intra- and inter-firm IT control mechanisms, this issue has received little attention from researchers and practitioners in the field of IT research. To bridge this research gap, we explore whether firms with a good fit between their internal and external IT control mechanisms are expected to have better firm performance than those without such a fit. Therefore, we attempt to answer the following research questions: 1) Is a certain alignment between internal and external IT control mechanisms more effective than any other alignments? 2) Does the effect of alignment between a firm’s internal and external IT control mechanisms on firm performance differ? To investigate these questions, we use the extended resource-based view (ERBV) to explain the alignment of internal and external IT control mechanisms. Particularly, we utilize three internal IT control mechanisms (i.e., centralized, de-centralized, and hybrid) and three external IT control mechanisms (i.e., independent, arm’s-length, and embedded). We then explore the performance implications of the alignment between internal and external IT control mechanisms.

2 THEORETICAL BACKGROUND

2.1 Extended Resource-Based View

Resource-based view (RBV) is widely considered one of the most prominent and powerful theories for explaining and predicting organizational relationships (Barney et al. 2011). According to RBV, a firm is equivalent to the broad set of resources that it owns (Das et al. 2000). The RBV provides a valuable way for IT researchers to determine how IT as a resource relates to firm strategy and performance (Wade et al. 2004). In particular, this perspective provides a cogent framework to evaluate organization control mechanisms for allocating IT resources. Recently, an increasing number of research extend the traditional RBV by focusing on network resources and explicitly address the role of strategic alliance, namely, ERBV (Eisenhardt et al. 1996; Lavie 2006).

1) Traditional RBV: The traditional RBV adopted an inward-looking view and conceptualized firms as heterogeneous entities consisting of bundles of idiosyncratic resource (Lavie 2006). In particular, early studies on RBV developed their own conception of resource-position barriers that
secure economic rent (Lavie 2006) to protect a firm’s resource from imitation and substitution (Barney 1991). The RBV of a firm is based on two fundamental assumptions, as developed in the field of strategic management (Barney 1991; Wan et al. 2011). The first assumption is that the resources and capabilities possessed by competing firms may differ; the second assumption is that these different resources can be persistent because of rarity and difficulties in acquisition or imitation. Therefore, in traditional RBV studies, researchers have assumed that value-creating resources are owned and controlled by the focal firm (Amit et al. 2006; Barney 1991).

2) Extended RBV: Firms cannot have all necessary resources to compete effectively in the rapidly changing business environment. Thus, firms seek access to the necessary resources through alliances with their external partners (Ireland et al. 2002). According to the ERBV literature (Wan et al. 2011; Wassmer 2010), traditional RBV failed to acknowledge the direct sharing of resources and the indirect transferability of benefits associated with external resources (Lavie 2006). Given that the fundamental assumptions of the RBV turn out to be inapplicable (Lavie 2006), many researchers have long stressed that firms must simultaneously consider their internal and external resources to gain and sustain competitive advantage. Lavie (2006) suggested the ERBV that firm valuation should be based not only on the resources of the focal firm in question but also on the resource endowments of its alliance partners by employing a theoretical background of the relational view and social network theories. Thus, a more detailed understanding of the internal and external resources in organizations must be obtained to effectively control these resources and to create competitive advantage of firms.

2.2 Organizational Control Mechanisms

Organization control has many definitions and has been interpreted in numerous ways. Organization control mechanisms have been viewed as a mode of organizing transactions (Williamson 1979). Organization control mechanisms are used to govern economic transactions between actors and alternative mechanisms for allocating resources (Bradach et al. 1989) and to determine the broad uses to which organizational resources will be deployed and the resolution of conflicts among the myriad participants in organizations (Daily et al. 2003). In addition, these mechanisms are used to identify who is responsible for specific decisions, how the organization is to be managed, how objectives are identified and met, and how performance and the general oversight are managed (Simon et al. 2009). Alternative forms of organization control mechanisms are particularly important in shaping an organization’s or a department’s performance (Bradach et al. 1989; Olson et al. 2005).

Many researchers from several disciplines (e.g., strategic management, organization science, and economics) have identified various organization forms and their corresponding control mechanisms. Ouchi (1979) fundamentally described three different organizational control mechanisms (e.g., market, bureaucracy, and clan) that can seek to cope with organizational problems of evaluation and control. In addition, some researchers argued that price, authority, and trust are independent and can be combined in a variety of ways to enhance our understanding of intra- and inter-organizational control (Adler 2001; Bradach et al. 1989). According to a long tradition of scholarship in organization control literature, three ideal-typical organizational control mechanisms are used in this study: (1) hierarchy-based, (2) market-based, and (3) network-based control mechanisms.

