# A Comparison of Transaction Cost, Agency, and Knowledge-Based Predictors of IT Outsourcing Decisions: A U.S.–Japan Cross-Cultural Field Study

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ABSTRACT: As outsourcing evolves into a competitive necessity, managers must increasingly contend with the decision about which software development projects to outsource. Although a variety of theories have been invoked to study the initial outsourcing decision, much of this work has relied in isolation on one theoretical perspective. Therefore, the *relative* importance ascribed by managers to the factors from these theories is poorly understood. The majority of this work also masks interesting insights into outsourcing decisions by focusing on the information technology (IT) function rather than individual projects as the unit of analysis, where many of these decisions occur. In contrast, prior research at the project level has focused on predicting development performance in the *post*outsourcing-decision phases of projects.

The objective of this study is to examine the relative importance that IT managers ascribe to various factors from three complementary theories—transaction cost economics, agency theory, and knowledge-based theory—as they *simultaneously* consider them in their project outsourcing decisions. A secondary objective is to assess the cross-cultural robustness (United States versus Japan in this study) of such models in predicting project-level IT outsourcing decisions. We develop and test a multitheoretic model using data on 1,008 project-level decisions collected from 33 Japanese and 53 U.S. managers. Overall, our results provide novel insights into the

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relative importance that managers ascribe to the factors from these three theories, their complementarities and occasional contradictions, and offer new insights into the differences among U.S. and Japanese IT managers. Implications for theory and practice are also discussed.

KEY WORDS AND PHRASES: agency theory, conjoint study, IT sourcing, Japanese software, knowledge-based theory, knowledge management, outsourcing, subcontracting, transaction cost economics, vendor selection.

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A challenging but important decision that contemporary information technology (IT) managers face is the decision about whether to outsource or internalize applications development projects. IT project outsourcing is defined as an interfirm contractual arrangement in which an external software development organization (hereinafter "vendor") custom develops a software application for a client firm [48]. Although outsourcing is increasingly viewed as a competitive necessity, it is nevertheless a risky—and often irreversible—decision [32, 50]. The stakes in such decisions are high considering that only one in six internal IT projects is successful (i.e., on schedule, within budget, and fulfills its intended goals), yet the annual IT outsourcing spending in the United States alone is approaching $50 billion [32]. It is therefore vital to understand how managers charged with outsourcing decision making actually arrive at those decisions.

A review of the past two decades of literature (1984–2006) reveals two overarching themes in IT outsourcing studies: (1) studies that predict the initial outsourcing decision rely in isolation on one of a variety of theories and often focus on the IT function rather than the project as the unit of analysis and (2) studies at the project level focus on the *postdecision* phases of outsourcing, typically examining the relationship between the development process and project performance. The dominant theoretical perspectives are transaction cost economics (TCE) [5], agency theory, and knowledge-based theory. Other firm-level theoretical perspectives such as institutional theory [51], the political perspective, and relational theory have also been invoked in prior empirical studies. Multiple theoretical perspectives therefore independently coexist and few prior studies have attempted to explore how they complement each other or assess their *relative* explanatory merits. This proliferation without integration of theoretical perspectives has led to contradictory prescriptions, sometimes about the same predictor. For example, knowledge-based theory opposes the prediction of agency theory about the influence of client knowledge on outsourcing decisions. Whereas the former theory suggests that greater client knowledge will lead to internalization, the latter predicts outsourcing [66]. Furthermore, much of the prior research on the initial decision to outsource has been at the IT function level [7, 48, 51], potentially masking interesting managerial insights at the project level where such decisions are often made. A second noteworthy theme in prior project-level work is the focus on the postdecision process of managing outsourced projects and the impact on performance

[28, 43, 45, 47, 48]. The relative importance that managers simultaneously ascribe to the factors suggested by various theories in their project-level outsourcing decisions is therefore poorly understood.

The motivations for outsourcing identified in prior research are multifarious: increased flexibility, benefit from vendors' economies of scale, specialization in core business activities, lower risks, and access to technical expertise [32, 48, 50, 51]. The project-level decision to outsource can be influenced by various managerial considerations corresponding to the various organizational theories—TCE, agency theory, and knowledge-based theory of the firm—that predict the expansion of firm boundaries. While normative prescriptions abound, the relative importance that IT managers ascribe to them in their project outsourcing decisions remains unclear. We address these understudied issues in this paper, guided by the following research question: What is the relative importance that managers ascribe to factors from three complementary theories—TCE, agency theory, and knowledge-based theory—in their outsourcing decisions at the project level?

A secondary objective of the study is to examine the cross-cultural robustness of such perspectives. We focus on the United States versus Japan for three noteworthy reasons. First, the two cultures exhibit equifinality—a different approach to the same problem, as illustrated in the Japanese and U.S. auto and electronics industries. Both nations have well-developed, highly successful, internationally competitive companies in these industries, yet the ways in which they are organized and operated differs greatly.[1] Stark differences have been observed in software development practices as well [18], although no prior work has contrasted their IT outsourcing practices. This can potentially provide new, unobvious insights into global IT outsourcing decisions. Second, the differences in the two contexts offer a fertile ground for assessing the cross-cultural generalizability of existing theories. Finally, Japan represents the largest Asian outsourcing market but is also one that non-Japanese software firms have been unsuccessful in penetrating, especially in higher-end development work [17].

A better understanding of these questions can provide valuable theoretical insights for two reasons. First, outsourcing decisions represent conscious managerial choices that alter the firm boundary, which is a central facet of organization theories [74]. Because managerial decision making is influenced by their mental models derived from prior experience [73], eliciting managers' "theories in use" provides an empirical basis for assessing their behavioral consistency with the normative prescriptions of TCE, agency theory, and the knowledge-based view. Our multitheoretic approach further highlights how these theories complement each other. Second, although there is large variance in outsourcing success across firms, outsourcing practices are still emerging and no robust frameworks or models yet exist to guide such decisions. Therefore, understanding the cognitive decision models that IT managers apply can provide novel insights into outsourcing decision-making practices. Furthermore, contrasting U.S. with Japanese outsourcing practices in the model lends insights into theoretical cross-cultural differences.

Although the empirical infancy of the IT outsourcing literature renders a formal meta-analysis premature, valuable insights can nevertheless be gleaned by qualita-

tively comparing and empirically exploring the complementarities among the TCE, agency, and knowledge-based perspectives based on dozens of prior studies that have used these perspectives in mutual isolation. We use these perspectives to develop a multitheoretic model, which we test using data on 1,008 project-level decisions collected from 33 Japanese and 55 U.S. managers. A novel aspect of this study is that it accounts for how managers *simultaneously* process project characteristics derived from multiple theories previously invoked to explain outsourcing to reach a holistic, project-level outsourcing decision. Thus it simultaneously accounts for all three theoretical perspectives, whereas most prior studies have only considered one in isolation, which allows us to draw inferences about the *relative* importance that IT managers ascribe to each of these three theoretical perspectives on IT project outsourcing. Overall, our results provide strong support for the hypothesized relationships and yield novel insights into the differences among U.S. and Japanese IT managers, which we interpret using complementary interview data. The contributions of the paper are twofold: (1) it shows the relative importance ascribed by managers to various factors from three complementary theories—TCE, agency, and knowledge-based view—and (2) it provides new insights into their previously unexplored cross-cultural generalizability. Overall, the results demonstrate that both U.S. and Japanese managers weigh transaction cost considerations most heavily and agency considerations the least in their project outsourcing decisions.

## Theory and Hypotheses Development

Managerial decisions to outsource can be driven by three broad types of motivations: (1) It is possible to realize substantial cost savings by outsourcing a project, (2) it is possible to reconcile the divergent interests of the client and vendor to produce an outcome that is valuable to the client, and (3) the vendor's expertise can successfully help accomplish the client's project objectives.

These broad motivations roughly correspond to the three theoretical perspectives of TCE, agency theory, and knowledge-based theory. Our unit of analysis is the project and we focus on project-level characteristics grounded in these theories. We focus on only these three theories because (1) they are applicable at the project level of analysis and (2) they have been widely invoked in prior outsourcing research. We deem firm-level theories such as institutional theory outside the scope of this project-level study. To address our primary research question, we discuss individual drivers of the project-level decision to outsource that are encompassed by each of these three theories. Figure 1 summarizes the multitheoretic research model.

Table 1 provides an overview of how each of the three theories in the study explains complementary facets of managers' outsourcing decisions and the individual project characteristics associated with each theory.

In addressing our secondary research question about differences between U.S. and Japanese managers, although we expect differences, no prior theoretical perspective yet explains how or why they might exist. Therefore, we review and synthesize the key patterns of differences between U.S. and Japanese managers that have been ob-

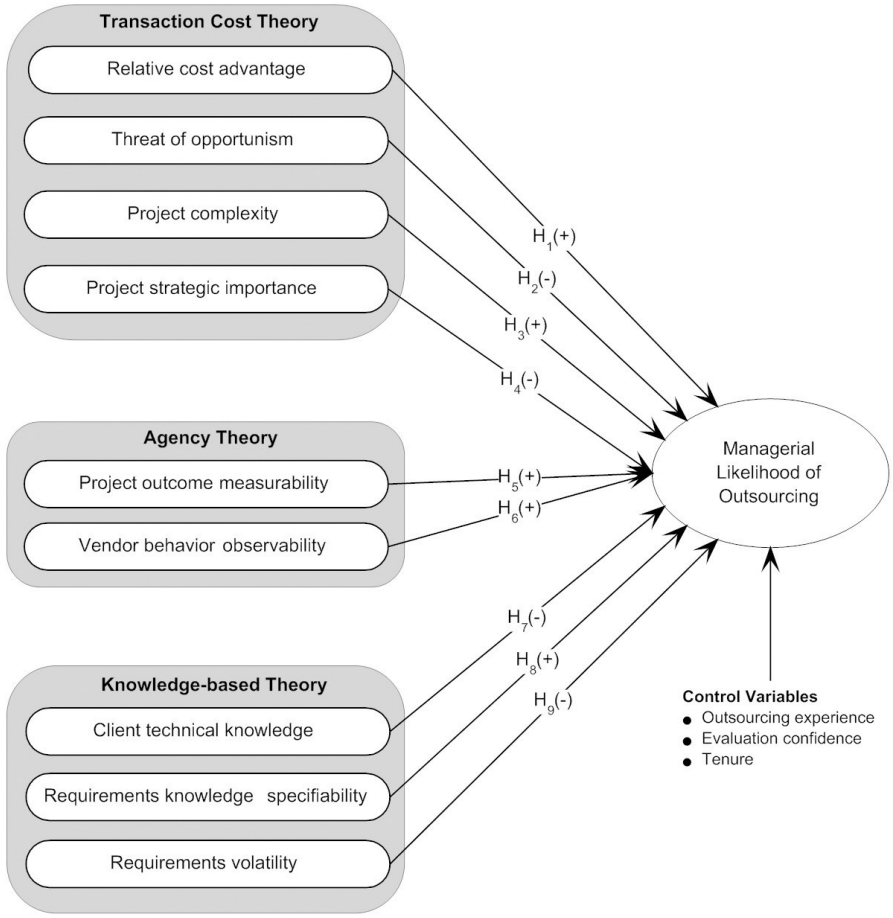


*Figure 1.* The Research Model

served in prior auto industry studies to interpret—rather than predict—the observed differences.

