When Do Vendors Benefit from Relational Governance? Contracts, Relational Governance and Vendor Profitability in Software Development Outsourcing

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Abstract

We examine the interacting effect of formal contracts and relational governance on vendor profitability in the software outsourcing industry. We argue that the presence of relational governance is driven by perceptions of exchange hazards. In a departure from extant literature, we propose that its benefits depend on the manner in which exchange risks are shared. Specifically, we hypothesize that relational governance provides benefits to an exchange partner only in those contracts in which they are exposed to greater risk. We test these arguments by examining 105 software projects completed by a software vendor. We conclude with a discussion of the implications of our findings.

Keywords: Software Development, Relational Governance, Contracts, Software Development Outsourcing, Exchange Hazards, Regression Analysis
Introduction

In recent years, relational governance of inter-organizational relationships has emerged as a dominant perspective in vendor-client relationships. Situating the vendor-client relationship in the center of a series of economic and social interactions between organizations (Macneil, 1980; Dyer and Singh, 1998), the relational view emphasizes non-contractual elements of the relationships such as trust (Gulati, 1995), reciprocity and flexibility (Heide, 1994) as safeguards against opportunism. Many researchers (Poppo and Zenger, 2002; Goo, Kishore, Rao, and Nam, 2008) have argued that the effectiveness of these relational mechanisms depends on the level of exchange hazards in the relationship. At lower levels of exchange hazards, simple formal contracts suffice to govern the relationship. As the level of exchange hazards increase in the relationship, formal contracts have to be more complex to effectively govern them (Mesquita and Brush, 2008; Poppo and Zenger, 2002; Ring and Van de Ven, 1992). However, such complex formal contracts are still limited in their ability to rein in opportunism owing to their incompleteness (Williamson, 1979). It is only in these contexts that relational governance plays an important role by augmenting formal contracts, thus suggesting a complementary relationship between formal and relational contracting.

While the use of relational governance in hazardous transactions may be theoretically warranted, there is little evidence that the use of these governance mechanisms indeed create value for all exchange partners (with the possible exceptions of Poppo and Zenger (2002) and Carson, Madhok and Wu (2006)). In addition, most studies appear to implicitly assume that the risk of opportunism, and hence the benefits of relational governance, are symmetric for all participants. In other words, the literature accepts that first, the use of relational governance leads to greater value in the presence of exchange hazards and second, that both vendors and clients benefit significantly from relational governance in all contexts. These two assertions represent gaps in the literature that need empirical validation. We argue that the use of relational governance is driven by perceptions of exchange hazards (such as uncertainty) and the nature of the relationship between the exchange partners. However, in a departure from extant literature, we propose that the benefits from relational governance are dependent on the manner in which exchange risks are shared between contracting parties. Risk-sharing is driven by the formal contract used in governing the exchange. We argue that incompleteness in formal contracts manifests itself through differential risk exposure, i.e. one party to the contract may be more at risk of opportunism from the other in such contexts (Banerjee and Duflo 2000). In such circumstances, relational governance differentially benefits the party that has the higher risk exposure in the exchange. Alternatively, relational governance provides benefits to an exchange partner only in those contracts where they are exposed to relatively greater risk. In formal terms, we hypothesize that the formal contract type moderates the value provided by relational governance to the specific party by varying the risk exposure.

We test these arguments from a vendor perspective by examining 105 software projects completed by an Indian outsourcing software vendor. The software outsourcing industry is characterized by high uncertainty, ambiguous performance measurement and high asset specificity and is thus, highly suitable for testing the use of relational governance (Poppo and Zenger 2002; Goo et al 2008). In addition, there are two formal contracting types used extensively in this setting - Fixed Price (FP) and Time and Material (T&M) (Banerjee and Duflo 2000). These two contract types impose differential risk structures that favor the client (FP) and the vendor (T&M) respectively, allowing us to test our arguments about differential effects of risk sharing and relational governance on project outcomes. We hypothesize and show that the vendor benefits from relational governance only for projects governed by FP contracts. For projects under T&M contracts wherein the vendor faces lesser risk, relational governance provides little or no value to the vendor.

Our study contributes to the literature by clarifying the relationship between risk, relational governance and formal contracts. Specifically, while the complementarity of formal and relational contracting argument suggests that value from relational governance is enhanced in the presence of more complex formal contracts (Poppo and Zenger, 2002; Mesquita and Brush, 2008), our analysis suggests that this value is significant only for the more risk-exposed partner. Second, our work indicates that theoretical arguments pertaining to the benefits of relational and formal governance should depend on the perspective chosen, i.e. whether they are drawn for the more or less risk-exposed partner. Under the reasonable observation that risk is never equally shared in most exchanges due to incompleteness, bounded rationality and parties’ bargaining power (Williamson, 1985; Banerjee and Duflo, 2000; Hart and Moore, 1999), incorporating relative risk exposure into theories of relational governance is needed going forward. Third, most existing work in relational governance has focused on the client (or buyer) perspective, even though theoretical arguments do not differentiate between clients and vendors (Dyer, 1997; Ring and Van de Ven, 1992). In this study,
we explicitly take the vendor’s perspective in developing our arguments, thereby augmenting current literature (Levina and Ross, 2003) by providing a relatively rare counterpoint to the buyer’s perspective. Finally, we use an objective measure of performance – the vendor’s project profitability - in contrast to perceptual measures such as exchange performance (Poppo and Zenger 2002), opportunism (Carson, et al., 2006) and relational risk (Nooteboom, Berger and Noordhaven, 1997) that have been used in extant literature. Not only does this address problems of common method variance, it also tests the potentially beneficial role of relational governance on the metric that arguably is of most interest to the vendor.

