

HOW MANY VENDORS DOES IT TAKE TO CHANGE A LIGHT BULB? MITIGATING THE RISKS OF RESOURCE DEPENDENCE IN INFORMATION TECHNOLOGY OUTSOURCING

Rui Huang

University of Oklahoma
Norman, OK U.S.A.
rhuang@ou.edu

Shaila Miranda

University of Oklahoma
Norman, OK U.S.A.
shailamiranda@ou.edu

Jae-Nam Lee

Kookmin University
Seoul, Korea
isjnlee@kookmin.ac.kr

Abstract

As the scope and complexity of information technology outsourcing expand, the importance of the number of vendors adopted by a client is rising. What are the reasons why some companies contract with a single vendor while others contract with several? While there has been considerable research on this issue, we still lack a systematic understanding of why firms utilize different numbers of vendors. With the premise that clients' contracts with their dominant outsourcing vendor create varying levels of resource dependence and therefore client risk, this study seeks to answer the following questions: First, to what extent do contractual conditions prompt clients to seek risk mitigation via an increased number of outsourcing vendors? Second, how do the respective resource levels of the client and vendor impinge on this relationship? From a resource-dependency perspective, we hypothesize a relationship between contract conditions (i.e., contract duration and type) and the number of vendors used by a client. We then explore client resource and resource-access conditions (i.e., MIS budget and vendor performance) that moderate this relationship between contract conditions and the number of vendors engaged by a client. The proposed model and hypotheses are tested using a sample of 311 organizations in Korea that had outsourced their IT functions to external service vendors. The empirical evidence sheds light on the role of resource conditions in the relationship between contract conditions and the number of vendors. The findings have significant implications for further research and practice.

Keywords: IT outsourcing, number of vendor, interorganizational relationship, risk, vulnerability, trust, power, resource dependency

Introduction

“Despite growing maturity of vendors and their clients, the practice of IT outsourcing continues to be a high-risk process” (Kern and Willcocks 2001, p. 39). The risks associated with IT outsourcing have been a long-standing concern of outsourcing clients (Earl 1996). While the possibility of problems such as cost over-runs, system failure, and misalignment are inherent in the management of the IT function, the outsourcing of the function heightens these risks. This heightened risk from outsourcing derives from the externalization of control of critical organizational resources to another firm (Ngwenyama and Bryson 1999; Pfeffer and Salancik 1978). This externalization of control is made explicit in the terms of outsourcing contracts.

A key factor that has been considered in managing such outsourcing risks is the number of vendors adopted by a client (Cross 1995; Ngwenyama and Bryson 1999; Willcocks and Lacity 1999). While there has been considerable research on this issue, we still lack a systematic understanding of why firms utilize different numbers of vendors. On the one hand, reliance on a single vendor is believed to be beneficial because it streamlines clients' relationship management, permitting them to concentrate their efforts on a single, strong partner who is best able to complement their capabilities along the value chain (McFarlan and Nolan 1995; Ngwenyama and Bryson 1999). The exclusive vendor strategy is also advantageous because that vendor will have a better knowledge of the client and its needs (Aubert et al. 1996). On the other hand, researchers and practitioners have recognized that a single vendor or a limited number of vendors creates an asymmetric resource dependency that increases clients' vulnerability to vendor opportunism or non-performance (Frost 2000; Willcocks and Lacity 1999). A single vendor creates a condition of governance inseparability, such that the governance of new transactions becomes inseparably linked to the governance of transactions that have been previously contracted for with the vendor, thereby limiting clients' choices (Argyres and Liebeskind 1999). Vendor exclusivity generates switching and lock-in costs (Nam et al. 1996). In contrast, contracting with multiple vendors creates ongoing competition, thereby encouraging optimal performance and dissuading opportunism (Cross 1995; Ngwenyama and Bryson 1999). An increased number of vendors may therefore be viewed as a risk-mitigation strategy, undertaken by clients seeking to minimize dependency on a single outsourcing vendor.

The premise of this research is that clients' contracts with their dominant outsourcing vendor create varying levels of resource dependence and, therefore, client risk (Lacity and Willcocks 1998). Clients offset this risk by engaging multiple vendors. However, clients' internal resource levels as well as their access to their dominant vendor's resources will moderate their need for risk-mitigation via engagement with multiple vendors. This paper seeks to answer the following two questions: (1) *To what extent do contractual conditions prompt clients to seek risk-mitigation via an increased number of outsourcing vendors?* (2) *How do the respective resource levels of the client and vendor impinge on this relationship?* While many other explanations for the number of vendors used are possible (e.g., industry conditions, the size and scope of a firm's operations, the size and scope of outsourcing), this research focuses on a resource-dependency explanation of the problem. In the following sections, we outline the manner in which contract conditions engender clients' resource dependency on vendors. Based on the resource dependency created, we hypothesize a relationship between contract conditions and the number of vendors used by a client. We then explore client resource and resource-access conditions that moderate this relationship between contract conditions and the number of vendors engaged by a client.

