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RESEARCH ARTICLE

HOLISTIC ARCHETYPES OF IT OUTSOURCING STRATEGY: A CONTINGENCY FIT AND CONFIGURATIONAL APPROACH

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Appendix A

Prior Studies in IT Outsourcing Projects[1]

Select Studies	Outsourcing Objectives	Key Constructs in Outsourcing Relations	Background Theories	Key Findings
Ang and Straub (1998)	Economic benefits (production and transaction cost)	Degree of IT outsourcing (degree of internal resource control: operations, functional, applications perspective)	Transaction cost economic theory (TCET)	The decision of IT outsourcing degree is influenced by production cost advantages offered by vendors. The degree of outsourcing is negatively associated with transaction costs, but transaction costs were much smaller than production costs. Firm size also has a significant impact on the degree of IT outsourcing.
Bapna et al. (2010)	Economic benefits (Incentive)	Number of outsourcing vendors (single vs. multiple)	Resource dependency theory (RDT)	When multiple vendors have to work together to deliver end-to-end services to a client, the choice of formal incentives and relational governance mechanisms depends on the degree of interdependence between the various tasks as well as the observability and verifiability of output.

[1]Ordered alphabetically by author's name.

Select Studies	Outsourcing Objectives	Key Constructs in Outsourcing Relations	Background Theories	Key Findings
Bhalla et al. (2008)	Economic benefits (profitability and productivity)	Degree of IT outsourcing; Relationship type (fee-for-service model, dedicated offshore center, built-operate transfer, captive model, value center)	TCET	There was no clearly significant impact of the degree of outsourcing/offshoring in different outsourcing types on firm performance.
Caniëls and Roeleveld (2009)	Economic benefits, Strategic benefits(core competency)	Relationship type (in terms of power and dependence between clients and vendors), Degree of outsourcing (in-house outsourcing of core activities, no outsourcing at all)	RDT, Power-dependence perspective	Power and dependence considerations do play an important role in the make-or-buy decision and the design and development of the outsourcing relationship. Moreover, the outsourcing decision appears to be oriented toward a trade-off between benefits of outsourcing versus the risk of becoming dependent on the other party, rather than being determined by the opportunities for cost reductions.
Cao and Lumineau (2015)	Strategic benefits (opportunism, overall satisfac-tion, relationship performance)	Relationship type (contractual vs. partnership); Period of outsourcing (number of years)	TCET; Social exchange theory (SET)	The paper provides evidence for the complementary arguments of the contractual-relational governance relationships and their joint impacts on firm performance.
Carson et al. (2006)	Economic benefits (opportunism caused by uncertainty)	Relationship type (formal contracting, relational contracting); Period of outsourcing; Number of outsourcing vendors	TCET, SET	The effectiveness of relational contracts as safeguards against opportunism is robust to volatility but not ambiguity. In contrast, formal contracts are robust to ambiguity but not volatility.
Chen et al. (2017)	Strategic benefits [intellectual property rights (IPR) allocation]	Relationship type (IPR ownerships; Usage rights sharing) Number of outsourcing vendors (if the contract had a noncompete clause)	TCET, Property rights theory	Clients retained more IPR when software development was modularized whereas they shared more IPR with vendors in contracts that incorporated greater use of a vendor's proprietary software. Greater levels of task complexity were associated with more IPR sharing with vendors.
Cullen et al. (2005)	Economic benefits; Strategic benefits (fit of IT outsourcing configuration)	Period of outsourcing (length of term); Number of outsourcing vendors (single vs. multiple); Relationship type (arms-length, value added)	Agency theory (AT); Resource-based view (RBV)	The paper Identifies seven attributes—Scope Grouping, Supplier Grouping, Financial Scale, Duration, Pricing, Resource Ownership, and Commercial Relationship—as key descriptors of an organization's IT outsourcing configuration.
Dibbern et al. (2012)	Economic benefits (production and transaction cost); Strategic benefits (service quality, etc.)	Degree of IT outsourcing (the extent to which the tasks and activities for the provision of an IS function are carried out by external service vendors)	TCET	A sourcing arrangement for degree of out-sourcing by an organization is the result of consideration of multiple types of rational choices, including efficiency and effectiveness criteria as well as social and environmental influences.
Domberger et al. (2000)	Economic benefits (provision at expected cost and correctness of error fix)	Period of outsourcing (length of contract in years)	TCET	The paper shows the effect of contract characteristics including period of outsourcing on both price and quality, as well as their potential interactions in the outsourcing of knowledge-intensive IT services.
Fitoussi and Gurbaxani (2012)	Economic benefits (reductions in business/IT costs); Strategic benefits (improvement in business/IT productivity, etc.)	Relationship type (performance metrics and measurement)	AT, Contract theory	The paper examines whether multitask agency problems are prevalent in IT outsourcing contracts and finds that the use of strong direct incentives for a given measurable objective is negatively correlated with the presence of less measurable objectives in the contract.

Select Studies	Outsourcing Objectives	Key Constructs in Outsourcing Relations	Background Theories	Key Findings
Gilley and Rasheed (2000)	Economic benefits (ROA, ROS, etc.); Strategic benefits (process/product innovations, etc.)	Degree of IT outsourcing (peripheral/ core outsourcing intensity)	RBV, Core competency	There was no significant direct effect of outsourcing on firm performance, both firm strategy and environmental dynamism moderated the relationship between outsourcing and performance.
Goo et al. (2007)	Economic benefits; Strategic benefits (opportunistic behavior, satisfaction with output quality)	Period of outsourcing (total amount of time a client firm has engaged with a particular vendor); Relationship-specific investment	Strategic, economic, social perspective	Knowledge acquisition, relationship specific investment, and the extent of substitution by the vendor have a positive influence on IT outsourcing relationship duration and requirement uncertainty has a negative influence on duration.
Gopal and Koka (2012)	Economic benefits for vendor (profit); Strategic benefits (service quality)	Relationship type (contract type - fixed price, time and materials); Relational flexibility	TCET, SET	The paper shows how and when relational governance as flexibility provides benefits to exchange partners in the presence of formal contracts. The paper also argues that relational benefits are contingent on how risk is apportioned by the contract.
Handley and Angst (2015)	Economic benefits (service provider opportunism)	Relationship type (contractual governance vs relational governance)	TCET, AT	Contractual governance is more effective in individualistic and low uncertainty avoidance cultures, while relational governance is more effective in collectivist and high uncertainty avoidance societies.
Kim and Brown (2012)	Economic benefits (cost reduction); Strategic benefits (timing of delivery; quality of the product)	Period of outsourcing (short-term vs. long-term); Compensation terms	TCET, AT	Three basic contract design elements (i.e., type (fixed price versus cost reimbursement), length, and value—across simple to complex products) allow agencies to tap the benefits of competition: innovation and cost-efficiency.
Lacity and Willcocks (1996)	Economic benefits (cost savings)	Degree of IT outsourcing (total insourcing, selective sourcing, total outsourcing)	TCET	When companies properly select and contract for specific IT activities by treating IT as a dynamic portfolio, they can maintain management and control of core IT activities while still accessing vendor expertise and economies of scale for well-defined, mature IT activities.
Lacity and Willcocks (2017)	Strategic benefits (conflict outcomes: client/provider satisfied, some-what satisfied, dissatisfied)	Relationship type (in terms of conflict resolution styles)	Interorganiza-tional relationship perspective	The collaborative and switched-to-collaborative styles resolved conflicts to the satisfaction of both partners, which is consistent with theory.
Lee (2001)	Economic benefits; Strategic benefits (fit between customer's requirements and outsourcing outcome)	Relationship type (the degree of partnership quality)	SET, RBV, Knowledge-based view	Knowledge sharing is one of the major predictors for outsourcing success and organizational capability to learn or acquire the needed knowledge from other organizations is a key source of successful knowledge sharing. Also, partnership quality is a significant intervening factor between knowledge sharing and outsourcing success
Lee and Kim (1999)	Economic benefits; Strategic benefits (business and user satisfaction)	Relationship type (partnership quality: trust, business understanding, benefit and risk share, conflict, commitment)	TCET, RDT, AT, SET, Power-politics theory	This study distinguishes the components of partnership quality from its determinants and investigates the effect of partnership quality on outsourcing success based on an integrated theoretical framework.