## Transaction Cost Economics

The central idea behind TCE theory is that interfirm exchanges incur transaction costs that arise from having to implement complex transaction governance structures to reduce costly bargaining over specialized resources [5, 74]. Transaction costs are defined as the direct and indirect expenses of negotiating, monitoring, and enforcing explicit and implicit contracts between firms. The central tenet of TCE theory (and its derivatives such as incomplete contracting theory [14]) is that exchanges or activities that incur high transaction costs are likely to be kept within firm boundaries, whereas transactions for which such costs are lower are more likely to be outsourced [74]. Therefore, attributes of projects that lower transaction costs are likely to increase the

Table 1. A Summary of the Three Complementary Theoretical Perspectives on Managers' Decisions to Outsource

| Theory | How the theory explains managers' outsourcing decisions | Representative references in the IS literature | Project characteristics derived from the theory | Expected influence | Hypothesis |
|---|---|---|---|---|---|
| Transaction cost economics | Project characteristics that lower (increase) net transaction costs with an external vendor should increase (decrease) the likelihood that managers will choose to outsource the project. | [4, 5, 12, 51, 64] | Relative cost advantage | + | H1 |
| | | | Threat of opportunism | – | H2 |
| | | | Project complexity | + | H3 |
| | | | Strategic importance of the project | – | H4 |
| Agency theory | Project characteristics that lower potential principal–agent conflicts between the client and vendor should increase the likelihood that managers will choose to outsource the project. | [7, 16, 35, 45] | Project outcome measurability | + | H5 |
| | | | Vendor behavior observability | + | H6 |
| Knowledge-based theory | Project characteristics that increase the likelihood that the client firm will be able to access and exploit specialized technical expertise for the project from an external vendor firm should increase the likelihood that managers will choose to outsource the project. | [16, 32, 49, 50, 61] | Client technical knowledge | – | H7 |
| | | | Requirements knowledge specifiability | + | H8 |
| | | | Requirements volatility | – | H9 |

likelihood that managers will choose to outsource them. We focus on project-level, transaction-specific characteristics that guide the initial decision to outsource; factors that enter the actual development process after the decision to outsource has been made are outside the scope of this study. The key characteristics of projects under the umbrella of TCE are asset specificity, overall cost advantage, threat of opportunistic behavior by the vendor, and the complexity of the transaction. (We also control for other TCE factors such as bounded rationality [68] that are not project specific but can influence managers' decisions about outsourcing. Some factors such as vendor opportunism are also covered under agency theory, further highlighting the overlaps and complementarities to which we alluded at the outset of the paper. When a factor is encompassed by more than one theory, we include it in the model under the theoretical perspective that it is primarily associated with and also discuss it under other pertinent theoretical umbrellas.)

### Relative Cost Advantage

Small internal scale limits the efficiency of internal IT development operations [74]. In contrast, specialized IT vendors have the capacity to aggregate the demands of multiple clients, thereby achieving greater software development scale economies relative to a single-client firm. This is likely only if the client does development similar to (e.g., comparable platforms, development languages, and application types) the prospectively outsourced project on a smaller scale than a vendor. This may not always be the case with large client firms that have extensive scale economies in their internal IT activities. In addition to the size of the client firm's internal IT operations, the magnitude and pace of technical change in the skill set specific to that type of project would influence the extent to which a project can be cost-effectively completed internally [64]. Thus, production cost is used by Williamson [74] as a starting assumption from traditional economic theory but it is not explicitly measured in most TCE-based studies of outsourcing. Therefore, instead of confounding scale economies with these other factors, we directly consider the relative cost advantage from outsourcing a project vis-à-vis internally completing the same project. Relative cost advantage is defined as the expected overall cost savings from outsourcing an IT development project instead of pursuing it internally. This conceptualization allows us to examine the net cost advantages of outsourcing in the model irrespective of why those advantages arise. A prior study found such comparative cost advantage to be the strongest predictor of IT outsourcing [5]. The extent to which managers perceive high relative cost advantage from outsourcing a project will therefore increase the likelihood that they will choose to outsource it. This leads to our first hypothesis:

> *Hypothesis 1: The higher the relative cost advantage that managers perceive a vendor to have relative to the client's own costs of doing the project internally, the higher is the likelihood that they will choose to outsource it, given a competitive vendor market.*

### Threat of Opportunism

A second important element of outsourcing transaction costs is the client firm's exposure to vendor opportunism [75]. Such opportunistic behavior might manifest itself in the form of the vendor taking advantage of the client after the outsourcing decision has been made—that is, during or after development. Threat of opportunism is defined as *lack* of trust that a vendor will honestly fulfill project obligations [27]. The greater this threat, the greater the extent to which a client must implement complex and costly governance mechanisms to safeguard its interests in its transactions with a vendor [22, 24]. Since outsourcing involves significant hazards of opportunism, managers are likely to outsource a project only if they perceive ex ante that they are sufficiently protected from such opportunistic behavior. Trust between the client and vendor firms therefore reduces interfirm transaction costs by lowering the perceived threat of opportunism [25]. Such trust in a vendor is a project-specific characteristic that might arise from a vendor's reputation or be developed through prior experience with the same vendor on projects of similar scale and scope [63]. It must be evaluated at the project level because it is a transaction-specific characteristic. Trust gained through prior experience with a vendor therefore accounts for at the project level of analysis the effect of prior experience with the same vendor/transaction frequency in TCE (and "knowledge-based trust" in knowledge-based theory [1]) at the dyadic relationship level. In other words, it is plausible that a client might perceive a lower threat of opportunism for one project but higher for another with the same vendor. Note, however, that if the client inappropriately trusts and therefore chooses to less closely monitor a vendor, the threat of opportunism actually increases. Overall, the greater the perceived threat of opportunism specific to a project, the lower is the likelihood that managers will choose to outsource that project. This leads to our second hypothesis:

> *Hypothesis 2: The higher the threat of opportunism perceived by managers for a given project, the lower is the likelihood that they will choose to outsource it.*

### Project Technical Complexity

Task, transactional, or project complexity is another important variable in TCE [12]. Project complexity is defined as the complexity of a project due to its size, scope, or technical novelty [76, 77]. TCE theory proposes two competing perspectives on the effects of complexity on managers' decisions to outsource. As a project grows in complexity, two opposing tensions come into play: on one hand, the depth of skills needed to cope with a complex technical project requires deeper specialized expertise, motivating outsourcing, while, on the other hand, greater control is desirable by managers, motivating internalization. In a study of aerospace parts production, Masten [53] found that greater aircraft parts complexity led firms to internalize their production. Integration and coordination of development activities across the client–vendor boundary would require fuller identification of the interdependencies among the outsourced systems and other systems in the client organization. This argument follows the TCE logic that greater complexity raises coordination challenges among interdependent

activities [36], and makes it difficult to write effective, detailed outsourcing contracts. However, IT applications, unlike aircraft parts [53], are more likely to require skills that are not the client's core competency. More complex IT projects are inherently riskier and more prone to failure [4, 28], although this factor has not directly been examined in prior empirical IT outsourcing studies. This should increase the client managers' inclination to rely on a specialized vendor, who is more likely to be equipped with the skills and experience to handle technical complexity relative to a client firm that is more broadly focused in its internal technical skill set. Overall, we expect that as project complexity increases, the benefits that managers perceive from utilizing a specialist vendor will outweigh the perceived costs from loss of direct control. Therefore, as project complexity increases, the net effect will be that managers will be more likely to outsource development. This leads to our third hypothesis:

> *Hypothesis 3: The higher the perceived technical complexity of the project, the higher is the likelihood that managers will choose to outsource it.*

### Strategic Importance of the Project

A final attribute of project-level transactions derived from TCE is the strategic importance of the project to the client firm's business. Projects with greater strategic importance are viewed as having greater asset specificity from a TCE perspective—that is, the intended outcome is likely to be relatively idiosyncratic to the client firm [22]. A notable departure from the broader TCE literature is that it has focused on the make versus buy decision in theorizing the choice between internalization and outsourcing. However, the *custom* software development projects studied here represent a "make versus make" choice—that is, the choice is between making internally versus making externally using a vendor. We therefore assume that custom-developed outsourced projects by definition have some degree of asset specificity because of their client firm–specific characteristics; thus we do not explicitly model asset specificity in our analysis. Instead, we use project strategic importance as a proxy for the *degree* of project asset specificity. IT projects such as routine applications development, maintenance, or enhancement of existing noncritical IT applications can be nonstrategic [10]. On the other hand, IT applications that facilitate competitive moves and differentiation of the client firm, development of new firm-level capabilities, or software that is deeply embedded in hardware products (such as digital cameras, cell phones, or automobile ignition systems) can be of high strategic importance [26]. Higher strategic importance of a project to the client firm's business drives attempts to closely control its development through both formal and informal mechanisms [43]. Both informal and formal forms of control are generally easier to exercise when a project is internalized and uses the client's IT staff [43]. Such close, hierarchy-based control can facilitate greater direct control over the development process. This, in turn, will increase the likelihood of internalization of the development process. Therefore, higher strategic importance will lower the likelihood that managers will outsource a project. This leads to our fourth hypothesis:

*Hypothesis 4: The higher the perceived strategic importance of the project to the client firm's business, the lower is the likelihood that managers will choose to outsource it.*

## Agency Theory

The second major theoretical perspective that can be used to understand managers' outsourcing decisions is agency theory. The core idea in agency theory is the notion of goal incongruence between an agent (the external vendor) and a principal (the client) [39]. Although agency theory was originally conceptualized at the individual level of analysis, it has previously been applied to understand principal–agent conflicts in interfirm relationships such as outsourcing alliances because its basic assumptions hold irrespective of whether the involved entities are individuals or organizations [60]. The concept of information asymmetry is central to principal–agent models: the agent is assumed to possess private information that the principal is only able to acquire with added cost and effort [8].