Resource Dependence and Risk

Resource dependence theory views organizations as open systems that acquire resources from other organizations in their environment through exchange relations. Organizations that provide scarce and critical resources acquire power within the exchange relationship (Pfeffer and Salancik 1978). The primary concern for organizations in these exchange relationships is to ensure a stable flow of critical resources and to manage problems associated with the exchange.

"Problems arise not merely because organizations are dependent on their environment, but because this environment is not dependable" (Pfeffer and Salancik 1978, p. 3). Thus, it is not the dependency in the relationship or the ensuing power asymmetry that organizations wish to avoid, but rather the *risk* of being vulnerable to the other's default on an exchange—deliberate or otherwise. Thus, risk is an ineluctable condition of resource dependence. Given the centrality of IT to most businesses, this is especially true of IT outsourcing relationships (Earl 1996; Kern and Willcocks 2001). Earl (1996) enumerates several risks associated with outsourcing (e.g., weak management, inexperienced staff, outdated technological skills, hidden costs), the majority of which stem from possible vendor opportunism or non-performance.

Organizations seek to minimize their exposure in such asymmetric relationships. One way that organizations reduce their exposure is by increasing the number of administrative units assigned to monitor the exchange relationship (Tolbert 1985). Such administrative differentiation introduces *requisite variety*, where the complexity in the organization's design mirrors the complexity of its environment, thereby facilitating more accurate monitoring of the environment (Ashby 1956). An alternative strategy adopted by organizations to minimize their vulnerability to potential vendor opportunism has been to develop a coalition with other client organizations (see Provan et al. 1980). Where possible, an alternative may be to cultivate alternate resource sources, thereby creating a countervailing power that balances an organization's dependence on one vendor (e.g., Ingram and Simons 1995; Provan, et al. 1980). The focus of this study is on such efforts by clients to offset the risks inherent in IT outsourcing by increasing the number of vendors with whom they contract.

Research Model and Hypotheses

In the interorganizational literature, disparate perspectives persist on the relative viability of exclusive versus nonexclusive relationships. The social capital perspective is that exclusive relationships can “reduce opportunism, offer downside insurance, and provide better service through continuity and insider knowledge” (Baker 1990, p. 597). However, studies advocating this perspective focus on industries where the nature of the transaction is highly structured and relatively discrete (e.g., Baker 1990; Uzzi 1997). Thus, the duration of any given transaction is relatively limited. In contrast, there is considerable variation in the level of structure of IT outsourcing transactions and in the duration of these transactions. Another characteristic of these exclusive relationships is the long-term, personalized ties among business partners. Because of the extremely mobile nature of the IT workforce, the development of close, personalized relationships across client and vendor organizations is precluded.

A competing perspective suggests that vendor exclusivity creates conditions of ex post asset specificity, as only a single vendor develops the competence to meet the client’s IT needs (Williamson 1975; also Ngwenyama and Bryson 1999). This prevents future switching behavior and makes the client vulnerable to vendor opportunism. In contrast, the presence of multiple vendors creates competitive conditions that encourage each vendor toward optimal performance (Cross 1995). Such competition can also deter potential vendor opportunism (Williamson 1975). More importantly, developing client-specific capabilities with multiple vendors provides the client with multiple sources for future contracts, thereby creating “countervailing powers” and minimizing the ability of a single vendor to control them (Ingram and Simons 1995). The presence of multiple vendors also reduces information asymmetries by enabling the client to become better informed (Williamson 1975). However, while the use of multiple vendors may minimize transaction costs, the strategy is expensive in terms of the initial costs of developing multiple relationships, establishing cooperative agreements, and adjusting business routines across organizational boundaries (Baker 1990; Coase 1937). Furthermore, vendor opportunism can be forestalled by conditions specified in the terms of the contract—i.e., the extent to which the terms of the relationship are clearly structured and the specified duration of the relationship (Grossman and Hart 1986; Williamson 1975). Therefore, the relationship between contract terms and clients’ choices regarding the number of vendors should be carefully considered.

Since contract terms essentially specify who has control over what resources and for what period of time (Grossman and Hart 1986), we look to resource dependence theory to understand the implications of different contract terms for the vulnerability experienced by the client, and the consequent usage of multiple vendors. The use of exclusive or multiple vendors represents a strategic effort to reduce dependence and exploit power in interorganizational relations (Baker 1990). Based on the resource dependence perspective, a model is developed relating contract conditions to the number of vendors used and exploring the moderating effect of client resources and vendor performance on this relationship. This research model is summarized in Figure 1 and discussed below.