Select Studies	Outsourcing Objectives	Key Constructs in Outsourcing Relations	Background Theories	Key Findings
Loh and Venkatram an (1992)	Economic benefits (economic performance); Strategic benefits (business performance)	Degree of IT outsourcing (ratio of IT outsourcing expenditure to total assets)	TCET, AT	The degree of IT outsourcing is positively related to both business and IT cost structures. Also, it is negatively related to IT performance.
Ngwenyam a and Bryson (1999)	Economic benefits (service and transaction cost)	Number of vendors (single vs. multiple)	TCET	Presenting an approach to modeling the key aspects of single and multi-vendor outsourcing strategies, it demonstrates how a decision maker can model each strategy to find the minimum cost and maximum profit for each strategy.
Paulraj and Chen (2007)	Economic benefits (production costs, volume flexibility, etc.) Strategic benefits (rapid handling of cus-tomer complaints, etc.)	Period of outsourcing (long-term relationship orientation) Number of vendors (supplier integration)	RDT	Strategic supply chain management is driven by supply and technology uncertainty. Demand uncertainty on the other hand, was not found to have a significant impact on strategic supply management.
Poston et al. (2009)	Economic benefits (price); Strategic benefits (service quality)	Number of vendors	TCET, SET	Clients who outsource to vendors need to establish the appropriate balance between building strong collaborative relationships and encouraging market competition among vendors to ensure best price and service quality.
Rao et al. (2007)	Economic benefits (global efficiency between a head-quarter and globally dispersed subsidiaries)	Relationship type (in terms of control and coordination mechanism between headquarters-subsidiary pairs)	RDT	The use of both formal and informal mechanisms are significantly and positively associated with the level of IS dependence a subsidiary has its parent organization. The greater the level of dependence, the greater the use of both formal and informal mechanisms of control.
Ravindran et al. (2015)	Strategic benefits (learning and experience; reputation)	Period of outsourcing (contract duration of current project and prior relationship); Relationship type (structural, relational, contractual and positional)	TCET, SET	Firms may mitigate the hazard of ex post transaction costs in long-term contracts by relying on the information available from embedded firms in the buyer–supplier network.
Saunders et al. (1997)	Economic benefits; Strategic benefits (economic, technological, and strategic satisfaction)	Relationship type (partnerships, tight contracts); Number of vendors (single vs. multiple); Degree of outsourcing (core vs. commodity functions)	Economic, social perspective	This study suggests several strategies for negotiating outsourcing contracts, which consider outsourcing functions, relational governance (i.e., partnerships and contracts) and multi-vendor approach to achieve outsourcing success.
Straub et al. (2008)	Economic benefits (ROA, Profits per employee, Pricing against competitors)	Degree of IT outsourcing (extent of control of IT resource: level of outsourcing)	RDT	Locating the extent of control within the firm in cases where the firm depends on IT as a strategic resource proves to be a good explanation for effective decisions leading to higher performance.
Susarla et al. (2010)	Economic benefits; Strategic benefits (Pareto improving amendments and terminations)	Degree of IT outsourcing (breadth of service); Period of outsourcing (contract length)	TCET, Incomplete contract theory	The paper investigates the role of renegotiation design in fostering flexibility in IT outsourcing and finds that post-contract restructuring enables both client and vendors to learn from their experiences and realize hazard equilibration.

Select Studies	Outsourcing Objectives	Key Constructs in Outsourcing Relations	Background Theories	Key Findings
Weigelt (2009)	Economic benefits; Strategic benefits (performance in the market, technology integrative capabilities)	Degree of IT outsourcing (the percentage of in-house development vs. external outsourcing); Number of vendors (number of external partners)	RBV, Knowledge based view	Higher degree of outsourcing reduces a firm's learning by doing, internal investment, and tacit knowledge applications, thereby impeding a firm's integrative capabilities and performance in the market. However, outsourcing is also less detrimental for firms with experience in prior related technology.

Appendix B

Dimensions of Interorganizational Relationship Strategy

This study focuses on strategic decisions that determine a firm's outsourcing relationships at the early stage of IT outsourcing projects. These guide the entire outsourcing process and are thus different from other factors such as actions that emerge during implementation or execution of specific outsourcing relationships. That is, outsourcing strategic factors, by our definition, impact the overall process of outsourcing while other factors have their effects only on a part of the whole process. In this study, other such factors arising in the later stages are not considered to be relevant strategic elements of outsourcing. For example, according to the general process model of outsourcing (Chaudhury et al. 1995; Huber et al. 2013; Lee 2008; Lee and Kim 1997), such factors as specific contract negotiation, outsourcing implementation, actual contract management, and performance feedback are implemented and completed only after decisions on outsourcing strategic elements have been made during the earlier stage.

In their pursuit of interorganizational relationships (IORs), firms adopt diverse strategies in managing or governing those relationships (e.g., Baker 1990). In order to understand the dimensions that distinguish among IT outsourcing strategies, we searched for the literature on the IOR governance forms.

Following Granovetter's (1985) landmark article outlining the embeddedness thesis, researchers on IOR across several disciplines have identified two types of relationship strategies. While they allude to these strategies utilizing different names, the characteristics that distinguish among the strategies are largely similar. Dwyer et al. (1987) characterize buyer–supplier relationships as discrete transactions or relational exchanges. In a discrete transaction, an easily measurable commodity is traded for money. The terms of a relational exchange are less definite and may include noneconomic satisfaction in addition to economic advantage. Baker (1990) describes IOR based on the nature of interface. A relational interface is one wherein "inter-firm contracts can be so strong that they act as functional substitutes for hierarchy" (Baker 1990, p. 594). Conventionally, this type of interface has a long-term, exclusive tie with a single vendor. By contrast, a transactional interface is transitory and based solely on competitive pricing. Thus, the transactional interface assumes multiple, interchangeable service vendors, induced to act more competitively and yielding competitive prices (Baker 1990). Accordingly, transactional interfaces avoid problems incurred with a relational interface (e.g., dependence on a sole source). However, such a transactional relationship is not well suited to activities that require cooperative endeavors.