Consistent with these perspectives, the client firm represents the principal and the vendor represents the agent in outsourced IT projects [16]. Because the client ("principal") and vendor ("agent") are separate organizations, their goals and objectives are likely to diverge, creating a scenario in which the vendor might exhibit self-interested *shirking* behavior (e.g., avoiding project responsibilities that add to the cost of completing the project or exploiting opportunities to derive additional revenue from the client by expanding the work done for a project outsourced by the client) [7]. Recent research has found that agency problems are indeed more pronounced in outsourced software development projects relative to internal projects [16], reinforcing the assertion of goal noncongruence among clients and vendors in outsourcing arrangements. The extent to which a client can overcome such information asymmetry at the project level should therefore influence the degree to which outsourcing is considered viable by client IT managers. Agency concerns can be mitigated through two mechanisms: (1) prespecifying in detail how the outcomes of an outsourced project will be evaluated and using these metrics to tie vendor performance with rewards ("bonding mechanisms") and (2) monitoring the behavior of a vendor during the development process.[2]

### Project Outcome Measurability

Project outcome measurability is defined as the extent to which the outcome of a project can be precisely evaluated using *predefined* criteria such as project milestones, schedules, costs, and acceptable defect levels [16, 44]. Establishing performance metrics at the outset of a project allows a client firm to tie incentives and penalties with vendor performance [37]. Measurement difficulty is a critical characteristic of principal–agent relationships because the ability to objectively and precisely measure project outcomes is necessary to tie rewards with performance [75]. Outcome measurability is therefore a critical requirement for effectively controlling the development process [43]. While this is necessary in both internal and outsourced development, the

need is more pronounced in market-based arrangements such as outsourcing [74]. In contrast, when the performance of the vendor cannot readily be measured, it is difficult to write contracts that adequately govern an outsourcing relationship [2], exposing the client firm to considerable risk of agency conflicts. Internalizing a project with higher measurement difficulty then circumvents such threats. When clearly defined evaluation criteria can be specified to assess project outcomes, market-based arrangements are more feasible because ambiguity about vendor performance is lower [58]. In such cases, all else being equal, managers are more likely to prefer market-based outsourcing arrangements over internal development. Therefore, higher project outcome measurability increases the likelihood that managers will choose to outsource a project. This leads to our fifth hypothesis:

*Hypothesis 5: The higher the measurability of a project's outcome, the higher is the likelihood that managers will choose to outsource it.*

### Vendor Behavior Observability

Vendor behavior observability is defined as the extent to which vendor employee behaviors can readily be monitored during the development process once a project has been outsourced [43]. In outsourcing relationships, this is accomplished through three mechanisms: (1) collocation of vendor and client employees, (2) imposing frequent deliverables, and (3) use of Web-based project tracking software that facilitates monitoring vendor progress [16].

In agency theory, behavior monitoring is an important form of process control that discourages potential agency problems [43]. It also facilitates oversight of vendor employees working on the outsourced project, providing a mechanism for quality control [55]. In contrast, projects in which vendor behavior observability is lower create opportunities for agency problems and shirking by vendor employees. Recent empirical work has found that close project monitoring is an important antecedent to successful outsourcing outcomes [45]. Therefore, managers are more likely to consider outsourcing when they perceive high vendor behavior observability for a project. We expect that higher vendor behavior observability at the project level will increase the likelihood that managers will choose to outsource it. This leads to our sixth hypothesis:

*Hypothesis 6: The higher the observability of vendor behaviors for a given project, the higher is the likelihood that managers will choose to outsource it.*

## Knowledge-Based Theory of the Firm

The knowledge-based theory of the firm views knowledge as a key resource that guides managerial decision making. According to this theoretical perspective, firms are viewed as distributed repositories of tacit and explicit knowledge whose heterogeneous knowledge bases are the key determinants of sustained competitive advantage [30, 56]. The prescriptive aspect of knowledge-based theory emphasizes the importance of

exploiting knowledge resources within and outside firm boundaries. In the interfirm alliance context, this theoretical perspective suggests that outsourcing arrangements serve as a vehicle for utilizing vendors' complementary skills and expertise [31]. The managerial decision to outsource an IT project should therefore be motivated by the need to access and exploit specialized technical knowledge that is not readily available in the client firm.

Although the knowledge-based view emphasizes the *unique* knowledge of the client firm [29], integration of such knowledge with that of the vendor is often necessary in the software development process [16]. Successfully exploiting specialized external knowledge therefore also requires creating shared understanding between the client and vendor firms. The reason is that effective software development requires project-level *integration* of client domain knowledge and vendor technical knowledge during the development process [62, 67]. Without such integration, the unique knowledge of the client firm cannot be successfully leveraged in the outsourced custom-software development process. The feasibility of successfully exploiting the technical knowledge of a vendor at the project level is also influenced by two other project characteristics: (1) the extent to which knowledge about the client firm's requirements for a specific project can readily be communicated to a vendor and (2) the extent to which such knowledge remains stable over the course of the project's life cycle.

Next, we discuss these knowledge-based drivers of managers' outsourcing decisions. The first focuses on whether the client has the necessary technical knowledge for successfully accomplishing a project, the second on whether the knowledge of client needs for a project can readily be conveyed to a vendor, and the third on whether such knowledge is expected to remain stable during the development process. The first variable thus corresponds to the differences in client–vendor knowledge and the latter two to creating a base of common knowledge between the client and vendor. Our emphasis on project requirements stems from the recognition that requirements are the key knowledge integration mechanism in software projects [38, 67].

### Client Technical Knowledge

The first knowledge-based motivation for outsourcing is the desire to gain access to and exploit technical knowledge that the client firm does not possess [50]. When the client firm possesses higher levels of technical skills and knowledge in the domain of a prospective project, outsourcing that project will be less attractive. In contrast, specialized vendors are more likely to recruit and retain more technically skilled IT employees [50], making it more attractive for a client to outsource when the internal skills are weaker relative to those of a prospective vendor. Interestingly, this knowledge-based factor is also implicitly discussed in both TCE and agency theories. However, only the agency perspective on this factor contradicts the knowledge-based theory and TCE arguments. The former suggests that such knowledge enhances the client firm's ability to control an outsourced project [66], thereby increasing the likelihood of outsourcing.

In the TCE view, outsourcing an IT project also requires sharing proprietary business knowledge associated with the project with a vendor. Recent work in telecommunications alliances has shown that managers rationally attempt to safeguard such knowledge against appropriation by a vendor [59]. Prior work in manufacturing contexts also shows that the internal availability of technical skills is negatively related to the inclination to use outside contractors [19]. In contrast, when the internal supply of the requisite technical skills is scarce, clients are more likely to attempt to acquire them from outside firms [12].

Client knowledge also features prominently in agency theory, which proposes an *opposite* relationship. According to this view, greater technical knowledge increases the ability of clients to more precisely spell out contract terms and to effectively monitor and supervise vendors [28, 32, 43], increasing their relative bargaining power.

Overall, we expect that the advantages of internalization of the development activity that results from higher technical knowledge in the client firm will overshadow the enhanced ability to better control vendors. This is consistent with the perspective of the knowledge-based view that firms will internalize activities that they themselves perform well [6]. All else being equal, if the client firm has sufficient preexisting expertise to complete a project internally, it will be less attractive for managers to outsource it. Therefore, the higher the client's technical knowledge in the domain of the project that is being considered for outsourcing, the lower is the likelihood that managers will outsource it. This leads to our next hypothesis:

> *Hypothesis 7: The higher the managerial perceptions of their firm's internal technical knowledge in the project's domain, the lower is the likelihood of outsourcing that project.*

### Requirements Knowledge Specifiability

Requirements knowledge specifiability is defined as the extent to which the client can precisely communicate project requirements to a vendor at the beginning of a project. Some of the knowledge of the project's problem domain can be highly tacit, "sticky," and deeply embedded in the idiosyncratic internal practices of the client firm [20, 69]. For example, blueprints, formulas, internal business processes, and idiosyncratic routines are often difficult to articulate—or low in specifiability—because of their tacit and embedded nature. Lower knowledge specifiability makes it more difficult for the client to convey knowledge of the project's problem domain in a manner that is necessary for the vendor to effectively implement the outsourced system. This project attribute can also be analyzed from an agency theoretic perspective: Lower knowledge specifiability separates the implementation decision-making authority for the project that is delegated to the vendor and the knowledge that is required to effectively make those project implementation decisions [40]. The prediction based on this perspective is exactly the same as that based on knowledge-based theory. Such knowledge must nevertheless be integrated into the software development process for the outsourced

project to succeed [57, 70]. Without the ability to clearly spell out project requirements, managers in the client firm will also encounter difficulties in formulating target objectives for a prospective vendor [61]. Low specifiability can therefore raise the difficulty of precisely communicating knowledge about the objectives at the outset of a project to a vendor. Overall, this increases uncertainty about project requirements, which increases project risk [9, 28].

The more readily a client firm can precisely communicate project requirements—typically through a formal requirements specification document—the more likely a vendor will be able to integrate this knowledge in the development process. Prior empirical research on the post-decision-making phase of IT outsourcing has similarly found that clear requirements are an important antecedent to better project outsourcing outcomes [11, 45, 49]. Therefore, managers' likelihood of outsourcing will be influenced by their perception of whether the requirements for that project can be clearly and completely specified to a vendor. Therefore, we expect a positive relationship between a project's requirements knowledge specifiability and managers' decisions to outsource.

*Hypothesis 8: Managers are more likely to choose to outsource a project with higher requirements knowledge specifiability.*

### Requirements Volatility

Project requirements usually act as a knowledge transfer mechanism through which client requirements are transferred to a vendor [15]. The initial project requirements establish project priorities, desired functionality, and goals, which can later be used to assess a vendor's performance. However, as markets evolve and client business needs change, the initially specified requirements that characterize a successful project can also evolve. We define requirements volatility as the extent to which the business requirements of a project change during the project development life cycle. If the project requirements are expected to rapidly change once development has begun, the client firm runs a heightened risk that the features, functionality, and design of the delivered project—while meeting the initial formal requirements—might not satisfy the client's *evolved* needs [21]. Therefore, high requirements volatility lowers the reliability of knowledge transfer about the scope and problem that the project is intended to address. This, in turn, can expose the project to cost, schedule, and functionality-related risks [42]. Such risks are likely to be more pronounced when the project is outsourced than when it is in-house [16]. Therefore, managers will have a greater tendency to keep projects with volatile requirements in-house. This leads to the next hypothesis:

*Hypothesis 9: The higher the project requirements volatility, the lower is the likelihood that managers will choose to outsource it.*

Given the lack of preexisting theory on differences among U.S. and Japanese managers in their IT outsourcing decision making, we use previously observed patterns of differences in non-IT contexts to help interpret our post hoc analyses below.

## Research Methodology

We adopted a conjoint research design for this study. This technique belongs to the larger family of policy analysis methodologies that have previously been used and advocated in information systems (IS) research [33, 72]. Such techniques require the participants to analyze a variety of decision-making scenarios in which the independent variables are experimentally manipulated. The strength of the conjoint approach is that it combines the control of a laboratory experiment with the external validity of a survey. We used a sequential, multimethod data collection approach, where a theoretically guided conjoint survey was used to collect data from midlevel U.S. and Japanese IT managers and was complemented by semistructured interviews with Japanese managers (including some with prior experience in the United States) to help interpret the findings. Below, we describe this methodology, the reasons guiding its selection, and its operationalization. Figure 2 provides an overview of the methodology.