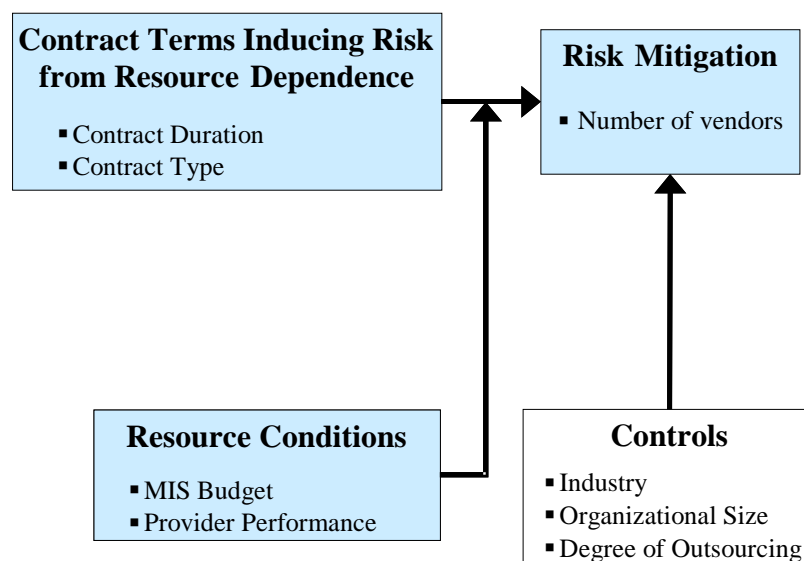


Figure 1. Research Model

Contract-Induced Risk from Resource Dependence

Organizations' dependency on external constituencies for access to critical resources creates asymmetrical power relationships wherein those with control of resources the other values hold the power (Emerson 1962). Such vulnerability increases as the external agent's control over critical resources increases (Pfeffer and Salancik 1978) and, consequently, their levels of opportunism (Provan and Skinner 1989). Outsourcing contracts engineer varying levels of client vulnerability in the extent to which control over critical client resources is yielded to the vendor. The two contractual conditions that engender such externalization of control and vulnerability are the *contract duration* and *contract type* (Lacity and Willcocks 1998).

Longer-term contracts are typically believed to be riskier than are short-term contracts (Lacity and Willcocks 1998). Given the pace of change in the IT arena, it is more difficult to stipulate realistic contract terms and measures for more distant time horizons. Furthermore, given the pace of technological innovation and the continuing drop in IT costs, the probability of technological obsolescence and costs structures that are incommensurate with the market are higher with longer contracts. Finally, shorter-term contracts can motivate vendors desiring contract renewal toward higher performance levels (Lacity and Willcocks 1998; Levina and Ross 2003). In an effort to offset these risks culminating from a longer contract with their dominant outsourcing vendor, clients will rely on multiple other vendors. In addition to creating conditions of competition, the presence of multiple vendors preempts the development of ex post asset-specificity of the outsourced function and creates a competitive environment, thereby limiting vendor opportunism (Cross 1995; Williamson 1975). This leads us to the following hypothesis:

Hypothesis 1: A longer-term contract with the dominant vendor will be associated with clients' reliance on a larger number of vendors.

Client-vendor relationships may be structured as buy-in relationships, as fee-for-service relationships, or as partnerships¹ (Lacity and Willcocks 1998). These relationships represent decreasing levels of structure and, consequently, increasing levels of risk (Saunders et al. 1997). With a buy-in contract, clients purchase resources from a vendor to supplement their in-house capabilities; however, the management of those capabilities is handled exclusively by the client. This type of relationship is the most structured, in that the scope of the relationship is completely defined in advance. With a fee-for-service contract, the client stipulates performance targets and an accompanying fee structure. Such contracts shift control of asset and/or service management to the vendor. Since complete delineation of client needs is near impossible, such contracts render the client vulnerable to vendor non-performance or malfeasance on issues that are not clearly covered by the contract (Williamson 1985).

Partnerships or strategic alliances are believed to be the most risky type of outsourcing arrangement (Lacity and Willcocks 1998). The contract terms underlying such arrangements tend to be sketchy and poorly specified, increasing the range of client vulnerability to the vendor (Lacity and Willcocks 1998). Furthermore, given that such a strategy is yet relatively novel in the IT outsourcing arena (Lacity and Willcocks 1998), it lacks the institutional support that might otherwise facilitate successful outcomes (Greif 1994). Nonetheless, clients do pursue such relationships when they lack the expertise to adequately stipulate appropriate contractual terms and are looking to develop such capabilities through relationships with outsourcing vendors (McFarlan and Nolan 1995). In this situation, it is natural that organizations pursue several relationships with more than one vendor to minimize their dependency on a particular vendor and uncertainty about their external environment, thereby diversifying unexpected risks. In an effort to offset the heightened risks inherent in the strategy, we propose that clients will develop relationships with multiple vendors.

Hypothesis 2: Less structured contractual relationships will be associated with clients' reliance on a larger number of vendors.