Dyer and Singh (1998) distinguish between arm's length relationships and alliances. Arm's length relationships are non-idiosyncratic, i.e., sellers are interchangeable (Dyer and Singh 1998), while alliances are formed by a firms' commitment to invest in relation-specific assets, substantial knowledge exchange, and complementary resources or capabilities (Dyer and Singh 1998). Alliances assume a long-term, committed relationship.

Jarillo (1988) distinguishes classic market relationships from strategic networks. Parties to a classic market relationship perceive the relationship to be competitive rather than cooperative. In the alternative, firms strategically create networks of complementary asset-specific functions. Similar to Dyer and Singh (1998), Jarillo (1988, p. 32) sees these networks as "long-term, purposeful arrangements among distinct but related for-profit organizations that allow those firms in them to gain or sustain competitive advantage vis-à-vis their competitors outside the network." While Dyer and Singh's alliance strategy addresses the relationship between a focal and a single vendor, Jarillo's strategic networks can also refer to a firm's relationship with multiple vendors who have embedded relationships with each other. Such firms within the network favor a hierarchical relationship, i.e., their contracts are relatively unspecified and the relationship is expected to be long-term.

In Uzzi's (1996, 1997, 1999) account , interorganizational strategies may be arm's length or embedded. An arm's length strategy is one in which transactions take place through loose collections of individual who maintain impersonal and constantly shifting exchange ties. In such relationships, actors constantly switch to new buyers and sellers to maximize cost advantages and/or to avoid dependence on a single vendor. In contrast, an embedded strategy is one wherein economic exchanges occur "through stable networks of exchange partners who maintain close social relationships" (Uzzi 1997, p. 36). In such relationships, both parties are committed to a long-term relationship, oriented toward information exchange. Table B1 summarizes the characteristics that distinguish among interorganizational strategies.

Table B1 also summarizes the contrasting interorganizational strategies by article. Following Dwyer et al. (1987), we make separate the distinctions that specify different strategies from those that emerge in the process of implementing various strategies. We then utilize these specified distinctions (third column in the table) to identify the dimensions underlying different strategies since these specification decisions are made early in the interorganizational relationship and will circumscribe the emergent process. Following Jarillo (1988), Uzzi (1996, 1997, 1999) and Dyer and Singh (1998), we also present outcomes that accrue from different relationship strategies in the table. The outcomes identified here will prove be informative in understanding the relative advantages of different outsourcing strategies.

Table B1. Distinguishing among Interorganizational Relationship Strategies

Article	Strategies	Strategic Specifications Distinctions	Emergent Process Distinctions	Outcome Distinctions
Theoretical Work				
Dwyer et al. (1987)	Discrete transactions vs. Relational exchanges	• Timing of exchange • Number of parties • Obligations • Expectations for relations	• Personal relations • Solidarity • Transferability • Cooperation • Planning • Measurement and specificity • Power • Division of benefits and burdens	
Jarillo (1988)	Classic market vs. Strategic network	• Shared investment • Long-term relationship • Unspecified contract	• Trust	• Economic Benefits • Strategic Benefits
Dyer and Singh (1998)	Arm's length vs. Alliance partnerships	• Relation-specific assets • Complementary resources and capabilities	• Knowledge-sharing routines • Effective governance	• Relational rents (returns that exceed opportunity costs of investments)
Empirical Work				
Baker (1990)	Transactional vs. Relational	• Exclusivity		
Uzzi (1996)	Arm's length vs. Embedded		• Fine-grained information transfer • Joint problem-solving arrangements	• Organizational survival
Uzzi (1997)	Arm's length vs. Embedded	• Written contracts • Reputation matters • Small-numbers bargaining • Lowest price • Shared investment	• Personal relationship • Reciprocity and favors • Monitor for opportunism • Trust • Exit to solve problems • Joint problem-solving • Concentrated exchange	• Shortened response time to market • Promotes innovation • Strong incentives for quality • Increases fit with market demand • Source of novel ideas
Uzzi (1999)	Arm's length vs. Embedded	• Duration of relationship • Complementarity of network • Size of network	• Multiplexity of relationship	• Credit accessed • Cost of capital

Based on Table B1, it is clear that there are four variables that distinguish among strategies in IOR: degree of outsourcing, number of vendors, relationship type, and period of outsourcing. The first distinguishing characteristic of arm's length versus embedded strategies made evident in Table B1 is exclusivity. Baker (1990) studied exclusivity in firms' relationships with banks and therefore refers to it as a relationship with a single external organization. However, we view exclusivity in its broader connotation as the degree of vertical integration as well as the number of trading partners used for a specific type of transaction. In other words, a client can be nonexclusive by insourcing a portion of its IT functions and by employing multiple providers. Thus, in the outsourcing context, exclusivity also pertains to *the degree to which IT functions are outsourced*. We note several other references to *the number of vendors* employed by a firm in strategic characteristics such as small numbers bargaining (Uzzi 1996, 1997) and the size of one's network of trading partners (Dwyer et al. 1987; Uzzi 1999). IORs also differ in the specified duration of the relationship (Dwyer et al. 1987; Uzzi 1999). An embedded relationship tends to be long-term while an arm's length relationship tends to be short-term (Dwyer et al. 1987; Jarillo 1998). We refer to this dimension as *the period of outsourcing*.

Finally, Dwyer et al. (1987) refer to the nature of the specified obligations. More specifically, Uzzi (1996, 1997) distinguishes among types of interorganizational relationships in terms of the extent to which price is a determining factor in the relationship, whether or not they have a written contract, whether reputation is considered important, and the extent to which both parties invest in the relationship. In a similar vein, Dyer and Singh (1998) allude to the extent to which IOR manifest relationship-specific assets and complementary resources. These characteristics speak to *the type of relationship* that differentiates pure market relationships from extended hierarchical relationships (Baker 1990; Williamson 1994). Fee-for-service contracts set up market relationships wherein the identity of the buyer or seller is unimportant (Williamson 1994). Price is still a decisive factor as is a detailed contract. In this and other types of highly specific and price-driven relationships, reputation, resource complementarity, and mutual asset-specific investments are unimportant (Dyer and Singh 1998; Jarillo 1988). Partnerships represent an extension of a firm's hierarchy when the transaction involves high asset-specificity and the identity of the buyer or seller is important (Williamson 1994). Partnerships are less specific in contract terms and price is less of a factor. Such relationships hinge on resource complementarity and mutual asset-specific investments. Relationship-specific investments signal credible commitment and enable the relationship to develop into a rare, inimitable source of competitive advantage (Dyer and Singh 1998; Jarillo 1988).