## Research Design

### An Overview of the Conjoint Research Design

Conjoint analysis is a multiattribute judgment analysis technique based on Anderson's [3] information integration theory, which involves a posteriori decomposition of the respondent's decision-making process [52]. There are three elements that constitute a conjoint research design—attributes, conjoint profiles, and part-worth and overall utilities. An *attribute* refers to a decision criterion that respondents might use to evaluate the dependent variable (outsourcing likelihood). The nine project characteristics derived from the three theory bases discussed in the preceding section represent the conjoint attributes in this study. The overall value assigned by the decision maker to the dependent variable is referred to as its *overall utility* and the contribution of each attribute its *part-worth utility.* Different combinations of attribute levels are called *conjoint profiles* or what Gray and Hovav [33] label as scenario spaces.

The technique requires the respondents to make a series of judgments about a dependent variable based on a set of attributes from which the underlying structure of their cognitive mental models can be statistically inferred. Each respondent is presented a series of conjoint project profiles with different combinations of attribute levels (project characteristics), and the respondent provides an assessment of the dependent variable (likelihood of outsourcing) for each project profile. Each project profile therefore describes a project in terms of the levels of each of the nine project attributes and requires the respondent to assess its attractiveness for outsourcing and the likelihood that they would recommend outsourcing the project.

The underlying structure of the respondents' cognitive models regarding the influence of various project characteristics on their decision to outsource can be statistically inferred from these judgments by analyzing the responses at the individual project and aggregate respondent levels using multiple regression [52]. The analyses are therefore comparable to repeated measures experimental design and account for nonindepen-

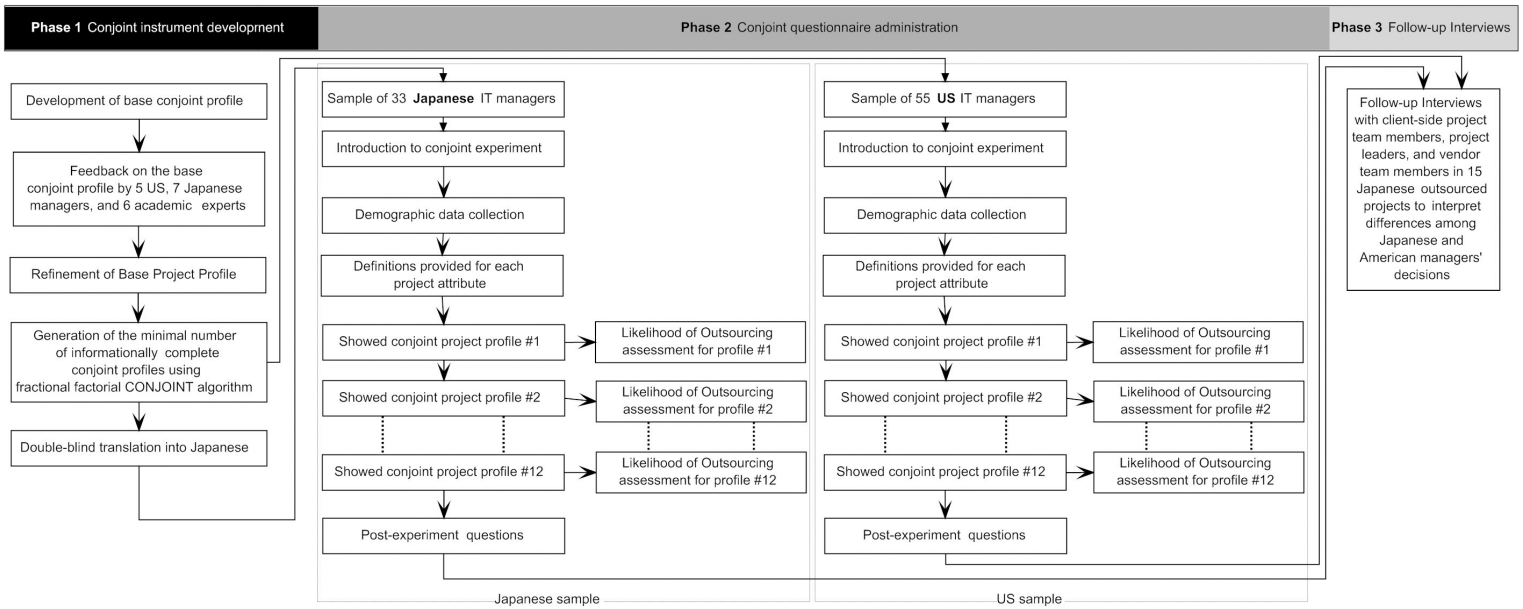


*Figure 2.* An Overview of the Data Collection Approach Used in the Study

dence among the assessments of multiple project profiles by a single respondent. To identify attributes that are statistically significant at the aggregate level, the regression coefficient for each attribute is averaged across individuals and the sign of this coefficient indicates the direction of the relationship between each project characteristic and the dependent variable. A *z*-statistic aggregates the *t*-statistics derived from the individual-level analysis for each conjoint attribute to assess the statistical significance of a project characteristic in predicting the dependent variable [54]. These significance tests are supplemented with Hays's omega-squared ($\omega^2$), which measures the variance explained by each project attribute and indicates its relative importance [52, p. 67]. Thus, beta values indicate the direction and $\omega^2$ indicates the *relative importance* of the project characteristics in predicting managers' likelihood of outsourcing a project.

### Motivations for the Choice of a Conjoint Research Design

Our choice of the conjoint approach over a traditional survey was motivated by three considerations: (1) our theory-testing objectives, (2) to mitigate social desirability bias, and (3) to assess the ascribed relative importance of nine predictors in the model when they are concurrently included in the model.[3]

### Development of the Conjoint Project Profiles

Each project characteristic (or attribute) in the conjoint profiles was operationalized using definitions in the extant IS outsourcing literature, as discussed in the theory section. Formal definitions for each project characteristic were provided to each respondent at the beginning of the survey. Following the established procedures for the conjoint methodology, each attribute could have a high or low value.

We chose two-level predictors with values of "high" and "low" (rather than a more complex approach of three- or five-level values) for three reasons. First, few other studies have examined how transaction cost, agency, and knowledge-related attributes of IT projects shape managers' decisions about outsourcing. Our primary objective was to assess the *existence* and *relative strengths* of those relationships. Second, use of two-level manipulations reduced the length of the conjoint survey to a count of 12 project profiles per respondent, which is feasible with real-world managers. In contrast, using a three-level continuum (e.g., high, medium, and low) would have resulted in 19,683 ($3^9$) possible profile combinations, raising the possibility of subject exhaustion even with the use of a fractional factorial design. Finally, two-level manipulations reduced the cognitive burden of simultaneously evaluating multiple project characteristics presented in each profile.

For TCE factors, *relative cost advantage* was operationalized as the expected cost savings if the project was outsourced rather than completed in-house. Similarly, *threat of opportunism* was measured as the reversed score for the level of trust that the client manager had that the vendor would honestly fulfill its project obligations based on the client firm's prior experiences with the vendor or on the vendor's reputation. Low trust therefore represented a higher threat of opportunism, consistent with the

conceptualization of this construct in the TCE literature [27]. *Project complexity* tapped into the perceived complexity of the project due to its size, scope, or technical novelty. *Strategic importance* of the project assessed the perceived importance of the project to the client firm's business. While strategically important projects are intended to achieve competitive advantage, nonstrategic projects can be operationally or tactically important and are usually intended to achieve competitive parity. In the set of variables based on agency theory, *outcome measurability* assessed the extent to which it is possible to predefine criteria such as project milestones, schedules, costs, and acceptable defect levels to assess the quality of the outputs produced by the vendor. *Vendor behavior observability* was defined as the ease with which vendor behaviors and processes could be readily monitored by the client either by collocating client and vendor staff or through monitoring software. The final set of variables were based on knowledge-based theory. *Client technical knowledge* was defined as the technical skills and knowledge of the client's internal technical staff in the domain of the outsourced project. *Requirements specifiability* was defined as the extent to which project requirements could be fully and accurately communicated to the vendor through a formal project specification document at the outset of the project. *Requirements volatility* tapped into the extent to which the business requirements of the project identified at the outset of the project were expected to change during development.

The dependent variable—managerial inclination to outsource—was measured using two items assessed on a nine-point semantic-differential scale, the extent to which the respondent (1) would recommend outsourcing a project and (2) believed that outsourcing that project was attractive from his or her organization's perspective.

### Translation, Instrument Validation, and Pretesting

It is important to ensure that the conjoint profiles be realistic, unequivocal, and unambiguous. To assess face validity and clarity of the definitions and the conjoint instrument, the materials were extensively pretested in the field with a convenience sample of seven Japanese managers, four U.S. managers, and six academic experts. Feedback from this panel was used to refine the wording, minimize ambiguities in interpretation, ensure that the scenarios were realistic, and demonstrate face validity. The Japanese version of the conjoint instrument was translated into Japanese, back into English, and again into Japanese from this reverse-translated version by separate native Japanese and English speakers (mediated by a U.S.-based bilingual speaker who was not on the research team) using the double-blind translation technique. This multistep, multicultural team-based translation procedure is necessary to ensure conceptual and normative equivalence between the English and Japanese versions of the research instrument.

Because there are nine project characteristics and each characteristic can have two possible values (high or low), the number of possible combinations (conjoint profiles) of these project attributes is 512 ($2^9$). The number of possible conjoint profiles therefore increases exponentially with each additional conjoint attribute or attribute level. It is infeasible to have each respondent evaluate every possible profile that can be generated

from this set of project attributes. A fractional–factorial conjoint design is an informationally efficient approach for addressing this bottleneck. The primary benefit of using a fractional–factorial design is that it safeguards against sources of variation that are not estimated (such as other excluded factors that might be important, or that are likely to most bias the estimated parameters, or are confounded with what is estimated) and are likely to bias the estimated parameters [52]. It allows identification of the smallest set of conjoint project profiles that must be presented to each respondent in a manner that most efficiently yields the most information. The conjoint algorithm implemented in SPSS 11.5 was used to generate this minimum set of conjoint profiles for the study. This resulted in 12 conjoint profiles with different combinations of project attribute levels (see Table 2), each of which was then presented to each participant.

## Data Collection and Research Setting

A two-pronged approach was used for data collection from 89 managers, of which 33 were in Japan and 55 were in the United States. The study was sponsored by a consortium of Japanese multinational companies including IBM-Japan, Mitsubishi, Fujitsu, Hitachi, and Toshiba, which provided access to the sampling frame of Japanese IT managers. For the Japanese sample, we administered the surveys on-site to 33 managers in five firms in and around Tokyo. These managers were identified by their top management as being directly involved in outsourcing decision making for their firms.

The U.S. sample was a random sample of management information systems (MIS) managers in 300 firms that was drawn from *Dun & Bradstreet's Million Dollar Directory*. We first sent prenotifications to potential respondents and discarded mailing addresses returned as undeliverable. This left us with a usable sample of 241 managers. We received a total of 55 responses, for a response rate of 22.8 percent (55/241), which compares favorably to other surveys involving middle managers. No statistically significant differences were found between the early (first 20) and late respondents (last 20), which suggests that our findings are not threatened by nonresponse bias. Of these responses, four were discarded due to substantial missing data, leaving data on 612 (12 conjoint scenarios $\times$ 51 managers) project assessments from 51 U.S. managers and 396 ($12 \times 33$) project assessments from 33 Japanese managers. A noteworthy strength of such conjoint-based data is that although the number of respondents is relatively small, multiple project assessments from each respondent provide greater overall statistical power for the analyses.