Theoretical Background and Hypotheses

A Brief Review of Relational Governance in Vendor-Client Relationships

Relational governance theory argues that while formal contractual parameters such as contingent-claims clauses and adjustment processes (Williamson, 1979) may be useful in reducing contracting hazards in the market, these are not the only options available to contracting parties that help in minimizing the effect of contracting hazards. Specifically, relational governance holds that dyadic relationships are embedded in a broader context of inter-organizational relationships that binds firms (and individuals) into industry-wide networks (Granovetter, 1985; Macneil, 1980; Uzzi, 1997). Such networked relationships provide parties with mechanisms that can be used to reduce exchange hazards, manage disputes and equitably distribute surplus from the exchanges – these mechanisms include trust (Gulati, 1995; Zaheer and Venkatraman, 1995; Nooteboom et al., 1997; Poppo and Zenger, 2002), joint action and reciprocity (Zaheer and Venkatraman, 1995; Heide, 1994), expectations of continuity and fairness (Arzt and Brush, 2000; Heide and John, 1990), reputation and repeated interactions (Kalnins and Mayer, 2004; Dyer, 1997) and relational flexibility (Heide, 1994).

There has been some debate in the literature as to whether the above relational mechanisms are substitutes or complements to formal contracts in governing exchanges (Poppo and Zenger, 2002; Goo et al, 2008). The argument for substitution relies on the logic that if there is trust between the two parties, there is little need for formal contracts. Others have extended this argument to suggest that the presence of formal contracts may actually be inimical to the development of relational norms since they may signal distrust (Ghoshal and Moran, 1996). The complementary view, on the other hand, accepts that most complex exchanges start with a contract. Contracts in such exchanges, though necessarily incomplete, set the basis for development of the relationship. Over time, as relationship norms evolve, parties may either ignore or modify the formal contract to reflect changing ground realities. Thus, relational norms complement the presence of formal contracting in allowing parties to better manage exchange hazards. More specifically, relational governance is most relevant in contexts where exchange hazards arising from uncertainty, ambiguous outcome measurement and asset specificity are high since it is precisely in these contexts that formal contracts are inadequate in governing the exchange.

Several studies have empirically established this hypothesized relationship between the use of relational governance and exchange hazards. Zaheer and Venkatraman (1995) showed that high uncertainty in the exchange was associated with increased use of relational governance in the insurance industry. Similarly, higher asset specificity was associated with greater reliance on relational norms (Nooteboom et al, 1997; Heide and John, 1990). Heide (1994) showed that the presence of asset-specific investments in marketing channels by buyers induces the use of relational governance as a safeguard against opportunism. Similar results have been observed in the relationship between exchange hazards and relational governance in Goo et al (2008), Dyer (1997), Poppo and Zenger (2002), Mellewigt, Madhok and Weibell (2007), Wathne and Heide (2004) and Chen and Bharadwaj (2008). However, a careful examination of this empirical evidence reveals two significant gaps. While these studies are premised on the argument that relational governance can mitigate the effects of significant exchange hazards, most studies have merely tested for the existence of relational mechanisms in the presence of exchange hazards. A much smaller subset has studied the use of relational governance in the presence of formal contracts. Germane to our arguments, very few papers have examined whether the use of relational governance is truly effective in enhancing relationship outcomes (with some exceptions such as Poppo and Zenger (2002) and Carson et al (2006)). In other words, existing studies on relational governance have implicitly conflated the use of relational governance with its benefits. While many of these studies have explicitly studied the conditions under which relational governance may be used, there is little work addressing the actual benefits that accrue from their use in monetary or objective terms. Thus, while the
use of relational governance in certain transactions is theoretically justified, the question of whether there is actually any evidence of value-creation from relational governance in these settings remains an open question.

A second assumption in this literature is that the risk of opportunism, and hence the benefits of relational governance, have been assumed, albeit implicitly, to be symmetric for all participants. In other words, both vendors and clients are assumed to benefit significantly and equally from relational norms. The arguments for relational governance provided in seminal papers in the literature (e.g. Ring and Van de Ven (1992) and Macneil (1980)) assume that both parties face ex post opportunism in uncertain transactions and therefore would benefit from relational norms. Again, there is little work on establishing differential benefits accruing from relational governance to different parties; in general, the operating assumption has been that relational governance provides benefits to all parties. However, this assumption may appear simplistic. Since relational mechanisms are necessary to govern exchange risks and thereby reduce opportunism, the benefits from relational governance should necessarily be driven by the manner in which exchange risks are apportioned in the relationship. The substitution versus complementarity debate downplays the fact that the formal contracts governing the exchange are, at their core, risk-sharing mechanisms (Eisenhardt 1989). In addition, most formal contracts in the real world are incomplete (Hart and Moore 1999), i.e. it is not possible for contracting parties to anticipate all contingencies that might emerge and specify appropriate payoffs. This residual incompleteness manifests itself through differential risk structures that benefit one party more than the other (Banerjee and Duflo 2000). Therefore, the benefits from relational governance should differentially flow to the party that faces more risk in the exchange, suggesting that the benefits of relational governance are not uniformly positive for both partners.

We examine these two gaps in the literature in the context of the software outsourcing industry by developing two theoretical models. We first hypothesize that the use of relational governance should be associated with high exchange hazards and the nature of the relationship. We then argue and hypothesize that for the same inter-organizational relationships (projects), the marginal value-creation from relational governance for the vendor is significantly higher in only those projects that are governed under contracts that expose him/her to relatively greater risk. The first step of our modeling thus predicts use of relational governance while the second step evaluates the benefits thereof; in our analysis, we therefore clearly differentiate between the use of relational governance in an exchange and the benefits that may arise. In addition, we examine whether the use of relational governance leads to monetary (objective) outcomes in the exchange, as opposed to subjective outcomes which may, by definition, be biased as a result of relational norms. As noted above, the contract determines which party bears greater relative risk in the project. The benefits thus depends on the perspective (vendor or client) taken in the analysis leading to the larger point we seek to make - that payoff from relational governance for the same relationship or project may not be symmetric across both parties. In this study, we take the vendor’s perspective in developing our arguments and use the formal contract in its original avatar - as an instrument to partition risk, to study the extent to which the formal contract influences the vendor’s benefits from relational governance.