As suggested by Porter (1980), different relationship strategies play out via different outcomes. A variety of outcomes of IORs are evident in Table B1. The literature provides some support for a distinctive relationship between the nature of the relationship and the types of outcomes that accrue from the relationship. Arm's length relationships minimize transaction costs by relying on multiple, inter-changeable partners, and detailed contract stipulations (Williamson 1985). Such relationships are therefore useful for reducing costs (Dyer and Singh 1998). In contrast, an embedded strategy yields knowledge and competence-related advantages (Dwyer et al. 1987; Uzzi 1996, 1997).

Appendix C

Measurement Development and Measures

Measure Development

Measurement development went through three stages: (1) item generation based on prior literature and extensive feedback from four academics who have published outsourcing papers in prominent journals and three practitioners who have experience in outsourcing practices for more than 10 years; (2) a pretest involving 15 IT outsourcing managers from different firms who have experience in outsourcing practices for more than 20 years; and (3) a pilot test using 30 firms in diverse industries that have implemented at least some degree of IT outsourcing.

The data gathered for our key strategic elements are relatively impersonal in that our questionnaire items do not measure a personal opinion but instead relatively objective project features. The number of outsourcing vendors involved in an IT outsourcing project, period of outsourcing contract, relationship type and budget for the IT outsourcing project (as a proxy for the degree of IT outsourcing) are not latent but essentially data-driven measures. On the other hand, outsourcing performance is markedly perceptual as we measure managers' assessment of economic and strategic benefits emerging from their IT outsourcing projects. We adopted well-defined and empirically validated items from extant IT outsourcing studies, ones that were specifically designed for measuring economic benefit and strategic benefit as outcomes of IT outsourcing projects (Grover et al. 1996; Lane et al. 2005). Given these formative outcome variables, we report the test results for formative construct validity in Appendix E.

Instructions to Respondents

Please choose the most important IT outsourcing project conducted in your organization within the last 5 years and specific external vendors involved in that project. Please answer all the questions regarding the IT outsourcing project.

Outcome	Items	References
Outsourcing success	Please check the degree to which predefined outsourcing objectives are realized in terms of each of following questions [Scale ranges from 1 (strongly disagree) to 7 (strongly agree)]. *Economic Benefits* B1. We have enhanced economies of scale in human resources. B2. We have enhanced economies of scale in technological resources. B3. We have increased control of IT expenses. *Strategic Benefits* B4. We have been able to refocus on core business. B5. We have enhanced our IT competency. B6. We have increased access to skilled personnel. B7. We have reduced the risk of technological obsolescence. B8. We have increased access to key information technologies. *– Strategic benefits here could be further divided into strategic benefits (B4, B5) and technological benefits (B6, B7, B8) (Grover et al. 1996; Lane et al. 2005) with factor analysis empirically show two categories works better. In Appendix E, we present the results of formative construct validity tests for both two and three categories. We did fsQCA for both and had the same results.*	Grover et al. 1996; Lane et al. 2005
Elements	**Items**	**References**
Degree of IT outsourcing	What was the amount of the IT outsourcing as a percentage of total IT budget?	Dibbern et al. 2012; Kaiser and Buxmann 2012; Lacity and Willcocks 1996; Willcocks et al. 1995
Period of outsourcing	How many years did you make the contract with your outsourcing service provider(s)?	Klepper 1994; Goo et al. 2007; Lacity and Willcocks 1998; Willcocks et al. 2011
Number of outsourcing vendors	How many outsourcing service providers did you employ for the IT outsourcing project?	Bapna et al. 2010; Hirschheim and Dibbern 2014; Lacity and Willcocks 2001; Pinnington and Willcocks 1995; Willcocks et al. 2011
Relationship type	What kind of relationship (contract) did you make with your outsourcing service provider(s)? Please, choose only one in the following list (1~4 is a specific type of fee for service): 1. *Standard contracts*: Your firm signed the service provider's standard, off-the-shelf contract. 2. *Detailed contracts*: The contract included special clauses for service scope, service levels, performance measures, and penalties. 3. *Loose contracts*: The contract did not provide comprehensive performance but specified the service providers' performance like "whatever the customer was doing in the baseline year" for the next five to 10 years at 10% to 30% less than the customer's baseline budget. 4. *Mixed contracts*: For the first few years, requirements of the contract were fully specified (detailed contract), but the technology and business requirements in the long run were not defined (loose contract). 5. *Partnership*: The relationship involved significant resources of you and your service provider(s) to create, add to, or maximize joint value. Also, contract included the	Cao and Lumineau 2015; Cao et al. 2013; Gopal and Koka 2012; Rai et al. 2012; Klepper 1995; Lee et al. 2004

	agreement to furnish a part of the capital and labor for a business enterprise, and each shares in benefits and risks. 6. Buy-in contracts: Your firm bought some resources to supplement in-house capabilities, but the resources were managed by in-house business and IT management *– Partnership contract is a collaborative relationship that involves significant resources from the client firm and its vendors to increase their joint value, while the buy-in contract means that a client firm purchases and manage by itself commercially available resources to supplement in-house capabilities (e.g., ERP package and Cloud service).*	
Contingencies	**Items**	**References**
Firm size	What is the number of total employees? (External contingency factor)	Goo et al. 2007; Lee et al. 2004
Outsourced IT Type	Which of the following activities best describes the selected IT outsourcing project? (Internal contingency factor) 1. Application development 2. Application maintenance 3. Data center management 4. Network management 5. Desktop configuration 6. Helpdesk activities 7. IT consulting *– 1, 2, and 7 grouped for IT application; 3, 4, 5, and 6 grouped for IT infrastructure.*	Chatterjee et al. 2002; Im et al. 2001; Lee et al. 2004; Loh and Venkatraman 1992; Nam et al. 1996

Appendix D

Instrument Validation Prior to Primary Data-Gathering

As a first step, a questionnaire based on prior work was prepared and evaluated by seven IT professionals for content validation. For example, the degree of outsourcing was measured by the actual amount of the outsourcing as *a percentage of the total IT budget in each organization* (Kaiser and Buxmann 2012; Lacity et al. 1996) because it is fairly objective, requiring a quantitative response and does need to consider each organization's specific situation and intentions in IT outsourcing. The period of outsourcing and the number of vendors are likewise less personal opinion than relatively objective aspects of outsourcing projects (Lacity and Willcocks 1998). For the relationship type, respondents were asked to select one among three major types—fee-for-service contract, partnership, and buy-in contract—based on their outsourcing contracts (Gopal and Koka 2012; Lacity and Willcocks 1998).