Both Japanese and U.S. managers were specifically asked to think in terms of new custom application software development projects to ensure comparability. Each respondent was first presented instructions and a reference card with the definitions of the nine conjoint profile attributes. Following this, the respondents were sequentially presented 12 hypothetical software projects in the form of 12 conjoint profiles, each with a different combination of project attribute levels (high/low). Each profile was evaluated by responding to the nine-point, two-item dependent variable scale as shown in the Appendix. The two items in this scale were averaged for the analyses. Only the levels

Table 2. Project Attribute Levels and Descriptive Statistics for the 12 Conjoint Project Profiles

| | Conjoint project profile | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Conjoint attribute | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Relative cost advantage | Low | Low | High | High | High | Low | High | High | Low | High | Low | Low |
| Trust in vendor | Low | High | Low | Low | High | Low | High | Low | High | High | Low | High |
| Project complexity | Low | Low | Low | Low | High | High | Low | High | Low | High | High | High |
| Strategic importance of project | Low | High | High | Low | Low | Low | Low | High | High | High | High | Low |
| Project outcome measurability | High | Low | High | Low | High | High | Low | Low | High | High | Low | Low |
| Vendor behavior observability | Low | Low | Low | High | Low | High | High | Low | High | High | High | Low |
| Internal technical expertise | High | High | Low | Low | Low | High | High | High | Low | High | Low | Low |
| Requirements specifiability | High | Low | Low | High | Low | Low | Low | High | High | High | Low | High |
| Requirements volatility | High | High | Low | High | High | Low | Low | Low | Low | High | High | Low |
| Japanese subsample | | | | | | | | | | | | |
| Mean | 3.09 | 3.03 | 4.75 | 5.72 | 5.83 | 3.03 | 6.97 | 5.48 | 5.50 | 6.53 | 3.20 | 4.70 |
| Standard deviation | 1.74 | 1.74 | 1.92 | 2.09 | 2.07 | 1.32 | 1.63 | 1.38 | 2.32 | 2.18 | 1.72 | 2.15 |
| U.S. subsample | | | | | | | | | | | | |
| Mean | 2.42 | 3.20 | 4.51 | 4.59 | 6.42 | 2.70 | 5.08 | 3.49 | 6.00 | 5.65 | 4.38 | 5.48 |
| Standard deviation | 1.87 | 2.01 | 1.96 | 1.98 | 1.80 | 1.62 | 2.46 | 2.44 | 2.20 | 2.77 | 1.88 | 2.37 |

of the nine project characteristics were manipulated across the 12 project profiles. These profiles are shown in Table 2 and a sample profile in the Appendix.

### Control Variables

Our choice of controls is guided largely by theoretical considerations. A major factor identified in TCE that can influence outsourcing decisions independent of project characteristics is the client's bounded rationality. Three demographic characteristics of the responding managers were used to account for the individual respondents' bounded rationality: how long the respondent had been with the firm (tenure), prior outsourcing experience (measured as the number of project-level outsourcing decisions in which the respondent had previously been directly involved) [28], and the self-reported level of confidence in the evaluation of the project profiles. Additional controls were also considered but were dropped for lack of significance.[4] Firm-level controls are not appropriate in this analysis because the unit of analysis is the project. The nonexistence of internationally comparable industry classification codes also prevented us from controlling for industry effects.

### Follow-Up Interviews

To help interpret the empirically observed differences between U.S. and Japanese managers' outsourcing decision making, we interviewed lead project managers for 15 outsourced software development projects in five leading Japanese technology corporations—Toshiba, IBM-Japan, Fujitsu, Hitachi, and Mitsubishi. All interviews were conducted using a semistructured methodology. Five researchers—which included three native Japanese speakers—were present for each interview, all of which were conducted in Japan. Four interviews were conducted in English and the rest were conducted primarily in Japanese. Each interview lasted between 75 and 175 minutes. All interviews were electronically recorded and supplemented by written notes taken by each of the five researchers. The recorded interviews and notes were then used to gain additional insights into the outsourcing decision-making differences reported in the next section.

## Descriptive Statistics and Respondent Demographics

The participants in the study were highly experienced IT managers. In the U.S. sample, the average IT experience of the responding managers was 15.37 years (standard deviation [SD] 9.24 years) and in the Japanese sample it was a comparable 18.77 years (SD 5.87 years). On average, the U.S. respondents had worked with the organization for 11.18 years (SD 8.94) and the Japanese respondents for 18.76 years (SD 6.4 years). The U.S. managers had previously participated in making outsourcing decisions for 20.5 projects (SD 26.3) and the Japanese managers for 11.84 projects (SD 13.3). In terms of organizational characteristics, both the U.S. and Japanese managers represented a variety of industries such as construction, manufacturing, automotives, chemicals,

IT services, consumer electronics, financial services, medical services, and content provisioning. However, the U.S. firms in the study were much smaller and diverse in their focal industries, whereas the Japanese firms were diverse multinationals whose businesses span a comparably diverse set of industries. The U.S. and Japanese subsamples are therefore comparable. The means and standard deviations for each conjoint profile are summarized in Table 2.

## Results and Discussion

### Results of Hypothesis Tests

Following the recommended procedures native to conjoint analysis, both individual respondent and aggregate project data were used for analysis using hierarchical multiple regression procedures [34, 52], as described above. In conjoint analysis, the direction of the relationship between each independent variable and the dependent variable is indicated by $\beta$, its regression coefficient. Its statistical significance is indicated by the corresponding *z*-statistic. These significance tests are complemented by Hays's $\omega^2$—a measure of the proportion of variance in the dependent variable explained by each independent variable—which is used to assess its *relative importance.* Thus, $\beta$ values indicate the direction and $\omega^2$ indicates the relative importance of each predictor.

The analyses to test the hypotheses were first conducted on the pooled sample using a stepwise regression model. A five-step hierarchical regression model was used in which the following five blocks of variables were incrementally added to the model: (1) nationality dummy variable (to account for the variance due to country-level differences between U.S. and Japanese managers), (2) control variables, (3) TCE predictors, (4) agency theory–based predictors, and (5) knowledge-based theory–based predictors. The predictors for each theoretical perspective are entered incrementally stepwise solely to compare the incremental explanatory contribution of each theory in explaining managers' outsourcing decisions. (We empirically verified that the sequence in which the blocks of variables were introduced did not influence the results.) The results of this analysis are summarized in Table 3, which shows the aggregated regression coefficient for each predictor, its statistical significance indicated by a *z*-statistic, and its relative importance, $\omega^2$.

The *z*-statistics are statistically significant for seven of the nine proposed predictors and the $\beta$ coefficients are in the hypothesized directions. The results show that relative cost advantage (H1), project complexity (H3), vendor behavior observability (H6), and requirements specifiability (H8) positively and significantly influence managerial likelihood of outsourcing, as hypothesized. Threat of opportunism (H2), client technical knowledge (H7), and requirements volatility (H9) have a negative and significant influence on managerial likelihood of outsourcing, as hypothesized. H1, H2, H3, H6, H7, H8, and H9 are therefore supported. These are discussed individually in the next section.

Two of our proposed predictors—project strategic importance (H4) and project outcome measurability (H5)—were nonsignificant. (They also remain nonsignificant in the subgroup analyses for the U.S. and Japanese subsamples.) To gain further insights into the nonsignificance of project strategic importance in outsourcing decision

Table 3. Regression Results for Pooled Sample

| Variable | Expected direction | Hypothesis | Step 1 Nationality β | Step 1 Nationality *z*-statistic | Step 2 Control variables β | Step 2 Control variables *z*-statistic | Step 3 TCE variables β | Step 3 TCE variables *z*-statistic | Step 4 Agency variables β | Step 4 Agency variables *z*-statistic | Step 5 Knowledge-Based variables β | Step 5 Knowledge-Based variables *z*-statistic | $\omega^2$ | Relative importance |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Constant | | | | **47.29** | | **12.39** | | **13.65** | | **13.75** | | **14.22** | | |
| Japan dummy | | | **0.07** | **2.16** | 0.04 | 1.08 | 0.04 | 1.19 | 0.04 | 1.20 | 0.04 | 1.24 | | |
| Organizational tenure | | | | | **0.08**** | **2.41** | **0.08**** | **2.65** | **0.08**** | **2.67** | **0.08**** | **2.76** | | |
| Outsourcing experience | | | | | **–0.06*** | **–1.82** | **–0.06*** | **–2.01** | **–0.06*** | **–2.02** | **–0.06*** | **–2.09** | | |
| Confidence | | | | | **0.07*** | **2.16** | **0.07*** | **2.38** | **0.07**** | **2.40** | **0.07**** | **2.48** | | |
| Model variables | | | | | | | | | | | | | | |
| Relative cost advantage | + | H1 | | | | | **0.29***** | **10.25** | **0.29***** | **10.32** | **0.29***** | **10.67** | 0.086 | 2 |
| Threat of opportunism | – | H2 | | | | | **–0.3***** | **–10.68** | **–0.30***** | **–10.76** | **–0.30***** | **–11.12** | 0.093 | 1 |
| Project complexity | + | H3 | | | | | **0.05*** | **1.69** | **0.05*** | **1.70** | **0.05*** | **1.76** | 0.003 | 6 |
| Strategic importance of project | – | H4 | | | | | 0.00 | –0.01 | 0.00 | –0.01 | 0.00 | –0.01 | — | |

*(continues)*

Table 3. Continued

| Variable | Expected direction | Hypothesis | Step 1 Nationality β | Step 1 Nationality *z*-statistic | Step 2 Control variables β | Step 2 Control variables *z*-statistic | Step 3 TCE variables β | Step 3 TCE variables *z*-statistic | Step 4 Agency variables β | Step 4 Agency variables *z*-statistic | Step 5 Knowledge-Based variables β | Step 5 Knowledge-Based variables *z*-statistic | $\omega^2$ | Relative importance |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Project outcome measurability | + | H5 | | | | | | | 0.03 | 0.89 | 0.03 | 0.92 | — | |
| Vendor behavior observability | + | H6 | | | | | | | **0.11** | **4.02** | **0.11*****| **4.16** | 0.045 | 4 |
| Client technical knowledge | – | H7 | | | | | | | | | **–0.21*****| **–7.72** | 0.013 | 3 |
| Requirements specifiability | + | H8 | | | | | | | | | **0.08**** | **3.03** | 0.007 | 5 |
| Requirements volatility | – | H9 | | | | | | | | | **–0.05*** | **–1.89** | 0.003 | 6 |
| $R^2$ adjusted (percent) | | | 0.4 | | 1.5 | | 18.9 | | 20.1 | | 25.2 | | | |
| *F*-statistic ($\Delta R^2$) | | | | | 4.95 | | 55.47 | | 8.49 | | 24.13 | | | |
| $\Delta R^2$ adjusted (percent) | | | | | 1.4 | | 17.7 | | 1.3 | | 5.3 | | | |

*Notes:* Significant relationships are shown in boldface. *** $p \leq 0.001$; ** $p \leq 0.01$; * $p \leq 0.05$; one-tailed test.