**A Model for Use of Relational Governance in Software Development Outsourcing**

Information technology (IT) outsourcing refers to the use of external agents to perform IT activities or functions that were previously performed within the organization. In this paper, we focus on outsourced software development projects, contracted individually on a turnkey basis. Each project represents a separate and identifiable series of tasks or activities undertaken to achieve a specific information systems objective within certain technical specifications, with defined start and end dates, and subject to funding limits and resource availability (Pressman, 2005). Outsourced software development projects are characterized by many of the basic constructs that have been shown to increase exchange hazards for the vendor within relational exchange theory (Ring and Van de Ven, 1992). First, there is considerable uncertainty in the process of managing the project. Uncertainty emerges from the very nature of software development (Pressman, 2005) in that it is difficult to predict the interaction between client requirements, technical parameters, team/manager experience and technology platforms in the project ex ante. Second, significant measurement difficulties are associated with outsourced projects (Alchian and Demsetz, 1972) due to the ambiguous and intangible nature of software services in general (Nayyar, 1993). For instance, it is hard to establish ex ante targets for quality or costs or measure them accurately ex post due to project uncertainty as well as ambiguity in their definition and measurement (Nayyar, 1993; Pressman 2005). Third, vendors need to make asset-specific investments in the project. For instance, a project may require technical staff trained in Java, C++, Oracle as well as expertise with the transportation industry. While technical knowledge per se may be acquired more easily in...
the market, the combination of technical knowledge and experience is a valuable resource not easily acquired in the market (Mata, Fuerst and Barney, 1995). Finally, outsourced software projects tend to be idiosyncratic in that no two projects within the same domain may be similar. The presence of these features in outsourcing projects thus leads to considerable levels of exchange hazards in the relationship, particularly for the vendor.

Within the transaction cost framework, the response to exchange hazards has been to devise more complex contracts as possible safe-guards (Williamson 1985). Complex contracts that specify contingent-claims clauses can, in theory, help by mitigating the risk of opportunism and hold-up in the relationship for both parties (Macho-Stadler and Perez Castrillo, 2001). Within the outsourcing area, there are two omnibus contract types that are typically observed - Fixed Price (FP) and Time and Materials (T&M) (Banerjee and Duflo, 2000; Gopal, Sivaramakrishnan, Krishnan and Mukhopadhyay, 2003; Ethiraj, Kale, Krishnan and Singh, 2005). We note that these are all software contracts, as opposed to differing services that may be contracted out within the gamut of IT outsourcing (Domberger et al, 2007). FP contracts specify a fixed amount to be paid to the vendor in exchange for completion of a specified project. T&M contracts, on the other hand, are cost plus contracts where the vendor’s services are bought at a specified billing rate. FP contracts are riskier for the vendor since cost and schedule over-runs are borne by the vendor, while T&M contracts are riskier for the client (Banerjee and Duflo, 2000). Clearly, the choice of contract for a project is critical and prior research shows that risk perceptions and parties’ bargaining power have a role to play in contract choice (Gopal et al, 2003; Kalnins and Mayer, 2004). The critical point here is that notwithstanding the conditions under which either contract type is used, most contracts in the outsourcing area are incomplete for the same reasons described above, i.e. the underlying transaction is prone to exchange hazards. Thus, there is considerable potential for opportunism for both parties in the project, even in the presence of formal contracts, thus necessitating relational governance. Researchers have argued that two broad sets of factors determine the use of relational governance in vendor client relationships. The first set, as we noted above, relates to exchange hazards. The second set relates to the nature of the relationship between the partners. We propose individual hypotheses around these two sets of factors next.

**Exchange Hazards**

In the outsourcing context, two of the greatest sources of uncertainty for the vendor pertain to unstable client requirements and asset specificity on the project (Pressman, 2005; Nidomolu, 1995; Banerjee and Duflo, 2000). Changing requirements are an unfortunate consequence of the intangible nature of software outsourcing; in some instances, requirements can only be expressed in an inexact form. Some projects exhibit greater requirements instability due to the domain or technological platform of the project. Changing requirements affect project outcomes such as service quality, cycle time and efficiency. From a vendor perspective, high requirements uncertainty necessitate considerable rework which adds to project costs. More importantly, it implies significant redesign while simultaneously affecting quality and potential delays in completion. It also affects the deployment of personnel as well as project schedules leading to significant impact on the vendor’s project management requirements. Under such circumstances, it seems likely that vendors would seek flexibility in the way the contract parameters are interpreted in order to offset the negative effects of changing requirements.

In a similar vein, tight labor markets and a premium attached to skilled personnel make human asset specificity a significant hazard (Ethiraj et al, 2005; Lacity and Hirschheim, 1993). Software outsourcing depends on the extent to which the vendor’s human resources are specifically invested in the project (Poppo and Zenger, 2002). These investments are built upon either hiring specifically trained personnel for the project or training existing personnel specifically for the project’s needs. While this training may be leveraged in other projects, the extent to which this training is specific to the current project will limit the vendor’s alternative options, possibly from project termination or changing business dynamics. Under such contexts, relational norms such as trust facilitate the deployment of such asset specific investments by the vendor. Thus, increases in the vendor’s human asset specificity should be associated with an increase in the use of relational governance. While the above argument addresses the risks of opportunism from the client side, this factor affects vendors from the supply point of view as well. Tight labor markets imply that these specialized resources are at a premium, resulting in potential employee turnover (Ethiraj et al, 2005). Here again, the implications of high asset specificity and turnover affect the vendor’s costs as it involves considerable training upfront and significant losses when trained personnel leave. More importantly, frequent reshuffling of the project personnel leads to disruptions in the way the project is designed and managed resulting in adverse implications for quality and meeting delivery schedules. Therefore, vendors are likely to seek flexibility in
the interpretation of contract parameters with regard to quality and delivery schedules, suggesting the increased use of relational governance. Hence, we propose:

**Hypothesis 1a:** Greater requirements uncertainty is associated with greater relational governance in the vendor-client relationship.