Moderating Effects of Client and Vendor Resources

Our argument thus far has been that contractual conditions represent varying levels of externalization of control of client IT resources, engendering client vulnerability to the vendor. However, the client's resource levels, as manifested in the budget available to the MIS function, and the client's past access to the resources of their dominant vendor, as manifested in their satisfaction with the vendor, can alleviate the vulnerability experienced by the client, and therefore their inclination toward risk-mitigation of control-externalizing contracts via the employment of multiple vendors.

¹While other taxonomies have appeared in the literature, this is a parsimonious set of categories that encompasses all types of contract structures.

Clients with access to a greater amount of resources enjoy a position of enhanced power vis-à-vis the vendor. Such power accrues from the more extensive revenue stream that they generate for their dominant vendor. Given such power, vendors are unlikely to sacrifice future revenue streams for the immediate benefits that opportunistic action may provide, even under conditions of externalized control. Additionally, vendor malfeasance or non-performance on larger MIS contracts is apt to be more visible within the client community at large, generating reputational effects that may be expected to dissuade such behaviors. Such visibility is apparent in the press surrounding the problems experienced in the Xerox-EDS relationship (e.g., Greenemeier 2001). This leads us to the following hypothesis:

Hypothesis 3: As client resource levels increase, the effects of externalized control (i.e., longer duration and less structured contracts) on the number of vendors will weaken.

In interorganizational relationships characterized by resource dependence, vendors that had previously committed to the relationship via investments in their client were noted to exercise power to the detriment of their clients much less frequently than vendors without such commitment (Provan and Gassenheimer 1994). A dominant vendor that has provided their client with satisfactory resource access in the past accrues power through provision of valued resources (Salancik and Pfeffer 1974) and facilitates client trust in its capabilities (Doney et al. 1998). Trust reduces negotiation cost and conflict, both of which lead to low performance (Zaheer et al. 1998). Thus, trust and commitment generate a “virtuous circle,” resulting in an improved client-vendor relationship and vendor performance over time (Lee and Kim 1999; Sabherwal 1999). This leads us to the following hypothesis:

Hypothesis 4: As client satisfaction with vendor performance increases, the effects of externalized control (i.e., longer duration and less structured contracts) on the number of vendors will weaken.

Controlling for Other Influences on Number of Vendors Used

Several pragmatic considerations are likely to impact the number of vendors with which a client contracts. Among these are the industry in which the client operates, the size of the client organization, and the degree of the client’s outsourcing. Specifically, industries with more integrated and standardized processes are more likely to rely on an exclusive outsourcing relationship so as to foster a consistent architecture across the organization (Dess et al. 1990). Larger clients are more likely to engage with multiple vendors as the scope and heterogeneity of their operations increases (Leiblein et al. 2002). Similarly, a greater degree of outsourcing translates to the increasing scope and complexity of operations outsourced (Ang and Straub 1998). Since these three variables are likely to account for some of the underlying variance in clients’ choice of the number of vendors, they are treated as the control effects in our model.

Research Methods

The location for data collection was South Korea. As of 2002, there were about 130 service vendors in the Korean outsourcing market, consisting of two types of IT service vendors: members of traditional *chaebols*² (about 60 percent of the market share) and independent IT service vendors (about 40 percent of the market share). Firms in the first group of IT vendors were initially spin-offs of internal IT departments of affiliated firms within a *chaebol*. While these vendors have historically tended toward exclusive relationships with their client firms, in the late 1980s, recognizing their lack of accumulated IT knowledge, they began partnering with non-Korean firms such as IBM and EDS. The second group of IT vendors entered the outsourcing market with their own IT solutions, targeting niche areas. *Chaebol*-based IT vendors differed from independent IT service vendors in that they provided IT services largely to affiliated firms within the same *chaebol*.

However, as the Korean outsourcing market grew and matured, the outsourcing industry changed from limited competition to free competition among all service vendors. The affiliated firms become more eager to select better service vendors and to be treated as real customers, while the *chaebol*-based IT vendors expanded their IT services beyond their group boundaries so as to become globally competitive. The independent IT vendors have not only expanded their targets from niche and solution-oriented areas to general areas, but have also grown with enough capability to handle large and diverse IT outsourcing projects. As a result, the dependency of the *chaebol*-based IT firms on their affiliated firms is on the decrease (about 80 to 60 percent between 2000 and 2003 in terms of total sales volume). In sum, there is increasing competition among service vendors in the Korean outsourcing arena.

²*Chaebols* are corporate clusters with common financial holdings by a parent firm.

In this study, 1,000 firms were identified from Maeil Business Newspaper's 1999 Annual Corporation Reports. Survey questionnaires were sent to the CIO of each company. One week after the surveys were sent out, a follow-up post-card was mailed. Four and seven weeks later, the same questionnaires were mailed again to increase the response rate. A total of 390 companies replied, yielding a response rate of 39. However, 54 firms did not outsource at all and 25 surveys consisted of incomplete data. These were discarded, leaving 311 responses for the final analysis.