1) Hierarchy-based control mechanism: Hierarchy-based control mechanism focuses on authority or legitimate power to allocate and utilize organizational resources (Adler 2001). Coase (1937) argued that transactions will be governed by the institutional arrangement that is most efficient. A large body of organizational research has shown that an organization structured by this mechanism may be efficient when performing routine-partitioned tasks but encounters enormous difficulty when performing innovation tasks requiring the generation of new knowledge (Adler 2001).

2) Market-based control mechanism: Under the market-based control mechanism, prices in the market convey all of the necessary information for efficient decision-making (Ouchi 1979). Thus, this mechanism is effective when low uncertainty on individual performance in groups and/or low uncertainty on future contingencies exists. The market form, being distinct from the actual functioning
of most real markets, relies on the price mechanism to coordinate competing suppliers and anonymous buyers (Adler 2001). Under this mechanism, the parties performing the work (i.e., supplier or contractor) are compensated according to the output produced, thereby bearing both the risk in case of poor performance and the rewards in case of strong performance (Makadok et al. 2009).

3) **Network-based control mechanism**: Network-based control mechanism highlights trust and social relationship, which has been found to be unique to a particular organization (Ouchi 1979). This mechanism has focused on trust intertwined with authority (hierarchy) and price (market) (Bradach et al. 1989). Under this mechanism, trust is a powerful alternative to formal governance mechanisms that attempt to align incentives and control opportunism through monitoring and sanctions (Puranam et al. 2009). In addition, trust enables firms to gain access to knowledge unavailable in-house, to spread the risks associated with uncertain ventures, to benefit from economies of scale, to enter new product and geographic markets rapidly, to manage inter-organizational dependencies, and to respond quickly and flexibly to changing circumstances (Bradach et al. 1989). Table 1 provides characteristics of the three organizational control mechanism types.

<table>
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<tr>
<th>Organizational control Mechanisms</th>
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<td>Chenhall 2003; Tanriverdi et. al 2007</td>
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<td>Market-based</td>
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<td>Network-based</td>
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Table 1. Characteristics of each organizational control mechanism type

3  THEORETICAL DEVELOPMENT

3.1 Two Approaches of IT Control Mechanism

3.1.1 Internal IT Control Mechanism

The effective way to control firms’ IT resources has been a critical issue in IT management literature. Many studies related to IT resource control have been performed based on the traditional RBV. On the basis of the traditional RBV of IT resource, literature has identified three forms of internal IT control mechanism: (1) centralized, (2) de-centralized, and (3) hybrid. The control mechanisms of internal IT resource are viewed as the relationship between corporate IT and divisional IT (IT unit) and among interdivisional ITs.

1) **Centralized**: Under a centralized mechanism, the corporate IT hierarchically controls over divisions. Under the centralized mode, IT resources and decision rights are owned and controlled by corporate IT (Brown 1999; Sambamurthy et al. 1999). The incentives for collaborations of inter-divisions are limited and therefore bear neither risk from poor performance nor reward for strong performance (Makadok et al. 2009). The main benefits of central IT control mechanisms are identified as high quality and low price (Tavakolian 1989), operational efficiency (Brown 1997), synergy across business units (Brown et al. 1998), and core business (Nolan et al. 2005). Given that hierarchical control over IT divisions may help assure dissemination across divisions, this control undermines incentives for the divisions to create new knowledge (Adler 2001).

2) **De-centralized**: Under a de-centralized mechanism, IT resources and decision rights are owned and controlled by divisional IT (IT unit) (Brown 1997; Sambamurthy et al. 1999). The de-centralized mechanism is more effective than other mechanisms in enabling firms to respond to changing markets and deal with customer demands rapidly. The main benefits of the de-centralized IT control
mechanisms responsiveness (Brown 1997), and differentiation (Brown et al. 1998). Considering that market control over IT divisions may help assure an autonomous profit center for each division, this control suffers because the optimal allocations of IT resources are blocked (Adler 2001).