**Hypothesis 1b:** Greater presence of employee turnover from the vendor project team is associated with greater relational governance in the vendor-client relationship.

**Hypothesis 1c:** Greater vendor human asset specificity in the project team is associated with greater relational governance in the vendor-client relationship.

### Relational Factors

While exchange hazards (on the vendor’s demand side) are seen as determinants of relational governance in the literature, other factors act as antecedents by enabling the development of appropriate norms between client and vendor - these are often referred to in the literature as relational norms. In most cases, researchers have tended to equate relational norms with relational governance. It is important to distinguish relational norms from the actual instantiation of relational governance in the specific project. Relational norms provide the conditions under which parties can institute relational governance in managing the exchange (Poppo and Zenger, 2002); however, the actual use of relational governance may not occur even when the norms are in place. In other words, relational norms can be viewed as critical inputs to the use of relational governance. In our analysis, we are interested in relational governance as an outcome, i.e. the extent to which relational governance was actually reflected in the relationship through the vendor’s perspective. Thus, we differentiate between relational norms (as inputs) and observed relational governance (as an outcome) but consistent with extant literature, we hypothesize that the presence of relational norms is an important determinant of the use of relational governance in the relationship.

One of the primary antecedents of relational governance is trust between the client and vendor (Gulati, 1995; Zaheer, McEvily and Perrone, 1998). Trust is an important determinant of relational governance since it allows the contracting parties to go “beyond the contract” in establishing norms and practices built on expectations of reciprocity, fairness and future business. The presence of prior interactions between vendor and client has been shown to enhance trust in the exchange (Kalnins and Mayer, 2004; Sabherwal, 1999; Poppo and Zenger, 2002). Prior interactions result in greater understanding between the partners as to their motivations, goals and objectives. Specifically, the greater the level of prior interactions between the vendor and the client, the greater is the trust in the relationship and the higher are the chances that relational governance will be used in the specific project (Ring and Van de Ven, 1992; Dyer, 1997). Therefore, we propose:

**Hypothesis 2a:** The greater the number of completed projects for the same client, the greater will be the relational governance in the client-vendor relationship.

For the vendor, a significant factor that drives institutionalization of relational governance in the project is expectations of the client’s capabilities (Ethiraj et al, 2005). There are several roles that the client plays in these settings. First, the client is vital in terms of knowledge-sharing that is essential for most projects. Software development outsourcing is an interactive process, as evidenced by the project description given earlier, and the business domain knowledge resident in the client is critical in providing quality services. Prior literature in knowledge-sharing and boundary spanning attests to the critical role that client abilities play in enabling successful projects (Gopal and Gosain, 2008; Levina and Vaast, 2005). Second, the client plays an important coordination and control role within the exchange (Mellewigt et al, 2007). This role pertains to the ability of the client to provide value-added input to the vendor on open issues in the project, act as a controller and provide feedback on various technical and project-related matters. Finally, the clients’ experience is critical in terms of his/her understanding of the difficulties inherent in the software development process and is thus a factor in predicting his/her willingness to be flexible in the interpretation of the contract terms. The greater the extent to which the client MIS department is able to manage these roles through its capabilities, the greater is the probability that relational governance will be observed in the project. Inadequate client capabilities will increase costs of relational governance for the vendor (Ring and Van de Ven, 1992), making it harder to justify in the specific relationship. Thus, we propose:

**Hypothesis 2b:** Greater client MIS department experience with outsourcing is associated with greater relational governance in the vendor-client relationship.
The Moderating Effect of Formal Contract Type on the Value of Relational Governance

Hypotheses 1 and 2 describe the role of relational and exchange factors in determining the use of relational governance in the project. However, equating the use of relational mechanisms with its effectiveness may not be valid. Implicit in the literature is the assumption that the cost of developing relational mechanisms is outweighed by the benefits accruing from it. However, as we noted earlier, the extent of benefits depends on the level of risk assumed by each of the exchange partners. While Poppo and Zenger (2002) have shown that the use of formal contracts and relational governance are complements in their seminal paper, we extend this analysis by arguing that this complementarity may be more nuanced and contingent on whose perspective (the party facing relatively greater risk or relatively lesser risk) is adopted.

Consider the FP contract. In this contract, the vendor’s revenues are fixed. Therefore, any materialization of unforeseen risks on the project is likely to endanger the vendor’s bottom line and hence, the vendor’s risk exposure is higher. Moreover, the incompleteness of formal contracts in software outsourcing allows some leeway in the extent to which contractual parameters can be interpreted by contracting parties in the project. In such situations, observed extra-contractual flexibility in interpreting the contract benefits the vendor by mitigating some of the adverse effects of incompleteness and risk exposure. The presence of relational governance allows the vendor and client together to mutually adjust project parameters ex post in spite of the presence of ex ante parameters that may not be attainable; indeed, this is one of the primary benefits of relational governance discussed in the literature (Dyer and Singh, 1998). For instance, the contract may stipulate a certain level of quality required from the vendor ex ante; as the project unfolds, it is possible that due to the uncertain nature of software development, these specific quality targets may not be achievable for reasons outside the vendor’s control. Relational governance allows the vendor to work together with the client in ensuring that the vendor’s payoff from the project does not suffer. In the absence of such flexibility, this is less likely to occur. Similarly, consider the warranty conditions that are specified ex ante during contracting. Again, information revealed during development could induce relatively high costs on the vendors to reach warranty conditions, affecting its profitability. Relational governance along this dimension will allow the vendor and client to jointly work together towards ensuring that the “spirit” of the contract is retained rather than the “letter” of the contract, thereby enhancing the vendor’s value from relational governance.