Regarding outsourcing performance, we assessed the economic benefits and strategic benefits of outsourcing project by adopting Grover et al.'s (1996) instrument, which consisted of three and five items respectively with a seven-point Likert scale (1 as strongly disagree and 7 as strongly agree). Grover et al.'s (1996) original instrument was developed as a three dimensional construct to assess the degree of achieving strategic, economic, and technological benefits of IT outsourcing and has been adopted and validated by numerous outsourcing studies (e.g., Lee and Kim 1999; Lee et al. 2004; Schwarz 2014). However, few studies have confirmed their three dimensions of IT outsourcing success and some studies have instead questioned the construct validity of the original three dimensions of IT outsourcing success (e.g., Goo et al. 2008; Lane et al. 2005). In particular, Lane et al. (2005) found that a two dimensional model (i.e., strategic and economic benefits) is more appropriate and reliable than the three dimensional one (i.e., strategic, economic and technological benefits) when assessing outsourcing benefits using Grover et al.'s (1996) instrument. Thus, we decided to adopt a two dimensional outcome construct in this study, consisting of two distinct factors, i.e., strategic benefits and economic benefits. Furthermore, in Appendix E, we present the results of formative construct validity tests for both two and three categories. We also conducted fsQCA analysis for both and ended up with the same results. Please note that the items for strategic benefits (B5~B8) measure the tangible and intangible outcomes resulting directly from IT outsourcing, particularly from a client firm's IT resource perspective. However, these items do not measure a firm's IT capability, that is, a firm's ability to leverage IT resources to meet business needs. We certainly admit the importance of IT capability, but it is just not the focus of this study. A future study could well

investigate IT capability as an outcome of IT outsourcing projects. After drafting the initial version of the questionnaire, four academic scholars and three industry professionals in the area of IT outsourcing assessed the content validity of the items and also provided feedback on the initial items. After considering their feedback, we refined and restructured the questionnaire.

As a second step, a pretest test was conducted with 15 IT outsourcing managers from different companies experienced in outsourcing practice for more than 20 years. The purpose of the pretest was to test the wording, the ease with which the questionnaire could be answered, the appropriateness of the question sequence, and the consistency in meaning. The pretest also helped to validate the scales for the survey items. Once the content of the survey instrument had been polished, back translation (with the material translated from English into Korean, then back to English, then comparison of versions, and finally discrepancy resolution) was carried out by three IT outsourcing professionals who speak both Korean and English; the intent of this procedure was to ensure consistency between the Korean and original English version of the instrument (Mullen 1995; Singh 1995).

A pilot test was then conducted to assess questionnaire construct validity with 30 managers from 30 Korean companies in diverse industries that have already adopted IT outsourcing practices. The respondents were CIOs or the heads of IT departments. The responses from 30 managers were analyzed for the discriminant and convergent validity for the formatively measured outcome variables. All the items for the economic and strategic benefits of outsourcing performance had item-to-construct correlations more than 0.6 (Campbell and Fiske 1959; Loch et al. 2003).

Multiple phases of instrument development and validation resulted in significant refinement and restructuring of the survey instrument and also established the initial face validity of the measures (Nunnally and Bernstein 1994). These tests showed that the instrument was ready for full scale testing. The final questionnaire items are listed in Appendix C.

Appendix E

Validation of Formative Construct

The single questionnaire items for the four outsourcing elements were designed to gather straight-forward factual data from respondents. Thus, there was no real need to test them for construct validity. However, for the IT outsourcing success constructs, we used multiple items that measured the perception of CIOs about the benefits derived from their outsourcing projects in terms of the economic benefits and strategic benefits. Therefore, we conducted a series of tests to evaluate the construct validity of the formative outcome variables using the data collected from the main survey.

Two methods were adopted to examine construct validity. First, a confirmatory factor analysis was performed as part of the PLS algorithm (Gefen and Straub 2005). For outsourcing success, its item weights were then evaluated. As summarized in Table E1, the weights of all items were significant, indicating convergent validity. Second, a modified multi-trait multi-method analysis was conducted to assess both convergent and discriminant validity (Petter et al. 2007). In this process, three items of the economic benefits and five items of the strategic benefits are multiplied by their respective weights, as calculated by PLS. Then, composite measures for both benefits are created for the formative construct by summing the weighted item values. In addition, correlation matrixes were calculated, as summarized in Tables E2 and E3. The tables include two demographical variables, number of employees and total sales revenue, which should not be correlated with either the items of the economic and strategic benefits or their composite value. Tables E2 and E3 show the item-item and item-to-construct correlations for the items of the strategic and economic benefits and their respective composite value. For example, convergent validity is demonstrated when the economic benefit items are more correlated with the composite construct-level metric than with each other (see blue-filled cells versus the yellow-filled cells in Tables E2 and E3). The results meet this criterion, thereby further establishing convergent validity. What's more, the results in Tables E2 and E3 show that weighted items of the strategic and economic benefits are more highly correlated with the composite metric than with the two demographical variables (see green-filled cells), which demonstrates discriminant validity[2] Thus, the macro-level construct outsourcing success (in terms of economic and strategic benefits) shows acceptable construct validity.

[2] Not surprisingly, total sales are highly correlated with number of employees at .630. This has no bearing on the measurement validities other than to show that the data seems to be realistic and the data quality likely acceptable.

Table E1. Weights and T-Statistics of Two Dimensional Outsourcing Success Items

Outsourcing Success	Item	Weight	Standard Error	T-Statistic
Econimic benefits	B1	0.394	0.011	35.349***
	B2	0.342	0.008	42.496***
	B3	0.370	0.010	38.757***
Strategic benefits	B4	0.223	0.007	32.102***
	B5	0.220	0.006	34.707***
	B6	0.237	0.008	30.303***
	B7	0.227	0.006	35.624***
	B8	0.227	0.007	30.937***

Note: *p < 0.01; **p < 0.05; ***p < 0.001

Table E2. Item-Construct Correlation Matrix for Economic Benefits

	Items	1	2	3	4	5	6
1	B1	1.000					
2	B2	0.707**	1.000				
3	B3	0.677**	0.806**	1.000			
4	Item-Composite	0.895**	0.911**	0.909**	1.000		
5	# of employee	-0.010	0.082	0.019	0.029	1.000	
6	Total sales revenue	-0.012	-0.016	-0.044	-0.026	0.630**	1.000

Note: B#: Economic Benefit Item; Item-COMPOSITE: Composite Value of Economic Benefits; *p < 0.05; **p < 0.01

Table E3. Item-Construct Correlation Matrix for Strategic Benefits

	Items	1	2	3	4	5	6	7	8
1	B4	1.000							
2	B5	0.718**	1.000						
3	B6	0.724**	0.728**	1.000					
4	B7	0.715**	0.710**	0.731**	1.000				
5	B8	0.681**	0.697**	0.673**	0.824**	1.000			
6	Item-Composite	0.869**	0.871**	0.881**	0.904**	0.880**	1.000		
7	# of employee	0.008	-0.048	0.062	0.045	0.0025	0.025	1.000	
8	Total sales revenue	-0.046	-0.141*	-0.053	-0.059	-0.041	-0.076	0.630**	1.000

Note: B#: Strategic Benefit Item; Item-COMPOSITE: Composite Value of Strategic Benefits; *p < 0.05; ** p< 0.01

We conducted the same analysis for three dimensions IT outsourcing success (Grover et al. 1996; Lane et al. 2005). Table E4 indicates the weights of all items were significant, thus indicating convergent validity. We found the results also show acceptable construct validity, as summarized in Tables E5, E6, and E7. Although both three and two dimensional constructs show the similar level of validity, we can say that two dimensional approach is better in terms of parsimony (Lane et al. 2005).