3) **Hybrid:** Under a hybrid mechanism, the existing IT resource and capabilities are controlled not only by the corporate IT but also by the divisional IT (Brown 1999; Sambamurthy et al. 1999). The IT resources and decision rights are owned and controlled by both corporate and divisional IT. This hybrid mode is not integrated vertically because corporate and division IT are independent of each other (Adler 2001). The incentives for collaborations of inter-divisions are maximized; thus, the relationship of individual divisions is important rather than that of two control mechanisms. The main benefits of the hybrid mechanisms are efficiency and flexibility (Allen et al. 1991), best cost (Brown et al. 1998), and transformation (Nolan et al. 2005).

### 3.1.2 External IT Control Mechanism

On the basis of the ERBV, the control mechanism of IT resources extracted by the focal firms in an alliance is viewed as the relationship between client and vendor in IT outsourcing. Three types of external IT control mechanism are proposed by IT outsourcing literature (e.g., Lee et al. 2004): (1) independent, (2) arm’s-length, and (3) embedded mechanisms.

1) **Independent:** Firms adopting independent mechanism try to force improvements in their suppliers by introducing more complex “hierarchical contracts” (Stinchcombe et al. 1985). Relationships with external partners are tenuous, with interactions lasting only a very brief period of time. Thus, resources are acquired externally, but managed internally. Firms pursuing this mechanism have lower access to cost efficiency than those that acquire not only resources but also the management of resources in the market. This mechanism serves to minimize dependence on an external entity for critical organizational resources and competencies (Salancik et al. 1978). Therefore, such a mechanism is commensurate with the development of an indigenous strategic competency.

2) **Arm’s-length:** In the arm’s-length mechanism, firms impose sharp market discipline on their suppliers by aggressively demanding lower prices and moving rapidly to cut off suppliers who cannot deliver (Adler 2001). This mechanism is based on nonidiosyncratic relationships, i.e., sellers are interchangeable (Dyer et al. 1998). Thus, an easily measurable commodity is traded for money. Although such relationships commence with a detailed specification of each party’s obligations, control of unspecified obligations vests with the providers. To minimize exposure to provider opportunism, such relationships are therefore loosely coupled, and long-term commitments are avoided.

3) **Embedded:** Firms with the embedded mechanism build long-term trust-based partnerships with their suppliers (Bradach et al. 1989). When firms need innovation and knowledge inputs from suppliers rather than standardized commodities, strong hierarchical and market control cannot assure the high a level of performance (Adler 2001). Therefore, embedded mechanisms are more suitable for facilitating knowledge transfer and acquisition (Liebeskind et al. 1996). Economic exchanges occur through stable networks of exchange partners who maintain close social relationship (Uzzi 1997). Partners undertake joint problem solving and are motivated to share information and knowledge that may be unavailable in the market place.

### 3.2 Alignment of IT Control Mechanisms

This study views three internal IT control mechanisms (i.e., centralized, de-centralized, and hybrid) based on IT government literature and three external IT control mechanisms (i.e., independent, arm’s-length, and embedded) based on IT outsourcing research. This research seeks to provide insights into the alignment between internal and external IT control mechanisms and its implications of firm performance. Based on ERBV, several authors (Ireland et al. 2002; Lavie 2006; Wan et al. 2011) highlighted the importance of internal and external resource alignment. It is implicitly believed that the alignment between internal and external IT control mechanisms help enhance firm performance.
Firm performance is determined by how effectively the firm’s business activities are implemented and controlled (Olson et al. 2005). Therefore, firm performance is crucially dependent on the efficient operation of internal and external control mechanisms (Walsh et al. 1990). In spite of the fact, their combined role in firm performance remains unclear (Bharadwaj 2000; McLaren et al. 2011). Moreover, most prior research on IT control mechanisms has been treated firm performance as unidimensional. Thus, in viewing alignment and its firm performance implications, this paper identifies three related theoretical lens, namely, cost view (i.e., transaction cost economics), market view (i.e., organizational slack literature) and relational view (i.e., alliance network theory), which have been mainly adopted by prior studies. Based on these theoretical views, we categorized firm performance into operational, market, and innovation performances to capture various aspects of alignment effects between internal and external IT control mechanisms. We assume that internal-external IT control alignment is necessary to improve firm performance, and the different alignments yield the different types of firm performance. The overall research model is summarized in Figure 1.