An analysis of non-respondent bias was conducted by comparing the total sales volume and the number of employees across responding firms and 50 randomly chosen non-responding firms (Babbie 1990). This analysis revealed no significant differences between respondents and non-respondents at the significance level of 0.05.

The survey instrument consisted of objective and subjective questions assessing the dependent, independent, and control variables. Given the factual nature of the items assessing a majority of the constructs, the possibility of a common method problem was minimal (Podsakoff and Organ 1986). Prior research has suggested that outsourcing choices (i.e., degree of outsourcing, contract type, and contract duration) are meaningful within specified categories, and that variations within categories are not meaningful (Lacity and Willcocks 1998; Lee et al. 2004). Therefore, raw responses on these scales were categorized and recoded as discussed below. Similarly, since our prior and ensuing discussion of MIS budget, dominant vendor performance, and industry is based on categories, these too were recoded so as to be consistent with our conceptualization. These categories also make it easier to identify and interpret potentially nonlinear relationships among constructs. Thus, the only continuous measure is the dependent variable.

Dependent Variable

Number of Vendors: Respondents were asked to indicate the total number of vendors with whom they had outsourcing contracts. Responses ranged from 1 to 4 vendors, with the average number of vendors being 1.56, with a standard deviation of 0.81.

Independent Variables

In providing information on the two independent variables, respondents were asked to consider their relationship with their dominant or main vendor. This single vendor served as a point of reference for the two questions regarding the nature of the contract and its duration.

Contract Duration: Respondents were asked to indicate the number of years stipulated in the contract with their dominant vendor. Following Lacity and Willcocks (1998), responses were subsequently categorized as short-term contracts (those for less than 4 years), medium-term (those from 4 to 7 years), and long-term (those longer than 7 years).

Contract Type: Respondents were asked to indicate the nature of the client-vendor relationship specified on the contract from one of seven possible choices: a buy-in contract, standard contract, detailed contract, loose contract, mixed contract, partnership, and other. Further information regarding the definition of each of these categories is available from the authors upon request. Following Lacity and Willcocks, three major contract categories were subsequently constructed: a buy-in contract, a fee-for-service contract (i.e., standard, detailed, loose, and mixed contracts), and a partnership.

Moderators

MIS Budget: Consistent with prior IS research (e.g., Lacity and Willcocks 1998), budget was assessed as a percentage of total sales. Responses were subsequently categorized as follows: high budget—more than 0.7; medium budget—0.2 to 0.7 percent; low budget—less than 0.2 percent.

Vendor Performance: This was assessed using a nine-item, seven-point, self-report client-satisfaction instrument developed by Grover et al. (1996). The reliability (Cronbach's α) of this scale was found to be 0.96. Exploratory factor analysis with an extraction criterion of a minimum eigenvalue of 1 revealed only a single factor, with the loading for all items being 0.85 or better. This attests to the convergent validity of the scale. Since this was the only perceptual scale used in the survey instrument, discriminant validity cannot be confirmed with these data. However, the reader is referred to the prior validation of the instrument by Grover et al. Responses on this scale were averaged across the nine items, and thereafter categorized as low performance: 1 to 4.5, moderate performance: 4.5 to 5, and high performance: 5 to 7.

Controls

Industry: Work by Chatman and Jehn (1994) indicates the specific industries associated with Thompson's (1967) long-linked, mediating, and intensive industry types. Following Chatman and Jehn, manufacturing, distribution, construction, transportation, warehousing, and communication firms were categorized as belonging to long-linked technology industries; the mediating technology category included firms in banking, finance, and insurance; the intensive technology category included research and information technology firms.

Firm Size: The two metrics typically used as surrogates of firm size in the organizational literature are the number of employees and sales revenue, which may be used interchangeably if highly correlated (Agarwal 1979). These two metrics were found to be highly correlated in our data set, i.e., $r = 0.916$, $p(r) = 0.000$. Following Agarwal (1979), to preclude multicollinearity problems in our analysis, we relied solely on sales revenue as an indicator of firm size.

Degree of Outsourcing: Respondents were asked to report their amount of IT outsourcing as a percentage of their total IT budget. Following Lacity and Willcocks, these responses were subsequently categorized as follows: comprehensive outsourcing was more than 80 percent of IT budget, selective outsourcing was between 20 and 80 percent of the IT budget, and outsourcing levels under 20 percent of IT budget represented minimal outsourcing.

Analysis and Results

The GLM procedure was used. This procedure was best suited to the categorical nature of the independent, moderator, and control variables. Information on the distribution of the categorical variables is provided in Table 1. The intercorrelation matrix is presented in Table 2.