Table E4. Weights and T-statistics of Three Dimensional Outsourcing Success Items

Outsourcing Success	Item	Weight	Standard Error	T-Statistic
Strategic Benefits	B4	0.544	0.014	39.909***
	B5	0.535	0.012	45.019***
Economic Benefits	B1	0.394	0.011	35.645***
	B2	0.342	0.008	43.738***
	B3	0.370	0.009	41.525***
Technological Benefits	B6	0.375	0.011	34.102***
	B7	0.362	0.009	40.331***
	B8	0.362	0.010	37.778***

Note: *p < 0.01; **p < 0.05; ***p < 0.001

Table E5. Item-Construct Correlation Matrix for Strategic Benefits

	Items	1	2	3	4	6
1	B4	1.000				
2	B5	0.718**	1.000			
3	Item-Composite	0.929**	0.924**	1.000		
4	# of employee	0.008	-0.048	-0.021	1.000	
5	Total sales revenue	-0.046	-0.141*	-0.100	0.630**	1.000

Note: B#: Strategic Benefit Item; Item-COMPOSITE: Composite Value of Strategic Benefits; *p < 0.05; **p < 0.01

Table E6. Item-Construct Correlation Matrix for Economic Benefits

	Items	1	2	3	4	5	6
1	B1	1.000					
2	B2	0.707**	1.000				
3	B3	0.677**	0.806**	1.000			
4	Item-Composite	0.895**	0.911**	0.909**	1.000		
5	# of employee	-0.010	0.082	0.019	0.029	1.000	
6	Total sales revenue	-0.012	-0.016	-0.044	-0.026	0.630**	1.000

Note: B#: Economic Benefit Item; Item-COMPOSITE: Composite Value of Economic Benefits; *p < 0.05; **p < 0.01

Table E7. Item-Construct Correlation Matrix for Technological Benefits

	Items	1	2	3	4	5	6
1	B6	1.000					
2	B7	0.731**	1.000				
3	B8	0.673**	0.824**	1.000			
4	Item-Composite	0.887**	0.933**	0.911**	1.000		
5	# of employee	0.062	0.045	0.036	0.053	1.000	
6	Total sales revenue	-0.053	-0.059	-0.041	-0.056	0.630**	1.000

Note: B#: Technological Benefit Item; Item-COMPOSITE: Composite Value of Technological Benefits; *p < 0.05; **p < 0.01

Appendix F

Truth-Table Analysis in fsQCA

Truth-Table Algorithm

After calibration of set-memberships, fsQCA creates a truth-table to identify combinations of elements that produce the outcome of interest. A truth-table displays all possible combinations of the elements and each row corresponds to one combination.

In a truth-table, the "number" column means the frequency of firms allocated to each combination, that is, those sharing the same set of elements. First, we define five as the minimum frequency cutoff for qualifying empirically reliable and relevant combinations. Thus, we exclude combinations with fewer than five empirical instances (Fiss 2011; Ragin 2008). Table F1 is the truth-table for economic benefit outcome of IT outsourcing and Table F2 is the truth-table for strategic benefit outcome that include at least five cases. There are a total of 254 logically possible combinations with eight causal conditions (i.e., 2 to the eight power $2^8 = 256$); in both truth-tables only 47 combinations include at least one case, which means that 209 rows do not have any cases, known as limited diversity (Fiss 2007; Ragin 2008). There are theoretical and practical reasons that firms may subconsciously choose some combinations while avoiding other combinations. Counterfactual analysis handles this limited diversity, as discussed below.

Next, to determine which combination consistently becomes a sufficient solution for the outcome, we use set-theoretic consistency, a measure similar to the significance level in regression analysis. It is "the degree to which the cases sharing a given combination of conditions (i.e., a row in the truth-table) agree in displaying the outcome in question" (Ragin 2008, p. 44). Thus, it indicates how closely a combination of conditions becomes a subset of the outcome (i.e., a sufficient condition). In our study, it shows whether firms sharing a same set of outsourcing elements consistently result in outsourcing success.

In fsQCA, there are two types of consistency: raw consistency, which is calculated by giving credit for "near misses" and penalties for large inconsistencies and PRI consistency (a proportional reduction for inconsistency), an alternate measure of consistency that in addition eliminates the influence of cases that have simultaneous membership in both the outcome and its complement (i.e., y and ~y). In this study, we rely on both types of consistency. For rows (i.e., combinations of conditions) that satisfy the frequency threshold, we set 0.85 as cutoff for raw consistency and 0.75 for PRI consistency, meaning that only combinations with a raw consistency of at least 0.85 and a PRI consistency of at least 0.75 are considered as reliably resulting in the outcomes. In the truth-table, outsourcing performance (i.e., economic benefits and strategic benefits columns) has a value 1 for the combinations that satisfy this consistency cutoff, otherwise 0. In this filtering process with consistencies, all rows (i.e., combinations) that include "buy-in" contract type are determined not to produce the outcomes in enough consistency. If we lower the consistency threshold, there could be some configurations with buy-in contract to produce economic and strategic benefits. Further truth-table analysis reveals that such configurations have a common IOR structure, that is, "buy-in, selective outsourcing, not-long term," which can be best suited for minimizing dependency on other firms for key resources, and thus reflect the mechanism of resource dependence theory (RDT).

Next, using Boolean algebra, the truth-table algorithm reduces the numerous combinations into a smaller number of more parsimonious solutions (Ragin 2008). For example, if a combination A&B and ~A&B result in the desirable outcome, then regardless of whether A is present or absent (A&B + ~A&B = B), the outcome still occurs, where & means AND, + means OR, and ~ means a "negation." Thus, A does not matter and B alone becomes a sufficient solution for achieving the outcome.

Finally, the truth-table algorithm utilizes counterfactual analysis to handle the rows without empirical cases (i.e., limited diversity) and to further minimize the number of causal conditions in a configuration (Fiss 2011). By using "easy" counterfactuals, QCA deals with an empirically unobserved combination by adding a condition known to produce the outcome to a combination. Furthermore, with "difficult" counterfactuals, it deals with an empirically unobserved combination by removing a redundant condition from a combination (Ragin 2008, p. 162). QCA generates the most parsimonious solution by applying both easy and difficult counterfactuals and the elements in this result are considered to be core conditions that have a stronger causal relationship with the outcomes (Fiss 2011). By applying only easy counterfactuals, QCA creates intermediate solutions that include peripheral conditions that have weaker causal relationships with an outcome as well as core conditions. Thus, with intermediate solutions, we can explain which conditions play a core role or a peripheral role in producing the outcome of interest. We did an additional fsQCA for the three groups of outcomes (i.e., economic, strategic, technological benefits), as explained in Appendices C and E. The resulting configurations for both strategic and technological benefits are much the same, with little difference in consistency and coverage. These results for the three groups of outcomes are also the same from those for the two groups of outcomes.