Table 4. Subgroup Analysis for High and Low Strategic Importance

| | High | | Low | |
|---|---|---|---|---|
| | β | *z*-statistic | β | *z*-statistic |
| Relative cost advantage | 0.063 | 1.126 | **0.286*** ** | **5.463** |
| Threat of opportunism | –0.032 | –0.710 | **–0.286*** ** | **–5.451** |
| Project complexity | **0.188*** ** | **4.278** | –0.041 | –0.787 |
| Project outcome measurability | **0.289*** ** | **4.986** | *–0.057* | *–1.368* |
| Vendor behavior observability | **0.249*** ** | **3.517** | **0.140*** ** | **3.337** |
| Client technical knowledge | **0.147** ** | **2.536** | **–0.158** ** | **–3.008** |
| Requirements specifiability | **0.185*** ** | **4.134** | 0.020 | 0.476 |
| Requirements volatility | **–0.173** ** | **–2.993** | –0.031 | –0.480 |

*Notes:* Significant relationships are shown in boldface. *** $p \leq 0.001$; ** $p \leq 0.01$; * $p \leq 0.05$; one-tailed test; italics $p < 0.1$.

making, we created two subgroups for high and low levels of strategic importance and compared the model across these subgroups. The results are presented in Table 4. The reader should, however, be cautioned that our measure for strategic importance did not explicitly define low strategic importance as tactical importance, which might have influenced these results. A post hoc comparison of results across the subgroups reveals several additional insights. First, relative cost importance is significant only in the low strategic importance subgroup. For high strategic importance projects, potential cost savings have no effect on the decision to outsource. This implies that managers are more inclined to outsource motivated by cost savings if the project is of relatively low strategic importance but not if it is of high strategic importance. Second, threat of opportunism is negative and significant in the low group, suggesting that it is likely to enter managerial cognitive calculus in projects of low but not high strategic importance. Third, project complexity was positive and significant in projects of high strategic importance, suggesting that if a project is of high strategic importance and also relatively complex, managers are more likely to seek outside specialists. Fourth, client technical knowledge is positive and significant in the high subgroup but negative and significant in the low subgroup. This suggests that managers are more likely to outsource strategically important projects for which they have internal technical expertise. This is consistent with the idea in the controls literature that such internal expertise gives clients a better ability to govern and manage the outsourcing relationship [16]. Paradoxically, the results also suggest that managers are less likely to outsource a lower strategic importance project when their firm lacks the appropriate technical skills. Finally, the results show that managers are more likely to outsource strategically important projects when they believe that project requirements can readily be communicated to a vendor but less likely to outsource when they perceive that project requirements are volatile.

The second nonsignificant variable in the model was project outcome measurability. An interpretation for this is that measurement difficulty damages performance in both market-based outsourcing arrangements and in internal hierarchical arrangements [2]. Since measurement difficulty can impede the performance of project-level governance

mechanisms regardless of their placement inside or outside the firm, it does not directly influence managers' decisions to outsource. It might, however, lead to different choices of project governance mechanisms after the outsourcing decision has been made. This remains a fruitful question for future research.

The magnitude of the $\omega^2$ values for each project characteristic in Table 3 provides insights into its relative importance in influencing managers' outsourcing decisions. The results suggest that in their order of importance, managers ascribe the highest weight to threats of opportunism, relative cost advantage, their firm's internal technical knowledge in the project's domain, vendor behavior observability, and requirements specifiability. Project complexity and requirements volatility, although significant predictors of such decisions, are ascribed the lowest importance by managers in their outsourcing decisions.

## The Relative Influence of Transaction Cost Economics, Agency Theory, and Knowledge-Based Theory on Outsourcing Decisions

The foregoing results indicate the relative importance of the individual factors but not the relative importance of TCE, agency theory, and knowledge-based theory in explaining managers' outsourcing decisions. The latter requires evaluating the incremental variance explained by the factors derived from each theory. This is indicated by $\Delta R^2$ associated with the addition of each block of theoretically related predictors to the model in Table 3. The largest proportion of variance was explained by transaction cost theory ($R^2$ = 17.7 percent, $F(\Delta R^2) = 55.47$, $p < 0.001$), followed by knowledge-based theory ($R^2$ = 5.3 percent, $F(\Delta R^2) = 24.13$, $p < 0.001$), and finally, agency theory ($R^2$ = 1.3 percent, $F(\Delta R^2) = 8.49$, $p < 0.001$). This suggests that managers' project outsourcing decisions are explained by transaction cost theory, knowledge-based theory, and agency theory, in that order. Overall, this pattern of findings is consistent with the idea proposed in prior qualitative research that cost savings are a dominant driver of outsourcing decisions [50, 64]. Knowledge-based motivations are the next most important consideration in managers' outsourcing decision making, consistent with the normative prescriptions of the knowledge-based theory of the firm. Agency considerations, which contributed the least to the initial decision, paradoxically dominate postdecision IT project governance activities as documented in the extant controls and outsourcing governance literature [16, 44].

## Cross-Cultural Differences Between U.S. and Japanese Managers' Outsourcing Decision Making

### Generic Patterns of Differences Between U.S. and Japanese Managers Identified in Prior Research

While there is no prior theory as to why Japanese managers should behave differently from U.S. managers in their outsourcing decision making, an extensive body of work

in the manufacturing literature shows that the two groups do behave differently. We synthesize in Table 5 the key patterns of differences that have previously been observed in this literature along with qualitative exemplars from our preliminary interviews. Our synthesis reveals three thematic cross-cultural differences—in contracting approaches, postoutsourcing decision project management practices, and interfirm knowledge management—that can help develop an ex post interpretation of the results from our post hoc U.S.–Japan comparisons.

First, U.S. firms rely more on shorter-term, arm's-length relationships with vendors, whereas Japanese firms utilize longer-term, informal relational contracts [46]. These differences are also reflected in how managers choose to govern interfirm relationships: Whereas U.S. managers govern them through formal and informal control mechanisms [16, 63], Japanese managers rely predominantly on informal mechanisms. Second, differences in how interfirm collaborative processes are managed can amplify the effects of some knowledge-based considerations while attenuating others. Different expectations of how the development process will be managed once a project is outsourced might lead U.S. and Japanese managers to weigh similar criteria differently in their initial outsourcing decisions. A key thematic difference is that Japanese firms maintain much tighter control over technical design in projects involving external partners than U.S. firms [71]. Third, because of their longer-term focus, Japanese firms engage in extensive knowledge sharing with their partners while U.S. firms are more protective of their proprietary knowledge assets [41, 71]. These overarching U.S.–Japan differences in postoutsourcing interfirm processes might influence managers' outsourcing decision-making processes, as discussed next. However, we caution the reader that most prior U.S.–Japan comparisons are in the manufacturing rather than IS literature. Therefore, extrapolating prior patterns to draw interpretations about IT projects represents guided speculation. Furthermore, they represent patterns of differences and do not broadly generalize to all Japanese or U.S. firms.

### Post Hoc Tests to Assess Differences Between U.S. and Japanese IT Managers' Outsourcing Decision Making

To assess differences in the decision-making criteria used by U.S. and Japanese IT managers in their outsourcing decisions, we analyzed the regression model using subgroups based on the Japanese (Table 6) and U.S. (Table 7) data.

Table 8 summarizes the patterns of commonalities and differences across the U.S. and Japanese subgroups. Overall, the results demonstrate that both U.S. and Japanese managers weigh transaction cost considerations most heavily and agency considerations the least in their decision making about outsourcing. The noteworthy commonalities across both groups are that relative cost advantage (a factor in both production cost economics and TCE perspectives), threat of opportunism, and vendor behavior observability have comparable, significant relationships. Project strategic importance and project outcome measurability remain nonsignificant across both groups as they were also in the pooled sample. (Outcome measurability was marginally significant at the $p < 0.1$ level for the U.S. sample, suggesting that U.S. managers might be inclined to

Table 5. A Summary of the Key Themes of Differences Between U.S. and Japanese Managers' Behaviors

| Differences in… | United States | Japan | Representative citation | Illustrative exemplars from our interviews |
|---|---|---|---|---|
| Contracting approach | Formal, written contracts. | Informal relational contracts. | [46] | This subtlety was emphasized by two Japanese managers at IBM-Japan who had previously worked in the United States. Interviewees at Toshiba similarly indicated extensive reliance on collocation of client liaisons and frequent progress-check visits to the vendor site. Another interviewee pointed out that this does not imply that U.S. firms do not follow such practices; just that Japanese firms follow them to a relatively greater extent. A Japanese manager from Fujitsu's R&D group indicated that the business relationship with the vendor was far less important than the personal relationship, emphasizing a long-term relational focus. |
| | Shorter-term arm's-length relationships. | Long-term alliances. | [22, 71] | |
| | Reployable, non-asset-specific investments by client. | Greater asset-specific investments by client.* | [24] | |
| Project governance and management | Reliance on both formal and informal vendor controls. | Greater reliance on informal controls. | [46] | A project manager from Fujitsu indicated that a problematic outsourced project was the result of letting the vendor have free reign in picking the development methodology. A closely related difference that surfaced in our interviews is that Japanese managers prefer to decompose larger projects into concurrent subprojects, only some of which are handed off to vendors. Much of the detailed technical design is done in-house to accomplish this decomposition before a subproject is outsourced, effectively giving the client much greater early stage control over the outsourced software project. |
| | Problem-solving focused (emphasis on development stage of projects). | Problem definition focused (emphasis on initial project design stage). | [18, 78] | |
| | Design activity delegated largely to vendor. | Maintain tight control over design specifications. | [71] | |

| | | | | |
|---|---|---|---|---|
| | Phased development of entire project. | Parallel, concurrent development of subprojects by internal and vendor staff. | [13] | |
| Differences in interfirm knowledge management | Protection of proprietary domain knowledge. | Confidential domain and technical knowledge extensively shared with vendors. | [41, 71] | Our interviews with two managers at Toshiba and Mitsubishi also confirmed that the preferred strategy in Japanese firms for integrating domain knowledge from the client firm and technical knowledge from the vendor during the development process is through staff collocation. |
| | Knowledge integration by educating vendor staff about client business goals. | Knowledge integration through staff collocation. | [71] | |

* Asset-specific investments can be *site specific* (e.g., locating vendor offices close to client) or *human-asset specific* (e.g., staff rotation across organizations).