Table 3 presents the results of the hierarchical regression. In Model 1, we include the three controls: industry type, organizational size, and degree of outsourcing. To these, we add the main effects of externalization of control via the duration and type of contract in Model 2. Here, we first note that the increment in the explained variance over the base model is significant. However, while the effect of duration on number of vendors is significant, the effect of contract type is not significant at the 0.05 level. In Model 3, we inspect the main effects of the two moderators: MIS budget and the past performance of the dominant vendor. While the incremental variance appears significant, the effects for both of the two terms are insignificant. Finally, Model 4 depicts the effects of the interaction terms. Notably, the incremental R^2 is significant, as are the moderating effects of MIS budget on both the contract type and contract duration. However, the past performance of the dominant vendor only moderates the effect of the contract type, not the contract duration, on the overall number of vendors used.

Table 1. Distribution of Categorical Variables

Construct	Categories (Frequency, ^a Percentage)		
Industry	Long-linked technology (198; 63.7)	Mediating technology (65; 20.9)	Intensive technology (48; 15.4)
Degree of outsourcing	Minimal outsourcing (68; 21.9)	Selective outsourcing (163; 52.4)	Comprehensive outsourcing (80; 25.7)
Contract Duration	Short-term (138; 44.4)	Medium-term (117; 37.6)	Long-term (56; 18.0)
Contract Type	Buy-in (67; 21.5)	Fee-for-service (109; 35.0)	Partnership (135; 43.4)
Vendor Performance	Low (150; 48.2)	Medium (63; 20.3)	High (98; 31.5)
^a n = 311			

Table 2. Descriptive Statistics and Correlations

Variables	Correlations (n = 311)						
	1	2	3	4	5	6	7
1. Number of IT Vendors	1.000						
2. Industry	0.061	1.000					
3. Firm Size (Revenue)	-0.310	0.001	1.000				
4. Degree of Outsourcing	0.438+	0.030	-0.135*	1.000			
5. Contract Type	0.360+	-0.160	-0.920	0.772+	1.000		
6. Contract Duration	0.369+	0.066	-0.092	0.641+	0.701+	1.000	
7. MIS Budget	-0.230	-0.070	0.014	0.029	0.107	0.010	1.000
8. Vendor Performance	0.174+	0.054	0.014	0.192+	0.213+	0.264+	-0.039