Table F1. Truth-Table: Combinations of Outsourcing Elements for Economic Benefits

Degree of IT out. (Total)	Relationship type			Period of out. (Long-term)	Num. of out. vendors (Multi)	Out. IT Type (App 1, Infra 0)	Firm size (Large)	Number	High economic benefits	Raw consistency	PRI Consistency
	Fee for svc	Partner-ship	Buy-in								
0	1	0	0	1	0	0	0	6	1	1.00	1.00
1	1	0	0	1	1	0	0	8	1	1.00	1.00
1	1	0	0	1	1	1	0	8	1	1.00	1.00
0	1	0	0	0	0	0	0	7	1	0.97	0.95
1	1	0	0	1	1	0	1	9	1	0.97	0.95
1	0	1	0	1	1	1	1	8	1	0.95	0.90
1	0	1	0	1	0	0	1	8	1	0.94	0.90
1	0	1	0	1	1	0	1	9	1	0.94	0.91
1	0	1	0	1	0	0	0	7	1	0.93	0.88
1	0	1	0	1	0	1	1	7	1	0.93	0.88
0	1	0	0	0	0	0	1	8	1	0.92	0.85
1	0	1	0	1	0	1	0	10	1	0.91	0.89
0	1	0	0	1	0	1	1	5	1	0.91	0.80
0	1	0	0	0	0	1	1	5	1	0.91	0.81
1	0	1	0	1	1	0	0	10	1	0.89	0.84
1	0	1	0	1	1	1	0	14	1	0.86	0.79
0	0	0	1	0	0	0	1	24	0	0.84	0.73
0	0	0	1	0	0	1	1	12	0	0.84	0.72
0	0	0	1	0	0	0	0	8	0	0.83	0.59
0	0	0	1	0	0	1	0	8	0	0.78	0.55

Table F2. Truth-Table: Combinations of Outsourcing Elements for Strategic Benefits

Degree of IT out. (Total)	Relationship type			Period of out. (Long-term)	Num. of out. vendors (Multi)	Out. IT Type (App 1, Infra 0)	Firm size (Large)	Number	High strategic benefits	Raw Consistency	PRI Consistency
	Fee for svc	Partner-ship	Buy-in								
0	1	0	0	1	0	0	0	6	1	1.00	1.00
1	1	0	0	1	1	0	0	8	1	1.00	1.00
1	1	0	0	1	1	1	0	8	1	1.00	1.00
1	0	1	0	1	1	1	1	8	1	0.99	0.98
1	0	1	0	1	0	0	0	7	1	0.99	0.98
1	0	1	0	1	0	0	1	8	1	0.98	0.96
1	1	0	0	1	1	0	1	9	1	0.98	0.96
1	0	1	0	1	1	0	1	9	1	0.94	0.90
1	0	1	0	1	1	0	0	10	1	0.93	0.90
1	0	1	0	1	0	1	1	7	1	0.92	0.87
0	1	0	0	0	0	0	0	7	1	0.92	0.83
1	0	1	0	1	0	1	0	10	1	0.89	0.85
1	0	1	0	1	1	1	0	14	1	0.87	0.81
0	1	0	0	0	0	0	1	8	0	0.86	0.72
0	0	0	1	0	0	1	0	8	0	0.84	0.67
0	0	0	1	0	0	0	1	24	0	0.82	0.70
0	1	0	0	0	0	1	1	5	0	0.81	0.61
0	0	0	1	0	0	1	1	12	0	0.81	0.59
0	0	0	1	0	0	0	0	8	0	0.80	0.52
0	1	0	0	1	0	1	1	5	0	0.80	0.56

Appendix G

Supplemental Cluster Analyses

Alternative data analysis techniques that have been used in IT strategy studies include cluster analysis, interaction effects, and deviation score analysis, but such techniques have limitations in explaining the holistic interdependencies among multiple elements and could not reveal which elements and how they together produce the outcome of interest. They mostly look only at the impact of pair-wise combinations of outsourcing elements on performance and implicitly premised on unifinality (Fiss 2007).

The main objective of this study is to develop multiple archetypes of IT outsourcing strategy that are internally congruent in terms of the strategic objectives as well as matching specific contexts of IT outsourcing projects. To achieve this theoretical objective, we adopt a configurational approach and use qualitative comparative analysis (QCA), a set-theoretic configuration method which enables us to handle the complexity in the interdependency of the multiple elements of IT outsourcing projects. We empirically uncover two sets of configurations, one set of configurations exhibiting high economic benefits and the other set exhibiting high strategic benefits in IT outsourcing projects. Based on the findings, we could develop propositions that explain how to achieve both benefits simultaneously in IT outsourcing projects.

To explicitly show the benefits and superiority of our approach in reaching our research objective, we compared our results with the results from other techniques. Specifically, we conducted a cluster analysis with the same dataset to examine the congruence among the four outsourcing relational elements. Cluster analysis is a traditional statistical technique widely adopted by prior studies that aim to find multiple clusters of objects (Venkatraman 1989). The resulting clusters should show high internal homogeneity and high external heterogeneity, meaning that the cases within a same cluster are close together whereas different clusters will be far apart. This can be achieved by grouping cases in a way to minimize the Euclidean distance between cases in a same cluster while maximize the distance between cases in different clusters. Here, we used the K-Means clustering technique using the Quick Cluster routine produced by SPSS 22.0 software.

Interestingly, we found clusters similar to the configurations that we found with fsQCA. Although, with cluster analysis and additional supporting statistical analyses, we found some groups that may represent our posited archetypes, there are critical limitations to these findings, especially compared to those from QCA. First, using these tools, it is relatively difficult to validate whether the clusters consistently produce outsourcing success while all configurations resulting from QCA present a consistent solution in producing IT outsourcing success. Results of cluster analysis end up being mixed and thus it is not clear whether each group is valid or not. More importantly, the results from cluster analysis do not show the role of each element and how the outsourcing elements work together to produce the desired outcomes. Therefore, by introducing QCA into IT outsourcing research, the present study opens a new avenue to effectively investigating the complex dynamics among key outsourcing strategic elements.

Further Details of Testing

To derive a parsimonious set of clusters that could be clearly distinguished from one another, we attempted to extract a different set of clusters consisting of two, three, four, five, six, and seven groups using different options, such as Euclidean and Mahalanobis distance, a standardized form of Euclidean distance. To assess the distinctiveness of each cluster, equality of variable means between the clusters was assessed by the F-test. Finally, a six-cluster solution was selected based on the results of F-test. Table G1 shows means and standard deviations of variables in the six clusters from columns 2 to 7. F-value and the level of its significance related to the test result for equality of variable means between clusters are shown in column 8. The last column shows the results of Dunnett's multiple range tests for the significant pair of clusters between the variable means.

As shown in Table G1, both F-tests and Dunnett's multiple range tests show that the group means of these six clusters are significantly different. Five clusters (i.e., Groups 2–6) appear to be internally congruent while Group 1 is noncongruent. Table G2 presents the summary of cluster analyses in terms of the four outsourcing elements.