Table 6. Regression Results for the Japanese Subsample

| Variable | Expected direction | Hypothesis | Step 1 Control variables β | Step 1 Control variables *z*-statistic | Step 2 TCE variables β | Step 2 TCE variables *z*-statistic | Step 3 Agency variables β | Step 3 Agency variables *z*-statistic | Step 4 Knowledge-Based variables β | Step 4 Knowledge-Based variables *z*-statistic | $\omega^2$ | Relative importance |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Constant | | | | **9.59** | | **11.23** | | **11.37** | | **11.65** | | |
| Organizational tenure | | | –0.07 | –1.25 | *–0.07* | *–1.47* | *–0.07* | *–1.49* | *-0.07* | *–1.52* | | |
| Outsourcing experience | | | *0.09* | *1.64* | **0.09*** | **1.91** | **0.09*** | **1.94** | **0.09*** | **1.99** | | |
| Confidence | | | –0.05 | –0.95 | –0.05 | –1.11 | –0.05 | –1.13 | –0.05 | –1.15 | | |
| Model variables | | | | | | | | | | | | |
| Relative cost advantage | + | H1 | | | **0.45***** | **10.57** | **0.45***** | **10.70** | **0.45***** | **10.96** | 0.213 | 1 |
| Threat of opportunism | – | H2 | | | **–0.26***** | **–6.08** | **–0.26***** | **–6.16** | **–0.26***** | **–6.30** | 0.070 | 2 |
| Project complexity | + | H3 | | | –0.01 | –0.25 | –0.01 | –0.26 | –0.01 | –0.26 | — | |
| Strategic importance of project | – | H4 | | | –0.03 | –0.72 | –0.03 | –0.73 | –0.03 | –0.75 | — | |
| Project outcome measurability | + | H5 | | | | | –0.01 | –0.30 | –0.01 | –0.31 | — | |
| Vendor behavior observability | + | H6 | | | | | **0.15***** | **3.44** | **0.15***** | **3.53** | 0.023 | 3 |
| Client technical knowledge | – | H7 | | | | | | | *–0.06* | *–1.37* | — | |
| Requirements specifiability | + | H8 | | | | | | | **0.15***** | **3.62** | 0.022 | 4 |
| Requirements volatility | – | H9 | | | | | | | **–0.11**** | **–2.60** | 0.012 | 5 |
| $R^2$ adjusted (percent) | | | 2 | | 27.20 | | 29 | | 32.30 | | | |
| *F*-statistic ($\Delta R^2$) | | | | | **37.31** | | **5.97** | | **7.25** | | | |
| $\Delta R^2$ adjusted (percent) | | | | | **27** | | **1.8** | | **3.3** | | | |

*** $p \leq 0.001$; ** $p \leq 0.01$; * $p \leq 0.05$; italics $p < 0.1$; one-tailed test; significant relationships are shown in boldface.

Table 7. Regression Results for the U.S. Subsample

| Variable | Expected direction | Hypothesis | Step 1 Control variables β | Step 1 Control variables *z*-statistic | Step 2 TCE variables β | Step 2 TCE variables *z*-statistic | Step 3 Agency variables β | Step 3 Agency variables *z*-statistic | Step 4 Knowledge-Based variables β | Step 4 Knowledge-Based variables *z*-statistic | $\omega^2$ | Relative importance |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Constant | | | | **9.13** | | **9.91** | | **9.96** | | **10.56** | | |
| Organizational tenure | | | **0.12**** | **3.01** | **0.12***** | **3.27** | **0.12***** | **3.28** | **0.12***** | **3.48** | | |
| Outsourcing experience | | | **–0.08*** | **–1.94** | **–0.08*** | **–2.11** | **–0.08*** | **–2.12** | **–0.08*** | **–2.25** | | |
| Confidence | | | **0.12*** | **3.05** | **0.12***** | **3.31** | **0.12***** | **3.32** | **0.12***** | **3.53** | | |
| Model variables | | | | | | | | | | | | |
| Relative cost advantage | + | H1 | | | **0.19***** | **5.33** | **0.19***** | **5.36** | **0.19***** | **5.68** | 0.038 | 3 |
| Threat of opportunism | – | H2 | | | **–0.33***** | **–8.98** | **–0.33***** | **–9.03** | **–0.33***** | **–9.58** | 0.109 | 1 |
| Project complexity | + | H3 | | | **0.08*** | **2.27** | **0.08*** | **2.29** | **0.08**** | **2.42** | 0.007 | 5 |
| Strategic importance of project | – | H4 | | | 0.02 | 0.49 | 0.02 | 0.49 | 0.02 | 0.52 | — | |
| Project outcome measurability | + | H5 | | | | | *0.05* | *1.32* | *0.05* | *1.40* | — | |
| Vendor behavior observability | + | H6 | | | | | **0.09**** | **2.58** | **0.09**** | **2.73** | 0.009 | 4 |
| Client technical knowledge | – | H7 | | | | | | | **–0.30***** | **–8.82** | 0.092 | 2 |
| Requirements specifiability | + | H8 | | | | | | | 0.04 | 1.24 | — | |
| Requirements volatility | – | H9 | | | | | | | –0.02 | –0.52 | — | |
| $R^2$ adjusted (percent) | | | 3.50 | | 18.10 | | 18.90 | | 27.90 | | | |
| *F*-statistic ($\Delta R^2$) | | | | | **28.63** | | **4.19** | | **26.55** | | | |
| $\Delta R^2$ adjusted (percent) | | | | | **14.6** | | **0.8** | | **9.0** | | | |

*** $p \leq 0.001$; ** $p \leq 0.01$; * $p \leq 0.05$; italics $p < 0.1$; one-tailed test; significant relationships are shown in boldface.

Table 8. A Comparison of the Results Across U.S. and Japanese Managers

| Theory | Variable | Predicted | Results | | |
|---|---|---|---|---|---|
| | | | Pooled sample | U.S. managers | Japanese managers |
| Transaction cost theory | Relative cost advantage | + | + | + | + |
| | Threat of opportunism | – | – | – | – |
| | Project complexity | + | + | +* | * |
| | Strategic importance of the project | – | | | |
| Agency theory | Project outcome measurability | + | | | |
| | Vendor behavior observability | + | + | + | + |
| Knowledge-based theory | Client technical knowledge | – | – | –* | * |
| | Requirements knowledge specifiability | + | + | * | +* |
| | Requirements volatility | – | – | * | –* |

* Differences among U.S. and Japanese managers.

outsource projects with readily measurable outcomes. The low statistical confidence, however, cautions against a conclusive interpretation.) However, differences can be observed across four variables in the model in Table 8. We next draw on our theoretical arguments in light of the aforementioned generic differences between U.S. and Japanese managers summarized in Table 5 to interpret these results. A notable pattern in these results is that three of the four differences are associated with project characteristics derived from knowledge-based theory.

*Project technical complexity* was positively related to likelihood of outsourcing in the U.S. sample but not in the Japanese sample. This implies that U.S. managers but not Japanese are more likely to outsource as a project becomes more complex rather than make an immediate investment in ramping up their internal IT staff skills to deal with the complexity. In contrast, prior research in the automotive industry has observed that Japanese firms maintain enduring, informal relational networks with a variety of external suppliers [23]. Prior work in the electronics industry has also found that Japanese firms place greater emphasis on cultivating long-term relationships rather than engaging in short-term, arm's-length relationships [71]. Thus Japanese firms are more likely to have ready access to a variety of trusted partners with whom they have non-contractual bonds. Japanese managers are therefore likely to rely on their relationships with outside vendors regardless of project complexity. Our interviews reinforced this pattern in the IT context. For example, one firm in our Japanese sample—Hitachi—emphasized the strength of their long-term relationship with a particular vendor; even though the vendor produced a product with quality issues, the Japanese firm indicated they would continue using this vendor on future phases of the project because of their shared domain knowledge that had been developed as the project progressed. Switching vendors would require explaining the project in its entirety to a new vendor. IT project managers at Fujitsu (another of our Japanese firms) indicated that it took three years to develop confidence in the abilities of a particular vendor. In contrast, U.S. firms—due to their formal contract-driven arrangements—are less likely to have ready access to a preexisting network of business partners for help with *internally* completing a more complex project. Therefore, greater project technical complexity might motivate them to externally seek such expertise via outsourcing.[5] The other three differences were all related to knowledge-based characteristics of projects.

*Client technical knowledge* was negatively associated with the likelihood of outsourcing in the aggregate analysis. Recall that we theorized based on knowledge-based theory that higher technical knowledge would reduce managers' likelihood of outsourcing a project because of domain knowledge appropriation hazards, although the agency perspective suggests that such knowledge also makes managers better equipped to govern the outsourcing process. Although a negative relationship between client technical knowledge and likelihood of outsourcing was supported in the overall analyses and in the U.S. sample, the relationship was weakly significant ($p < 0.1$) for Japanese managers. One plausible interpretation for this is that Japanese firms already utilize a trusted network of outside firms to access complementary expertise, widely share proprietary domain knowledge with them, and generally tend to view interfirm relationships as more relational and longer-term than U.S. firms. Therefore, fears of

knowledge appropriation might be much less pronounced among Japanese managers. Thus the client firm's internal technical knowledge might not significantly influence Japanese mangers' outsourcing decision making. Although this result is consistent with both the TCE and knowledge-based arguments for client technical knowledge, it is impossible to discern without speculation from the results as to which theory is the correct explanatory theory. A simpler interpretation grounded in the latter theoretical perspective is that firms are less likely to outsource a project for which they have internal technical expertise readily available. An alternative explanation is that we might have lacked sufficient statistical power given the smaller Japanese sample to detect a stronger effect.

*Project requirements specifiability* was positively related to the likelihood of outsourcing among Japanese managers but not U.S. managers. This implies that Japanese managers are more likely to outsource projects whose design can be readily completed in-house and the resulting project specifications precisely communicated to a vendor. One interpretation for this difference is that Japanese firms more routinely use concurrent development practices and project decomposition strategies. Since effective parallel development of related project components requires effectively communicating the details of outsourced subprojects to a vendor, the ability to accurately prespecify those requirements might positively influence Japanese managers' outsourcing decisions. U.S. firms, in contrast, rarely engage in sophisticated decomposition of projects to be outsourced to the degree that we observed in Japanese firms, write more comprehensive formal contracts for outsourced projects, and enforce sophisticated process controls and formal capability maturity model (CMM) process guidelines in outsourced development work. Therefore, requirements specificability might not influence their outsourcing decisions as it did for Japanese firms.

*Requirements volatility* was negatively related to the likelihood of outsourcing among Japanese but not U.S. managers. An interpretation of this can be drawn from a recent study of U.S. IT managers [65], which found that they view requirements volatility as a risk factor outside their realm of control. They might therefore plan for it and put in place extensive software-based requirements management and change tracking tools, which we did not observe in the interviewed Japanese firms. Therefore, requirements volatility might have had no effect on their decision to outsource. In contrast, Japanese managers might view requirements volatility as a greater source of project risk because it can compromise the dependencies among concurrently developed subprojects, only a subset of which are typically outsourced to a vendor. Therefore, Japanese managers are less likely to outsource projects with higher requirements volatility.