Within the T&M contract, the vendor’s risk exposure and incentives operate along different lines. The vendor bears lesser risk in this contract type and its incentives are weaker; therefore, the impetus to protect its bottom line from fluctuations in project parameters that might emerge during development is muted. Any rework or change in specification does not reduce the vendor’s margins in any significant manner; rather, the vendor’s incentives are perversely aligned towards increasing the extent of work on the project. Thus, while relational governance may be institutionalized between the vendor and client on a project, the extent to which these governance mechanisms are associated with vendor profitability will be less pronounced than the FP regime. Consider the case discussed above regarding quality; in a T&M contract, the vendor will be willing to satisfy the stipulated ex ante quality parameters on the project even if it takes greater effort than anticipated because its profitability is protected through the structure of the T&M contract. In the event that the client steps in to control or modify ex ante quality parameters on the project, it will not result in an inordinately large impact on the vendor’s profitability since its margins are in any case protected. Thus, the presence of relational governance does not directly influence the vendor’s profitability within T&M contracts to the extent that it does in FP contracts. Similarly, the presence of strict ex ante warranty conditions do not represent a threat to vendor profitability that need to be mitigated by relational norms, in comparison to FP contracts. In summary, we argue that the value created for vendors from relational governance will be greater in FP contracts than in T&M contracts. Therefore,

Hypothesis 3: There will be a greater positive association between relational governance and vendor profitability in FP contracts than in T&M contracts. In effect, the contract type will moderate the relationship between relational governance and vendor project profitability.

Research Methodology

The data for this paper was collected on projects completed by a leading software services firm in Bangalore, India. The firm employed around 5000 people at the time of data collection. Its primary area of expertise is software development and maintenance of business systems. Focusing on a single vendor enables us to control for geographical and cultural variations between projects which has been hypothesized to affect the dynamics between
vendor and clients in the outsourcing context (Davis, Ein-Dor, King, and Torkzadeh, 2006). In addition, the use of micro-level firm-specific data was also helpful in controlling for project characteristics that might not be clear in larger industry-wide samples (Ethiraj et al. 2005; Kalnins and Mayer 2004). A random sample of 120 projects from the projects completed by the firm over a two-year period was identified for cross-sectional data collection. We sought two sources of data for each project. The project manager in charge of development provided information pertaining to the technical variables from the project while the business unit manager was the source for relational governance on projects.

From the 120 projects identified, we were able to collect data on 105 projects; the remaining project data was not complete due to the unavailability of project managers or business unit managers due to travel and attrition. Of the final sample of 105 projects, 61 were FP contracts and 44 were T&M contracts. The ratio of FP to T&M projects in our sample was obtained through a random project selection process and is similar to other published work (Ethiraj et al 2005; Banerjee and Dufo 2000). Primary data was collected through two questionnaires that were developed based on prior research in software outsourcing and governance. The questionnaires were pre-tested at the research site by members of the quality assurance group before they were administered to project and business unit managers. One questionnaire concerning project-level information was completed by project managers who ran day-to-day operations on the project. The second questionnaire included information about the business environment around the project as well as on vendor-client relationships and was completed by the business unit manager. Finally, we collected objective project-level data such as contract type and profitability from company databases. Summary statistics and questionnaire items used, available from the authors, are not presented here in the interest of space.

**Variable Measures**

The focal variable in this paper is relational governance. As discussed above, we measure the use of relational governance as an outcome observed in the exchange rather than the presence of relational norms such as trust. In addition, by definition, relational governance represents post-contractual aspects of the exchange in that these are not stipulated in the contract but represent what actually transpired during the length of the project. Thus, our measure of relational governance should capture the extent to which the parties actually went beyond the formal contract. As Poppo and Zenger (2002) point out, relational governance involves the institutionalized adaptation to unforeseen circumstances that may arise within the economic activity. This suggests that parties are willing to negotiate adjustments to existing processes and procedures used in completing the task as environmental or organizational factors change (Heide, 1994). These processes may not be written down in explicit form but are left open-ended such that adjustments can be made as and when required. Willingness to make such adjustments post-contract requires the existence of trust and forbearance between the parties which allows for greater protection of mutual investments that exchange partners may have made in the relationship (Macneil, 1978). Since there were few prior measures that captured this in the literature on software development outsourcing specifically at the time of data collection, through discussions with senior executives at the research site, we identified five specific areas where relational governance would be apparent if used in a typical project from the vendor’s perspective. Note that a corresponding measure of relational governance from the client’s perspective would differ considerably since the observed elements of relational governance would likely be different (Anderson and Narus, 1990; Wathne and Heide, 2004). The five areas of relational governance from the vendor’s perspective pertain to payment procedures, warranty and liability conditions, installation and testing procedures, disputes resolution and project management. These factors match well with case-based work in outsourcing projects (Lacity and Willcocks, 1998) that identified potentially problematic aspects of outsourcing engagements. Therefore, relational governance was measured using five items representing observed flexibility on the project along these dimensions (Cronbach’s alpha = 0.81).

This information was provided by the business unit manager, who is in the best position to provide this data from a key informant viewpoint. S/he is responsible financially for the project and is also usually the executive liaison between the vendor firm and the client (Gopalakrishnan, Kochikar and Yegneshwar, 1996). More importantly, as the person responsible for the project, s/he understands the consequences of relational governance and works closely with the client in establishing relational norms for the project. Using the business unit manager for relational flexibility also removes the risk of common method bias in analysis since the dependent variable is captured from a different person than the respondent for the independent variables.
The second key variable in our analysis is project profit, which is measured as the difference of the revenue accruing to the project and the total costs allocated to the project. The cost of the project includes all project costs, including overheads and apportioned costs. This data was collected from the company databases for each project and is used by the research site for their accounting purposes.