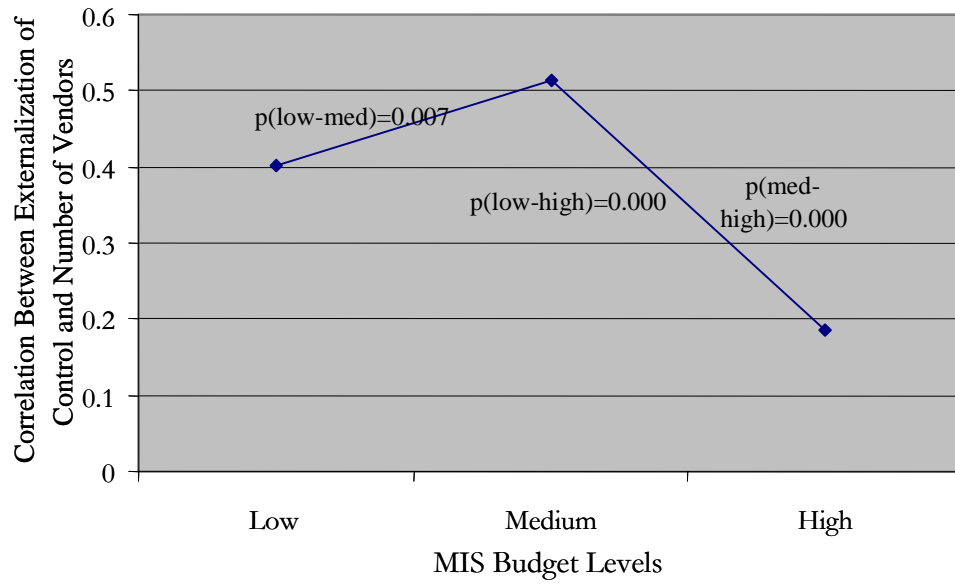
*p < .05; +p < .01

Table 3. Explaining the Number of Vendors: Results of Hierarchical Regression

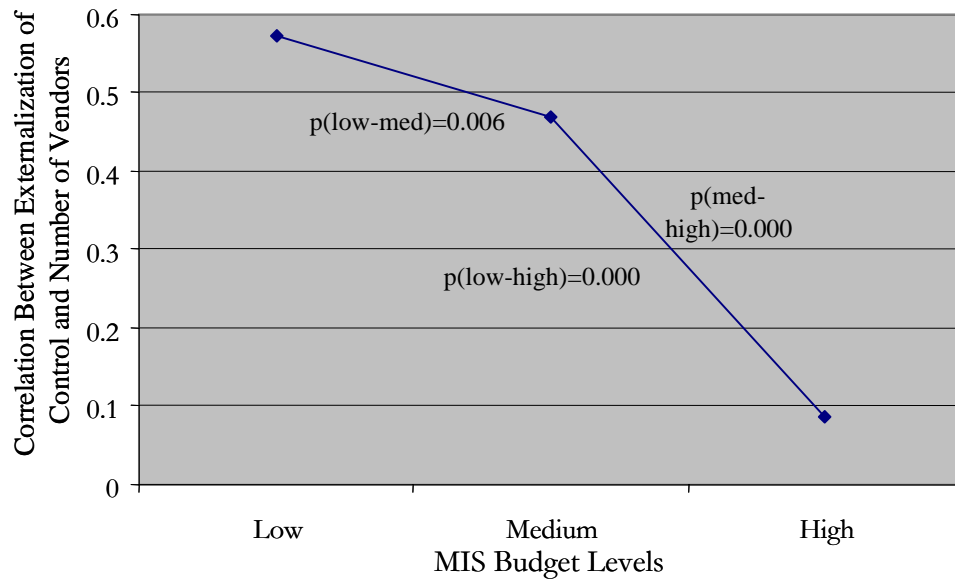
Effect	Model 1	Model 2	Model 3	Model 4
	F (p)*			
Industry	0.516 (0.598)	0.502 (0.606)	0.393 (0.676)	1.245 (0.290)
Firm Size (Revenue)	1.662 (0.130)	1.847 (0.090)	1.711 (0.119)	1.319 (0.250)
Degree	32.986 (0.000)	10.127 (0.000)	11.673 (0.000)	15.891 (0.000)
Duration		5.427 (0.005)	4.600 (0.011)	1.251 (0.288)
Type		2.108 (0.123)	2.655 (0.072)	2.673 (0.074)
Budget			1.000 (0.426)	1.207 (0.304)
Performance			0.815 (0.444)	0.559 (0.573)
Duration*Budget				2.150 (0.015)
Type*Budget				2.372 (0.007)
Duration*Performance				0.953 (0.434)
Type*Performance				3.790 (0.005)
R ² (p)	0.215 (0.000)	0.258 (0.000)	0.306 (0.000)	0.484 (0.000)
Adjusted R ²	0.187	0.221	0.245	0.357
ΔR ² (p)		0.043 (0.001)	0.048 (0.001)	0.178 (0.000)

*The F-statistic is reported in lieu of parameter estimates since there are multiple parameter estimates for each categorical variable.

Following Cohen and Cohen (1983), we now explore the interaction plots in order to understand the nature of the moderating effects. These plots are presented in Figures 2 and 3. In Figure 2, we illustrate the moderating effects of MIS budget. As predicted, from Figure 2b we notice that as MIS budgets increase, the relationship between decreasing contract structure and number of vendors weakens. However, the moderated effects with regard to contract duration are not as straightforward. In Figure 2a, we notice the strongest relationship between contract duration and number of vendors for medium-sized MIS budgets.



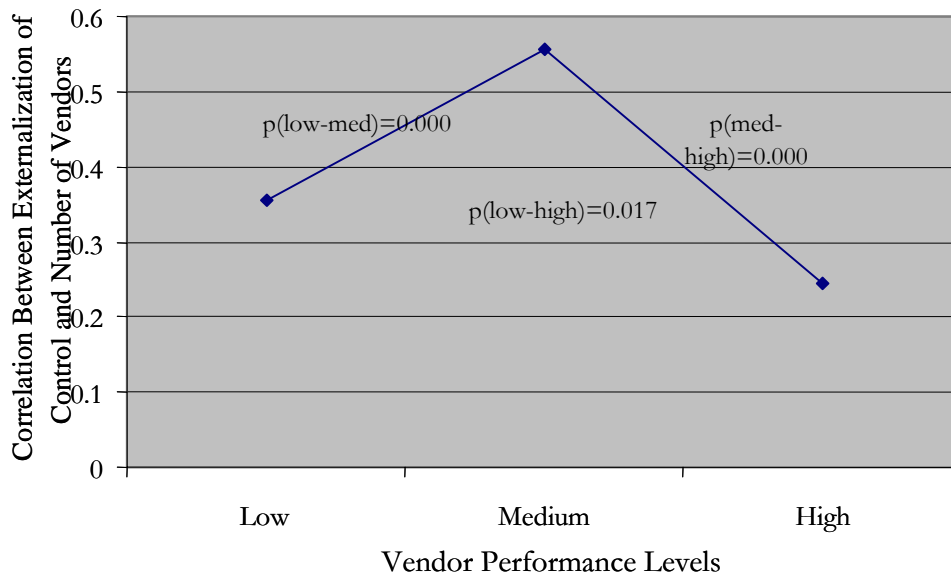
(a) Moderated Effects of Contract Duration



(b) Moderated Effect of Contract Type

Figure 2. Moderating Effects of MIS Budget

In Figure 3, we illustrate the moderating effect of vendor performance on contract type. Again, while there is a significant decline in the relationship between contract structure and the number of vendors utilized from low to high levels of vendor performance, we note an unexpected peak in the relationship at medium performance levels.