**Figure 1. Research model**

### 3.2.1 Hierarchy-based Alignment from the cost perspective

Under hierarchy-based alignment, firms emphasize authority or legitimate power to allocate and utilize IT resources (Adler 2001), thereby gaining cost efficiency and operational efficiency and high product quality. This alignment attempts to tightly control internal and external IT resources compared to other alignments to realize operational efficiency by reducing cost (Bradach & Eccles, 1989). For example, a key concern of the transaction cost economics (TCE) relates to the ways in which firms can structure their activities so as to minimize their transaction costs (Coase 1937; Williamson 1985). A large body of studies based on TCE provides empirical evidence of the close relationship between firm’s resources and operational efficiency, such as cost reduction (Aral and Weil 2007, Liang et. al 2010), productivity (Venkatraman and Ramanujam 1986), and overall cost of service (Poppo and Zenger 2002). To strongly control internal IT resources, firms are asked to use the centralized mechanism, which improves not only the quality of products and services but also operational and cost efficiencies (Tavakolian 1989; Brown 1997). Moreover, the independent mechanism of inter-firm IT resources enables firms to control and manage external resources internally, leading to enhanced operational efficiency and productivity. Therefore, the centralized mechanism should attempt to align with the independent mechanism to effectively improve the quality of products and services under firms’ hierarchical control, leading to high operational benefits. Thus, we hypothesize the following:

**H1:** When a centralized mechanism is aligned with an independent mechanism, the effect of the alignment will be greater than that of other alignments in terms of operational performance.

### 3.2.2 Market-based Alignment from the market perspective

Market-based alignment focuses on how to efficiently expand the current market by having competent decision making processes (Ouchi, 1979). In this sense, this alignment tries to loosely control internal and external IT resources and continuously seek market opportunities for firm’s
growth. For example, according to the organizational slack literature (Voss et al. 2008; Tan and Peng 2003; Mishina et al. 2004), resource flexibility has a positive effect on firm’s market growth, such as sales growth (Croteau and Bergeron 2001; Tippins and Sohi 2003), and market share (Brouthers 2002; Rubera and Kirca 2012). On one hand, the aim of de-centralized mechanism is to manage and control internal IT resources and decision rights by divisional IT to respond to rapidly changing markets and to effectively deal with customer demands. Thus, this mechanism provides firms with customer satisfaction and differentiation from autonomous process in divisional IT. On the other hand, the arm’s-length mechanism focuses on flexible relationships that can reduce the opportunistic behaviors of suppliers and cut off suppliers who do not deliver the acceptable level of services, leading to high customer satisfaction. That is, the de-centralized mechanism can be more effective with arm’s-length mechanism than with other external IT control mechanisms in achieving higher market growth because the relationships in arm’s-length mechanism are loosely coupled and effectively response to rapidly changing market demands. Therefore, our research hypothesis is as follows:

\[ H2: \text{When a de-centralized mechanism is aligned with an arm’s-length mechanism, the effect of the alignment will be greater than that of other alignments in terms of market performance.} \]

3.2.3 Network-based Alignment from the relational perspective

Network-based alignment highlights trust-based social relationships across firms (Puranam et al. 2009). This alignment focuses mainly on resource sharing between internal and external resources to enhance firm’s innovativeness. For example, most prior research based on alliance network theory (Gopal and Koka 2012; Bae and Gargiulo 2004; Capaldo 2007) emphasized the importance of relational view to enhance firm performance in terms of developing new products and services (Aral and Weil 2007) and entering new market (Ravichandran and Lertwongsatien 2005). Hybrid mechanism focuses on not only operational flexibility but also emphasizes collaborations of inter-divisions on the basis of trust for promoting knowledge sharing and transfer. Embedded mechanism facilitates knowledge transfer and acquisition between client and provider. Thus, both mechanisms continuously seek new opportunities from collaborations. The hybrid mechanism is expected to be effective with the embedded mechanism because firms adopting the former can effectively collaborate with their internal and external partners. The hybrid mechanism is likely to create a closer and more open relationship with partners to create new knowledge, which can help embedded mechanism in transferring knowledge effectively and efficiently from their partners. Therefore, the hybrid mechanism leads to better innovation performance with the embedded mechanism. Thus, we propose the following hypothesis:

\[ H3: \text{When a hybrid mechanism is aligned with an embedded mechanism, the effect of the alignment will be greater than that of other alignments in terms of innovation performance.} \]

4 RESEARCH DESIGN AND CURRENT STATUS

We developed our measure items on the basis of an intensive literature review to obtain content validity. Multiple-item measures of internal IT control mechanisms (i.e., centralized, de-centralized, and hybrid) and external IT control mechanisms (i.e., independent, arm’s-length, and embedded) were developed and drawn from strategic management and IT outsourcing studies. However, in case of some measure items in which little guidance exists, we developed completely new items based on previous conceptual studies. Especially, firm performance was measured in terms of operational, market, and innovation performance. Market performance was measured by actual data (i.e., market share), while operational and innovation performances were measured by perceived data.