The contract type is a binary variable, with 1 for T&M contracts and 0 for FP contracts. Prior projects for the same client are measured by the number of projects completed; this variable was extracted from company databases. Requirements instability (Cronbach’s alpha = 0.90) was measured by four questionnaire items adapted from Nidomolu (1995) and was provided by the project manager. Employee turnover (Cronbach’s alpha=0.73) is often difficult to measure accurately since personnel occupy different levels of importance in a team. The loss of a project manager is more keenly felt than the loss of a programmer. Therefore, rather than using the number of members leaving the team during the project, we use two questionnaire items that were filled out by the project manager.

Human asset specificity (Cronbach’s alpha = 0.77) in the project was measured as the extent to which trained people were deployed in the project and is adapted from Lacity and Hirschheim (1993). Three questionnaire items were used in measurement and the data was provided by the project manager. Finally, Client MIS Experience (Cronbach’s alpha = 0.77) was operationalized using four questionnaire items adapted from Lacity and Hirschheim’s (1993) discussion of the importance of the client’s monitoring experience. This was also provided by the project manager.

In addition, we include control variables extracted from company databases. Project size is included as a control variable and is measured as the total effort on the project (Gopal et al., 2003; Ethiraj et al., 2005). Project duration is used as control since prior research suggests that relational governance is more likely for longer projects, all else being equal (Dyer, 1997). Team size is included as a control since larger teams are harder to manage and represent a source of risk in the project (Guzzo and Dickson, 1996). Finally, we control for project type, which is a binary variable denoting whether the project involved new development or re-engineering of existing systems. Development projects involve new requirements and platforms while re-engineering projects involve existing requirements but new platforms. Development projects are coded 0 and re-engineering projects are coded 1.

**Data Analysis**

As a first step in our analysis, we established that the perceptual measures have construct and discriminant validity. The questionnaire items pertaining to the independent and control variables were subjected to a factor analysis with varimax rotation (results not shown here). The items loaded well on underlying constructs with factor loadings of over 0.60, while the cross-loadings were less than 0.35, indicating acceptable discriminant validity (Hair, Anderson, Tatham and Black, 1998). In addition, in exploratory factor analysis, each set of items for a construct loaded well on one underlying factor with the variance captured by the first factor lying between 55% and 75%. These tests indicated good convergent validity. In addition, as shown above, each of the constructs showed good reliability with Cronbach’s alpha of over 0.70. We also calculated the internal consistency reliability indicator (Venkatraman, 1989), which captures the ratio of the latent construct variance to the construct plus error variance, for each of our constructs. Venkatraman (1989) has indicated that composite reliability of at least 0.50 is acceptable, i.e. at least 50% of the measured variance is captured by the construct. All of the constructs display composite reliabilities of over 0.50. The construct variables were thus created by averaging the individual items pertaining to each construct for use in subsequent analysis.

The following generalized models were estimated for relational governance and project profitability respectively:

\[
\text{Rel Gov} = f(\text{Effort, Duration, Teamsize, Project type, Prior Projects, Requirements Instability, Employee Turnover, Human Asset Specificity, Client MIS Experience, Contract}) + e1
\]  
(1)

\[
\text{Profit} = f(\text{Effort, Duration, Teamsize, Project type, Prior Projects, Requirements Instability, Employee Turnover, Human Asset Specificity, Client MIS Experience, Contract, Rel Gov}) + e2
\]  
(2)

We conducted the empirical analysis in stages. First, we used OLS to estimate both equations. Before using OLS, we tested for the assumptions of the OLS model in both equations. The normality of the residuals was tested using the Shapiro-Wilks test which indicated no violation of the normality assumption (Greene, 1997). We tested for
heteroskedasticity in each equation through the Breusch-Pagan test, which failed to reject the null of homoskedasticity in each regression. No significant outliers were identified through the use of Cook’s distance measures (Belsley, Kuh and Welsch, 1980). We also tested for multi-collinearity in both models. The variance inflation factors in our analysis were under 2 in both equations and the condition indices were much lower than the threshold value of 15 identified by Belsley et al. (1980). While the correlations indicate high correlation between effort and duration (0.52, p<0.05) and profit and effort (0.71, p<0.05), this is not surprising since larger projects should, ideally lead to larger unadjusted profits.

The baseline OLS results for both equations are provided in Tables 1 and 2. In order to reduce collinearity from the interaction variable, we centered all the variables in the model for profit. In addition, for the profit equation (2), we introduced the interaction term Rel Gov X Contract in order to test Hypothesis 3. The OLS results of the base model with the interaction term are provided in the second column of Table 2. Since both governance and profit models are estimated on the same dataset, it is possible that the error terms e1 and e2 are correlated. Using this information in the estimation would provide more efficient estimates of the coefficients. Therefore, we estimated Seemingly Unrelated Regression (SURE) coefficients for the two equations (Greene, 1997). These results are provided in column 2 of Table 1 for relational governance and column 3 of Table 2 for profit.

The above analysis assumes that relational governance and contract type are exogenously chosen, which may be unrealistic. Specifically, relational governance could be driven by expectations of profitability or from relational norms from previous projects, rendering it endogenous. Similarly, prior research suggests that contract choice may be endogenous (Gopal et al., 2003; Carson et al., 2006), manifested as an omitted variable bias (Maddala, 1983). These factors would lead to biased OLS coefficients. We therefore conducted endogeneity tests for both relational governance and contract choice. For relational governance, we used a two-stage least squares model by specifying a set of instrumental variables. Since the instrumental variables should ideally be uncorrelated with profitability to provide efficiency, we used four instruments—availability of functional requirements for the project (binary), client size (number of employees), number of prior projects for the same client and the extent of financial risk in the project relative to the vendor’s existing projects (measured on a 5-point Likert scale). The first two of these instruments pertain to the client’s propensity to use relational governance while financial risk and prior projects correlate with the vendor’s propensity. The 2SLS estimates are shown in column 4 of Table 2. Note that this analysis does not include the interaction term since the endogeneity of governance renders the resulting interaction term endogenous as well and therefore biased and inconsistent (Harrison, 2008).