## Contributions

The study makes two contributions to the literature on IT outsourcing at the project level. Our primary contribution is offering the first direct comparison of the *relative importance* ascribed by IT managers to the factors from three complementary theories—TCE, agency theory, and knowledge-based theory—to show how managers *simultaneously* consider these perspectives to arrive at a holistic, project-level

outsourcing decision. Although these theories have been invoked in mutual isolation to explain IT outsourcing decisions, no prior study has attempted such systematic, multitheoretical integration. A noteworthy set of findings pertain to how TCE and agency theory complement and contradict the predictions for the knowledge-based variables in the model. The second contribution of the paper lies in evaluating the relative explanatory power of these three *complementary* theories in predicting IT project outsourcing decisions. The secondary contribution of the study is that it is one of the first assessments of the cross-cultural robustness of these perspectives across U.S. and Japanese IT managers.

## Implications for Practice

The results have five important practical implications for both clients and vendors. First, outsourcing decisions are driven predominantly by the *relative* cost advantage of doing so. Vendors must therefore better understand their clients' internal cost structures to successfully win contracts for new projects. Second, interfirm knowledge differences influence outsourcing decisions. For vendors, this suggests the need to convincingly demonstrate how their technical expertise exceeds that of prospective clients. Third, in projects of higher strategic importance, clients' willingness to outsource is heavily influenced by their ability to specify requirements and to keep them stable over the course of a project. Vendors with well-developed capabilities for requirements analysis and requirements management might therefore enjoy an advantage in attracting contracts for strategic applications development projects. Fourth, control over the front-end application design as done by Japanese firms is a novel approach for governance of outsourced projects that might complement the formal and informal control mechanisms used by U.S. managers. Finally, the observed U.S.–Japan differences illustrate how Japanese companies approach outsourcing decisions differently from U.S. companies. This can help non-Japanese software vendors, who have typically struggled to gain a foothold in the burgeoning Japanese market. Likewise, Asian vendors (e.g., Chinese or Indian firms) can use these insights to better understand how various factors influence U.S. managers' likelihood of outsourcing software projects.

## Limitations and Directions for Future Research

Six limitations of the study—three inherent to the conjoint technique—should be considered. First, our hypothetical project scenarios do not represent actual or historical project decisions, although our pretests with industry executives deemed them realistic. This trade-off was necessary to mitigate threats of social desirability bias. Second, although our pretests with managers indicate otherwise, the threat that a fractional–factorial design might result in spurious scenarios that do not exist in practice cannot be completely ruled out. Moreover, the orthogonal design of the conjoint study prevented us from analyzing potential interactions among factors. Third, the constraints on how many attributes could simultaneously be included in the model limited us to just nine project attributes from TCE, agency theory, and knowledge-based theory. This also

constrained the breadth of some measures such as threat of opportunism, which was measured somewhat simplistically as the absence of client-vendor trust. Theoretically, threats of opportunism can also be mitigated through a variety of features of the outsourcing contract. Similarly, a shared identity and culture can also help create shared understanding besides requirements. Future work should examine such less-salient variables identified by these theories that were not considered in our model. There may be also an impact of industry- and firm-level factors on the project manager's initial decision to outsource. Future work should expand this analysis to include other firm-level theories such as the relational view and institutional theory excluded in our project-level model. Since these theoretical perspectives have rarely been used to examine outsourcing decisions, considerable potential for generating novel insights exists in invoking them in future research. Fourth, unrelated to the method, we did not distinguish offshore from domestic outsourcing, which remains open for future research. Fifth, our sampling strategy relied on directly approaching U.S. managers but approaching Japanese managers through sponsorship by the Japanese parent companies. Although the IT managers surveyed in the United States and Japan were involved at comparable hierarchical levels for similar types of projects, this sampling approach might cause differences that cannot be controlled by nationality, experience, and firm size alone. Finally, the Japanese sample size of 33 respondents is on the relatively smaller side. We have therefore cautiously flagged marginally significant relationships ($p < 0.1$) in the results. Since conjoint research designs capture data on multiple project-level decisions from each respondent (providing $33 \times 12$ project-level decision data points), sample sizes as small as 30 respondents would be considered acceptable in studies of this nature.

## Conclusions

This research was motivated by the rich variety of theories that have been invoked to study IT outsourcing in the past two decades but the scarcity of systematic comparisons of the relative importance of these theoretical perspectives in managers' cognitive calculus about project-level outsourcing decisions. Our primary objective was therefore to understand the influence and *relative* importance that IT managers ascribe to various factors in three complementary theories—TCE, agency theory, and knowledge-based theory of the firm—in their IT project outsourcing decisions. We also explored how these theories complement and contradict in their predictions for some factors.

We tested the model using project-level outsourcing decision-making assessments from 55 managers in the United States and 33 managers in Japan. Overall, our results provide strong support for our overarching idea that managers simultaneously consider the salient factors proposed by these three complementary theoretical frameworks in their decision making. The results contribute new insights into the relative importance that managers ascribe to project-level considerations from TCE, agency, and knowledge-based theories; into the relative explanatory power of these theories; and novel

insights into the cross-cultural generalizability and differences and commonalities in IT outsourcing decision making across U.S. and Japanese managers.

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## NOTES

1. We are grateful to an anonymous reviewer for suggesting this point.

2. Both TCE and agency theories utilize arguments related to opportunistic behavior in interfirm relationships. We chose to include it under the TCE umbrella in this model primarily because it is more explicitly and dominantly conceptualized in the TCE perspective.

3. First, the objective of the study was theory testing rather than theory development. The choice of predictors and the direction of predicted relationships was based on three well-established theories. A conjoint research design is appropriate for such theory-testing goals. Second, outsourcing decisions can be politically and organizationally controversial. Therefore managers are likely to be defensive or might provide socially desirable responses if asked about an actual outsourcing decision. Since conjoint profiles are hypothetical and do not require a recall of prior decisions, the approach is less susceptible to social desirability bias and retrospection bias. Finally, prior research on IT outsourcing has only considered one theoretical perspective or a subset of the factors that we examine. A conjoint design allows us to understand how managers *concurrently* consider and weigh all of the nine project characteristics to form an overall decision about whether to outsource a project. The ability to infer the *relative* emphasis that managers place on various drivers of outsourcing decisions is therefore a notable strength of the design.

4. We also considered but eventually dropped for lack of significance the following additional control variables: use of external vendor ratings such as CMM levels or ISO rankings to guide vendor selection, whether the intent of outsourcing in the client firm was for capacity or for skills, the respondent's general IT experience, and the preferred contract structure used in the client organization—that is, fixed price or time and materials.

5. Our follow-up interviews with Japanese managers also provide some additional support for this idea. We found that Japanese managers used a rigorous capability assessment threshold for new vendors. For example, in a project that involved recoding a software application to speed it up, one Japanese firm awarded contracts for a "test project" to three vendors in parallel simply to assess the quality of their work. None of the vendors were aware that the contract was awarded to competing vendors or that the project had already been completed by the client's internal technical staff. To introduce an additional layer of complexity, the client manager intentionally introduced ambiguity into the project's requirements to assess how each vendor would deal with it. Internal technical staff evaluated the completed implementations provided by all three vendors and assessed not only the technical quality of the delivered solution (measured as reduction in query response time) but also the quality of communications with each vendor during the development process. The highest-ranked vendor was then awarded a contract for the actual, more complex project. This provides some additional support for the idea that Japanese managers are less likely to use project complexity in their outsourcing decision-making calculus.

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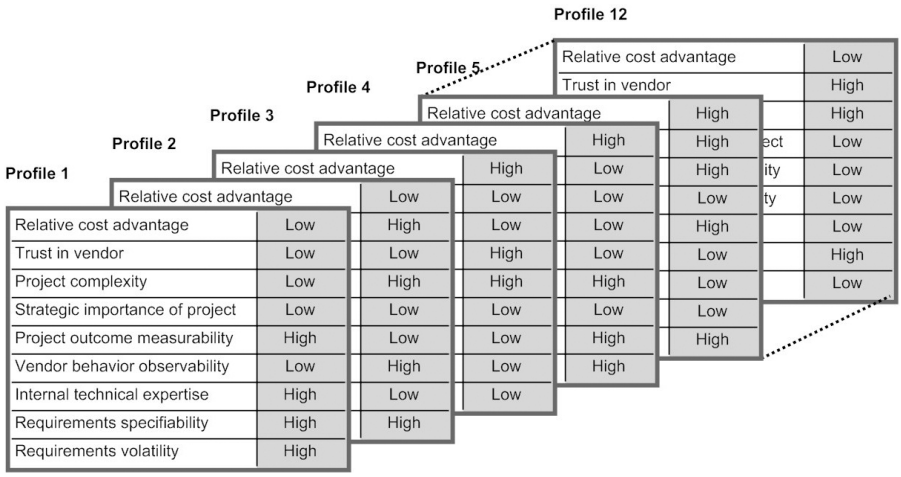
## Appendix. The Conjoint Instrument, Sample Project Profile, Attribute Descriptions, and Levels

The respondents were sequentially presented 12 conjoint profiles (see Table 2) and asked to provide an outsourcing likelihood assessment on a nine-point semantic differential scale for each project profile based on the information provided and their experience and knowledge. Data on the individual-level control variables were collected after the conjoint profile assessments.

### Conjoint Project Profiles




### Dependent Variable Items

1. How attractive would it be for your company to outsource this project?

   Very unattractive 1 2 3 4 5 6 7 8 9 Very attractive

2. What is the likelihood that you would recommend outsourcing this project?

   Very low 1 2 3 4 5 6 7 8 9 Very high

The following definitions were provided to each respondent for each project attribute on a preprinted reference card at the outset of the conjoint survey.

Reference Card with Project Characteristic Definitions Provided to Each Respondent

| Project characteristic | Definition |
|---|---|
| Relative cost advantage | Expected cost savings from outsourcing the project instead of doing it internally in the client organization. |
| Trust in vendor* | The extent to which the client trusts that a vendor will honestly fulfill project obligations, based on the client organization's prior experience with the vendor or on the vendor's reputation. |
| Project complexity | Complexity of the project due to its size or technical novelty. |
| Strategic importance of project | Importance of the project to the client organization's business. |
| Project outcome measurability | Extent to which project outcomes can be precisely evaluated using predefined criteria such as project milestones, schedule, costs, and acceptable defect levels. |
| Vendor behavior observability | Ease with which vendor behavior can be monitored during the development process using on-site staff collocation and project-tracking software. |
| Internal technical expertise | Technical skills and knowledge of the client's technical staff in the outsourced project's domain. |
| Requirements specifiability | Ease with which project requirements can be accurately and completely conveyed to a vendor at the *beginning* of the project through a formal project specifications document. |
| Requirements volatility | Extent to which the business requirements of the project are expected to change during development. |

* Reverse scored to measure the threat of opportunism.