When developing the measurement instrument, each item measured on a seven-point Likert scale from ‘strongly disagree’ to ‘strongly agree’. Prior to the main survey administration, a small scale pilot test was conducted to examine the reliability and validity of an initial version of the survey instrument by using a focus group of both operations and IT managers from 50 firms that have
outsourced their IT functions to external vendors. The results of pilot survey showed that our Cronbach’s alpha values of measures for internal and external control mechanisms ranged from 0.91 to 0.95 and those of firm performance measures were 0.85 to 0.89. We also used factor analysis to test the unidimensionality and discriminant validity of measures. The factor analysis confirmed that all indicators were loaded into appropriate factors, having values greater than 0.6. The results of the pilot test led to a significant refinement and restructuring of the questionnaire and to the establishment of the initial face and internal validity of the measures (Nunnally 1978). For the main survey, the sampling frame for this study will be compiled from 1,000 large firms listed in Maeil Business Newspaper’s Annual Corporation Reports in Korea. The IT representative of each firm will be then identified from the “Book of Listed Firms” published by the Korea Stock Exchange. As top IT managers are expected to be knowledgeable about their outsourcing relationship with external vendors, they will be regarded as key informants for the study. Backward translation procedure (with the material translated from English into Korean and vice versa, comparison of versions, and resolving discrepancies) will be used to ensure consistency between the Korean and original English version of the instrument (Singh 1995). In order to increase the response rate, the Total Design Method proposed by Dillman (1991) and Sivo et al. (2006) will be applied. Since we are still in the process of refining measures and identifying potential respondents to carry out a big scale main survey, we certainly welcome any comments and feedbacks on this research-in-progress paper.

5 EXPECTED CONTRIBUTIONS AND IMPLICATIONS

This study is one of the early attempts to theoretically build and offer alternative IT control mechanisms for allocating IT resources in view of intra- and inter-firm. Motivated by inadequacies in extant studies, our research hopes to contribute to both theoretical and practical contributions. Theoretically, we first hope to advance the current understanding of IT control mechanism in terms of the ERBV. This study attempts to create different theoretical arguments that explain how to manage both internal and external IT control mechanisms for allocating resources from the inter-firm perspective. Prior studies that adopted the RBV fell short of scrutinizing the combined effect of internal and external IT control mechanisms on firm performance. Second, we offer an integrative perspective on IT control mechanisms. Although many studies on the influence of internal and external IT control mechanisms have been conducted, few studies investigated the alignment between internal and external IT control mechanisms in a single study. It is natural that firms look for necessary IT resources through alliances with external vendors in the dynamic business environment because they cannot keep all required resources internally. Therefore, it is imperative that firms simultaneously consider not only internal IT control but also external IT control. Moreover, upon conducting our study, we hope to add to the lack of empirical research in the studies of IT control mechanism. As aforementioned, most studies have investigated internal and external IT control mechanisms separately. By verifying our theoretical conjectures against actual data, we would be able to either confirm our predictions or seek alternative explanations to unsupported hypotheses. With tested results and evidence, our arguments can be better fortified. In sum, our empirical results should add value to the existing methodologies on IT governance and outsourcing.

Practically, this study will closely link the internal–external IT control strategic alignment with superior firm performance, which suggests that such alignment should be viewed from the contingency perspective. Depending on how to combine internal IT control with external IT control, firms can enjoy the different types of firm performance, such as operational, market, and innovation performances. Therefore, this research can help IT managers to develop an appropriate alignment between internal and external IT control mechanisms in order to realize the expected synergistic effects on their firm performance. Additionally, a better understanding of strategic and effective alignment between internal and external IT control mechanisms and their effects on firm performance will help managers choose the appropriate alignment to ensure long-term survival. Therefore, the result of this study will provide valuable information to practitioners who seek practical guidance for IT governance from intra and inter-firm perspectives.
References