Turning to the endogeneity of the contract, we use the Heckman two-stage correction for endogeneity (Maddala, 1983). The procedure involves estimating a first-stage contract choice probit model and calculating the Inverse Mills Ratios (lambdas), which are then introduced into the second-stage governance and profit equations as an independent variable. This procedure accounts for the endogeneity of the contract and controls for the effects of any omitted variables. We used the probit contract choice model estimated in Gopal et al. (2003) to calculate the predicted probabilities. We then estimated both the relational governance and profitability equations with the inverse Mills ratios included. The results of this analysis are shown in column 3 of Table 3 and column 5 of Table 4. Here too, as before, the interaction variable is omitted since it is endogenous. However, we approximate the interaction effect by running the Heckman sample-selection model on the contract subsets; in other words, we estimate two separate profit equations for the FP and T&M regimes respectively using a switching regression framework (Maddala, 1983). While the detailed results are not shown here in the interest of space, the coefficient of relational governance on profits in the FP regime is significant and positive (136630, p<0.05) while the coefficient in the T&M regime is not significant (-29647.20, p>0.39) which, as we discuss later, are consistent with the results from the other models. In general, the results are similar across all the different models testifying to the robustness of the findings. Though contract endogeneity is a significant issue, the absence of differences in the empirical results does not indicate that endogeneity is absent. Thus, in the interest of robustness, we provide all the results after accounting for endogeneity. For ease of exposition, however, we focus on the OLS models in our discussion.

Results and Discussion

Table 1 provides the results for our model of relational governance and shows that all estimated models have significant F-statistics and high R2 values, indicating model strength. Hypothesis 1a pertains to the effect of requirements uncertainty on relational governance; the results show that this hypothesis is strongly supported (0.223,
p<0.01). Similarly, hypothesis 1b and 1c, addressing the impact of employee turnover and human asset specificity respectively on relational governance are also supported (0.21, p<0.05; 0.258, p<0.01). These results strongly support our hypotheses that relational governance is typically observed as a response to higher exchange hazards in the project and thus, are entirely consistent with theory.

Hypothesis 2a argued that greater the prior interactions between client and vendor, the greater would be the prevalence of relational governance in the project; we see support for this argument as well (0.017, p<0.05). As trust is built based on previous interactions, current exchanges feature relational norms that may not be present if this were the first project being completed for the client by the vendor. Similarly, client MIS experience is significantly associated with relational governance, showing support for hypothesis 2b (0.54, p<0.05). While prior research has argued that this may be the case, our model establishes this result empirically. In sum, our results are consistent with predictions from prior research, providing further support for the validity of our relational governance measurement.
It is noteworthy that the contract type does not affect relational governance in this model; this is an interesting finding in our context. It shows that while exchange hazards enhance the probability of relational governance being used, the contract that formally governs the project appears to have little impact on the use of relational governance. In other words, there is little systematic variation across T&M and FP projects in the use of relational governance. More specifically, while project risk, captured by exchange hazards in the transaction, is associated with relational governance, risk-sharing has no effect.

We now consider the results with respect to project profitability. As noted earlier, in order to simplify the exposition, we focus on the OLS results shown in the first two columns of Table 4. First, we observe that consistent with previous research, the contract variable is significant (54268, p<0.05), indicating that vendor profit is higher in T&M projects (Ethiraj et al, 2005; Gopal et al, 2003). Second, the direct effect of relational governance is positive and significant (72816, p<0.05), showing that relational governance has value even in the presence of formal
contracts. This result is consistent with Poppo and Zenger (2002); in the presence of formal contracts, observed relational governance still adds value for the vendor by enhancing profitability.

Hypothesis 3 argued that the positive marginal effect of relational governance on profit, if any, would be higher in FP than in T&M contracts. As shown in column 2 of Table 4, this is tested using an interaction term, which is negative and significant (-118635, p<0.05), showing that vendor profitability is indeed higher in FP regimes than in T&M regimes. The difference in R2 is significant at p<0.05, showing support for the observed moderation effect. To better understand the implication of this result, we plot the interaction in Figure 1, with high (low) relational governance at mean + (-) one standard deviation and other variables held at their means. The resulting plot is surprising; in the FP regime, the net benefits from relational governance are significantly high. However, in the T&M case, the net benefits from relational governance are negligible (the line’s slope is insignificant). Our analysis shows that in T&M contracts, the vendor does not gain any value from relational governance whatsoever, beyond the risk-protection that the formal contract provides. In other words, the direct effect of relational governance on vendor profitability observed earlier seems to be entirely driven by FP projects.

**Figure 1: Interaction of Relational Governance and Contract Type on Profitability**

In summary, our findings provide support to our thesis that while vendors and clients in risky and uncertain exchanges use relational governance mechanisms as safeguards against opportunism independent of risk exposure, these relational mechanisms provide value to the vendor only in riskier settings. In a rather startling result, we discover that when risk is covered adequately by the formal contract, there are no discernible benefits from relational governance for the vendor even in transactions of an idiosyncratic and uncertain variety. Recall that our hypothesis had argued only for a lesser impact of relational governance in T&M contracts but not an insignificant impact. This raises a striking paradox; if relational governance is costly, why would vendors (or clients) cultivate these mechanisms in the project even in conditions where they provide no value? As we noted earlier, our model of relational governance as a function of exchange hazards and relational factors receives significant support, suggesting that our measures of relational governance are not inconsistent with the literature. We therefore consider some alternative explanations for why relational governance may be observed in T&M contracts.