Discussion

From the results presented in Table 3, it becomes clear that while the duration of the client’s contract with its dominant vendor influences its choice of the number of other vendors, this relationship is entirely moderated by the size of the MIS budget. Similarly, the effect of the degree of structure defined by the type of the contract with the dominant vendor is moderated by both the MIS budget and the performance of the dominant vendor. Notably, with the inclusion of the terms exploring the moderation effects, we find that hypotheses 1 and 2 are no longer supported. We do note strong support for hypothesis 3 and partial support for hypothesis 4.

Understanding the Effects of Contract Duration

The effect of the duration of the dominant vendor’s contract on clients’ contracting with multiple vendors is moderated by MIS budget. In Figure 2a, we notice that at high levels of MIS budget, the relationship between increased contract duration and the number of vendors used is very low. Thus, more extensive MIS resources do appear to confer higher levels of power to the client, offsetting their vulnerability to longer contracts with their dominant vendor. Notably, however, at medium resource levels, the relationship between the duration of the contract with the dominant vendor and the total number of vendors used is highest. One possible explanation for this finding is that at medium budgetary levels, clients’ exposure to vendor non-performance or malfeasance is truly maximized. At medium MIS budget, an organization is relatively dependent on IT for its business processes. At these levels though, organizations lack both the ability to motivate their dominant vendor with sizable resource streams and the visibility to dissuade vendor opportunism through negative reputational signals. They, therefore, seek to offset their exposure by increasing the number of vendor relationships when they have longer contracts with their dominant vendor.

Understanding Effects of Contract Type

Our results indicate that both MIS budget and dominant vendor performance levels moderate the relationship between the type of dominant vendor contract and the number of vendors used. As expected, we note a relatively linear decrease in the relationship between less structured contracts and the number of vendors used with increasing budget levels. This supports our premise that at higher budget levels, clients will experience less vulnerability due to their ability to motivate their dominant vendor with future revenue streams, even with less structured contracts.

The moderating effect of dominant vendor performance on the relationship between contract type and the number of vendors is not linear. Rather, the relationship appears to peak at medium levels of vendor performance. This moderated relationship may be explained in the following manner. At low and high levels of dominant vendor performance, the client has little ambiguity or ambivalence about the vendor's resources and capabilities. At low levels of performance, rather than attempting to offset the risk with other vendors, the client may opt for waiting out its contract with the dominant vendor, and then either back-sourcing or outsourcing to another vendor. At high performance levels, the client is able to trust the vendor and experiences no vulnerability from less structured relationships. However, at moderate performance levels, the client experiences uncertainty about the future performance of the dominant vendor. When faced with such uncertainty, parties to an interorganizational relationship attempt to mitigate risk through formal control measures (Das and Teng 1998). Increasing the number of vendors when dominant-vendor contracts are less structured, therefore, represents clients' efforts to cope with the uncertainty surrounding the dominant vendor.

Limitations and Suggestions for Future Research

A couple of study limitations need to be acknowledged. First, this study tried to understand the number of vendors adopted by a client only from a resource-dependency viewpoint, but there may be others to be considered, such as transaction-cost and social-exchange perspectives. Second, in cases where multiple vendors had different contract types and contract periods, this study asked the respondent to select the dominant contract type and its period of outsourcing, which may compromise the findings of the study. Third, only the CIO of each organization was surveyed. While information from the CIO should provide a high level of confidence in the quality of the information gathered, selection bias could still exist due to relying on a single respondent for variables in the proposed model. Fourth, a Korean sample was used for this study. Thus, the results of the study may have to be carefully interpreted, while replication of this study in other cultures is needed to improve the generalizability of the findings.

The results of this study suggest several directions for future research. First, our results suggest that at high vendor performance levels or high MIS budgets, there is a negligible tendency for clients to offset the risks associated with long-term contracts or contracts that afford the vendor a high level of control. This suggests that perhaps absent outsourcing risks, clients perceive the exclusive vendor relationships, which foster the development and mobilization of social capital, to be viable (Baker 1990). Future research should more explicitly weigh the relative advantages of the competing resource dependency and social capital perspectives. Second, replication of this study is needed before the findings can be generalized to a more extensive geographical area. Third, the selection of the number of vendors in outsourcing relationship can be contingent on diverse factors, including environmental uncertainty, technological substitutability, IS maturity, corporate philosophy, and others. Nevertheless, this study did not consider these contingency factors. Studies that examine such factors can provide deeper understanding of the outsourcing process. Finally, this study examined the proposed model from the customer's perspective. Analysis of the outsourcing relationship from the service vendor's perspective seems to be crucial for developing a more robust outsourcing relationship over time.

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