In addition to cluster analysis, we also did one-way ANOVA to assess the differences between the six clusters in terms of outsourcing performance as measured using the eight performance items for IT outsourcing projects. The results are shown in Table G3. Columns 2 to 7 display the mean values and the standard deviations of outsourcing performance measures for the six clusters. Column 8 exhibits the F-values, degree of freedom, and significance levels. Paired clusters of which mean values are significantly different from each other are identified and shown in column 9. The F-test results indicate that the six groups are significantly different in terms of the outsourcing performance outcomes. Groups 2 to 6, which display a high congruency among four outsourcing elements, achieve different levels of outsourcing success—middle to high, while the noncongruent group 1 shows lower levels for outsourcing success. Thus, the firms in the congruent groups exhibit higher

mean ratings on the measures of outsourcing benefits compared to firms in the noncongruent group. Groups 5 and 6 together seem to correspond to the social archetype of IT outsourcing strategy (i.e., Proposition 1), Group 3 may correspond to the economic archetype of a selective IT outsourcing strategy (i.e., Proposition 2) but no cluster was found corresponding to the hybrid archetype of total IT outsourcing (i.e., Proposition 3). Group 4 appears to show that a configuration of the resource perspective and its performance is mediocre for all performance measures, compared to other groups.

Table G1. Cluster Analysis Results: Six Clusters

Variables	Cluster Groups; Mean (S.D.)						F (df, sig.)	Dunnett's Multiple Range Test
	Congruent Group					Noncongruent Group		
	Group 4 (n = 42)	Group 3 (n = 46)	Group 2 (n = 41)	Group 5 (n = 39)	Group 6 (n = 46)	Group 1 (n = 21)		
Degree of Outsourcing	8.55 (3.32)	40.83 (2.37)	54.76 (5.35)	80.64 (4.32)	94.41 (4.33)	24.14 (5.10)	2521.57 (5, 0.00)***	1-2****; 1-3****; 1-4****; 1-5****; 1-6****; 2-3****; 2-4****; 2-5****; 2-6****; 3-4****; 3-5****; 3-6****; 4-5****; 4-6****; 5-6****
Relationship Type	6.00 (0.00)	3.20 (1.80)	2.20 (1.12)	4.79 (0.61)	4.87 (0.50)	3.33 (2.31)	55.34 (5, 0.00)***	1-4****; 1-6*; 2-3**; 2-4****; 2-5****; 2-6****; 3-4****; 3-5****; 3-6****; 4-5****; 4-6****
Period of Outsourcing	2.10 (1.01)	4.15 (1.05)	4.98 (0.85)	7.21 (1.96)	8.24 (2.19)	3.76 (1.64)	92.32 (5, 0.00)***	1-4***; 1-5****; 1-6****; 2-3***; 2-4****; 2-5****; 2-6****; 3-4****; 3-5****; 3-6****; 4-5****; 4-6****
Number of Vendors	1.00 (0.00)	1.11 (0.38)	2.34 (0.85)	1.10 (0.31)	2.43 (0.69)	1.05 (0.22)	71.80 (5, 0.00)***	1-2****; 1-6****; 2-3****; 2-4****; 2-5****; 3-6****; 4-6****; 5-6****

Note: ****p < 0.001; ***p < 0.01; **p < 0.05; *p < 0.10

Table G2. Summary of Cluster Analysis Results in terms of our Four Outsourcing Elements

Variables	Cluster Groups					
	Congruent Group					Noncongruent Group
	Group 4 (n = 42)	Group 3 (n = 46)	Group 2 (n = 41)	Group 5 (n = 39)	Group 6 (n = 46)	Group 1 (n = 21)
Degree of Outsourcing	Total insourcing	Selective outsourcing	Selective outsourcing	Total outsourcing	Total outsourcing	Selective outsourcing
Relationship Type	Buy-in contract	Fee-for-service	Fee-for-service	Partnership	Partnership	Fee-for-service
Period of Outsourcing	Short-term	Medium-term	Medium-term	Long-term	Long-term	Short-term
Number of Vendors	Single vendor	Single vendor	Multi-vendors	Single vendors	Multi-vendors	Single vendor

Note: We define total insourcing if IT outsourcing is less than 20%, selective outsourcing for between 20% and 80%, and total outsourcing for above 80% by following our calibration anchors for full nonmembership (20%) and full membership (80%) for total outsourcing. In the same way, we define short-term for around 2 year contract, medium-term for around 5 years, and long term more than 7.

Table G3. One-Way ANOVA across Six Cluster Groups Leading to Outsourcing Success

	Dependent Variables	Cluster Groups; Mean (S.D.)						F (df, sig.)	Dunnett's Multiple Range Test
		Congruent Group					NonCongruent Group		
		Group 4 (n = 42)	Group 3 (n = 46)	Group 2 (n = 41)	Group 5 (n = 39)	Group 6 (n = 46)	Group 1 (n = 21)		
Outsourcing Performance Measures	1. Economies of scale in human resources	4.57 (0.80)	4.71 (1.15)	5.17 (0.86)	5.28 (0.92)	4.93 (0.83)	4.19 (0.75)	6.05 (5, 0.00)****	1-5****; 1-6***; 2-4**; 4-5***
	2. Economies of scale in technical resources	4.40 (0.73)	5.09 (0.86)	5.36 (0.80)	5.18 (0.68)	4.87 (0.78)	4.86 (0.73)	7.67 (5, 0.00)****	2-4****; 3-4***; 4-5****; 5-6***
	3. Control of IT expenses	4.33 (0.90)	5.09 (0.89)	5.36 (0.80)	5.23 (0.81)	4.91 (0.78)	4.90 (0.77)	7.77 (5, 0.00)****	2-4****; 3-4***; 3-6**; 4-5****; 4-6**
	4. Focus on core business	4.33 (0.72)	4.52 (0.96)	5.17 (0.74)	5.31 (0.83)	5.04 (0.70)	4.38 (0.92)	10.61 (5, 0.00)****	1-2**; 1-5***; 2-3***; 2-4****; 3-5***; 1-2**; 4-5****; 4-6****
	5. IT competence	4.38 (0.85)	4.78 (0.94)	5.17 (0.74)	5.23 (0.84)	5.06 (0.61)	4.33 (0.91)	8.13 (5, 0.00)****	1-2**; 1-5***; 1-6**; 2-4****; 4-5****; 4-6****
	6. Skilled personnel	4.33 (0.75)	4.78 (1.05)	5.19 (0.81)	5.23 (0.90)	5.06 (0.85)	4.19 (0.75)	8.72 (5, 0.00)****	1-5****; 1-6***; 2-4****; 4-5****; 4-6****
	7. Avoidance of obsolescence risk	4.45 (0.70)	4.76 (0.95)	5.10 (0.80)	5.13 (0.77)	4.91 (0.91)	4.24 (1.09)	5.43 (5, 0.00)****	1-5**; 2-4***; 4-5****
	8. Access to key IT	4.43 (0.83)	4.65 (0.99)	5.10 (0.73)	5.15 (0.74)	4.96 (0.87)	4.33 (1.01)	5.66 (5, 0.00)****	1-5**; 2-4***; 4-5****

Note: ****p < 0.001; ***p < 0.01; **p < 0.05; *p < 0.10

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