Our analysis focused on profitability as indicative of value creation but it is possible that relational governance provides benefits to the vendor along other dimensions in T&M projects. For instance, it is possible that relational governance helps in creating reputation effects that may have positive externalities (Banerjee and Duflo, 2000). Alternatively, relational governance may allow the vendor to achieve higher quality in T&M projects where the client drives project parameters. Finally, customer satisfaction is associated with relational governance and therefore, relational norms in T&M projects may lead to higher customer satisfaction which again may translate into future business. As argued earlier, since clients face relatively higher risk of opportunism in T&M contracts, their payoff from relational governance may include not only the delivery of software but also higher customer satisfaction. There is little current research on the effects of contracts on customer satisfaction in software outsourcing projects to clearly establish this notion. A second explanation for the use of relational governance in T&M projects could arise from managerial inertia (Hodgkinson, 1997). Evidence suggests that managers may not modify their strategic responses to environmental conditions that are in flux or uncertain; this inertia often leads to misalignment between the routines developed by managers and the underlying task characteristic (Collinson and
Wilson, 2006). This situation in the case of relational governance could be compounded by lack of clear feedback on the value created by these norms. For instance, vendor managers might accept that relational norms are important in technology-based projects but may not be aware of the difference in value generated by these norms in different contractual regimes. In such a situation, adopting similar governance mechanisms across all projects is a reasonable strategy. Our analysis is the first in the literature to suggest that benefits from relational governance are asymmetric; it also highlights the need for studies that explore the nuances of relational governance in various settings and provide more fine-grained arguments for when relational norms should be used, based on the value they create.

Implications and Conclusions

We started this paper by noting that extant literature on relational governance assumed that while certain transactions demanded relational mechanisms, these mechanisms would add symmetric value to all participants. We designed our analysis to test the validity of these assumptions; we started by estimating a model of observed relational governance in outsourced software projects based on features of the transaction. Subsequently, we hypothesized that risk exposure, inherent in the form of contract used, will determine the extent to which relational governance will enhance specific outcomes for participants. Our results are relatively stark — relational governance has a negligible net effect on project profitability for vendors in T&M contracts. The literature on software outsourcing suggests that roughly 40% of outsourced software projects are governed using T&M contracts (Kalnins and Mayer, 2004; Gopal et al, 2003; Ethiraj et al, 2005); our results thus suggest that for 40% of the projects in a typical portfolio, there appears to be low payoff from investing in relational governance for the party bearing the lesser proportion of risk.

This result has significant implications for managers. First, while relational norms may be valuable in transactions with high exchange hazards, managers need to pay more attention to the cost of developing and using these mechanisms. In much of the literature, this cost element is either absent or underemphasized. In our analysis, though we do not measure cost, our measure of project surplus includes the element of cost. While risk-exposed parties will benefit from relational norms (such as the vendor in FP contracts), in T&M contracts, the reliance on these norms may need to be weighed against the costs incurred. Second, while formal contracts may foster the growth of relational norms as argued by Poppo and Zenger (2002), these formal contracts also provide avenues by which the value from relational governance can be enhanced. Thus, for vendors, relational governance adds value in FP contracts and its use must be enhanced. This is consistent with Poppo and Zenger’s arguments. However, in T&M contracts, the vendor manager is better advised to not expect any value addition (in the form of project profitability) from these mechanisms. Note that the asymmetric nature of risk-sharing indicates that in T&M contracts, the client will be incentivized to institute relational norms. Our analysis thus points to an interesting dichotomy. While relational mechanisms are developed and maintained at a dyadic level, our analysis suggests in any exchange only the party bearing more risk benefits. It raises questions regarding the motivation of the party with lower risk to acquiesce in institutionalizing relational governance in exchanges. In the ideal case, the costs of relational governance should be borne by the more risk-exposed party. Given that there is almost always some cost to developing relational governance, examining why parties with lesser risk exposure go along in developing relational norms is a critical issue for future research.

We recognize that our analysis in this paper is subject to some limitations. First, we use data from one vendor firm; while this helps control some heterogeneity, it is nevertheless subject to limits to generalizability. Second, our sample of 105 projects is small. However, the sample is similar to other papers like Ethiraj et al (2005), Goo et al (2008) and Carson et al (2006). Our dataset additionally provides objective measures and more fine-grained data that provides greater veracity to our analysis. Third, our measure of contract type is limited to the two extreme forms of contracts observed in the outsourcing industry. However, new and hybrid forms of contracts can easily be devised for different settings. To the extent that risk-sharing is monotonically related to these contractual forms, our reasoning would apply to hybrid contracts as well. Fourth, we only consider the vendor’s value proposition from relational governance; it is possible that relational governance has differing implications for the client and future research is needed to tease this out. Finally, our measure of value is limited to profit from the project; as mentioned above, more work is needed to extend our results to other project outcomes. We are also not able to include price as a significant variable due to confidentiality requirements at the research site; thus, the possibility of the vendor charging higher unit prices within the FP regime as insurance remains in our dataset.
Our analysis raises a few interesting points that suggest avenues for future research. First, the explicit impact of risk-sharing needs to be incorporated into analyses of relational governance in outsourcing settings; while the complementarity argument for formal and relational governance is generally supported in our analysis, this complementarity breaks down if there is no value generated in certain formal contracts. More work is needed to establish the boundaries of complementarity under different contractual forms. Second, building on the above point, the use of perspective is critical in studying inter-organizational relationships such as outsourcing engagements. Unequal risk-sharing from incomplete contracts suggests that theoretical predictions will need to be grounded in the perspective adopted. Third, while we study vendor profitability, other outcomes need to be evaluated to provide a more complete picture of the value of relational governance, while accounting for the asymmetry we have shown here. Finally, assessing vendor and client payoff together would provide a more holistic picture of the arguments we make, i.e. while relational governance adds value to vendor payoff in FP contracts, one would expect client payoff from relational governance for the same project to be higher in T&M contracts. Such an analysis would provide a clearer conceptualization of relational governance and risk-sharing. We thus hope that our work will provide the impetus for a more nuanced analysis of relational governance and outcomes. Relational governance is a valuable weapon in the managers’ arsenal when managing uncertain transactions in the market; research on the implications of these mechanisms under different contingencies will enable the right and beneficial use of relational governance.

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