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Information Technology Outsourcing Risk: A Scenario-Based Conceptualisation

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Mission et objectifs de la Chaire

À l'aube du troisième millénaire, les entreprises évoluent dans un environnement de plus en plus complexe et changeant. Des marchés saturés, une compétitivité croissante des pays à faibles coûts de production, une compétition accrue de la part des firmes multinationales, une plus grande accessibilité au savoir, des clients plus exigeants et moins fidèles et des modifications au tissu démographique sont autant de défis que doivent relever les entreprises modernes.

Dans un tel environnement, la compétitivité des entreprises dépend de plus en plus de leur flexibilité et de leur capacité d'innover, tant dans leur structure organisationnelle, leur mode de production que dans leur mode d'échange avec les clients et les fournisseurs. Les développements récents du domaine des technologies de l'information permettent aux entreprises de devenir plus agiles, rendent possibles une multiplicité de structures organisationnelles et offrent une panoplie de modèles de relations avec les clients ou avec les fournisseurs. Pourtant, aussi prometteuses que soient ces nouvelles technologies, leur véritable impact ne se fera sentir que si elles sont arrimées à la stratégie de l'entreprise. La mission de la Chaire de gestion stratégique des technologies de l'information est de contribuer au développement et à la diffusion des connaissances sur la capacité des entreprises à choisir, déployer et mettre en place des technologies de l'information de façon à avoir un véritable impact sur la performance organisationnelle.

Dans ce contexte, les objectifs de la Chaire sont les suivants :

- mener des projets de recherche visant à contribuer à l'avancement des connaissances en matière de gestion stratégique des technologies de l'information;
- diffuser ces connaissances dans les communautés scientifique et professionnelle;
- contribuer à la formation de gestionnaires et de chercheurs dans ce domaine.

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Bouchaib Bahli and Suzanne Rivard

Abstract

In recent years many firms have adopted outsourcing as a means of governing their information technology (IT) operations. While outsourcing is associated with significant benefits, it can also be a risky endeavour. This paper proposes a scenario-based conceptualisation of IT outsourcing risk, wherein risk is defined as a quadruplet comprising a scenario, the likelihood of that scenario, its consequences, and the risk mitigation mechanisms that can attenuate or help avoid the occurrence of a scenario. This definition draws on and extends a risk assessment framework widely used in engineering. Using previous research on IT outsourcing as well as transaction cost and agency theory as a point of departure, the proposed conceptualisation of risk is then applied to the specific context of IT outsourcing.

Résumé

Au cours des dernières années, de nombreuses firmes ont choisi d'impartir l'exploitation de leurs technologies de l'information. Bien que l'impartition permette de retirer des bénéfices importants, elle comporte certains risques. Ce rapport propose une définition du risque d'impartition dans laquelle le risque se conçoit comme un ensemble formé de scénarios, de la probabilité d'occurrence de chaque scénario, de l'impact de chaque scénario et des mécanismes de mitigation se rapportant à chacun. Prenant appui sur la recherche antérieure dans le domaine de l'impartition des technologies de l'information de même que sur la théorie de l'agence et la théorie des coûts de transactions cette conceptualisation est appliquée au domaine de l'impartition.

Mots clés

EL07 : Outsourcing of IS
EL08 : IS Risk Management
AM01 : Agency Theory
AM02 : Transaction Cost Economics

Introduction

The reliance on outsourcing as a means of providing information technology (IT) services has been growing steadily over the past decade. It was recently estimated that IT outsourcing would reach US$156 billion in 2004 (Lacity and Willcocks, 2000). The fact that firms increasingly turn to external suppliers to meet their IT needs does not mean that outsourcing is a panacea, or that it is without problems. While it may help clients achieve major benefits such as cost-savings, increased flexibility, higher quality services, and access to new technology (McFarlan and Nolan, 1995), unsuccessful outsourcing experiences are often reported, in which suppliers failed to meet expected service levels and deliver expected cost savings (Earl, 1996; Willcocks, Lacity and Kern, 1999). A number of studies published on the risks associated with IT outsourcing have provided useful insights into the phenomenon (Earl, 1996; Aubert, Patry and Rivard, 1998; Willcocks *et al.* 1999). Notwithstanding their contribution, systematic efforts to refine the conceptualisation and measurement of IT outsourcing risks are required (Willcocks *et al.*, 1999). This has been the primary goal of this study.

This paper addresses the issue of risk assessment by proposing a conceptual definition of IT outsourcing risk. It begins with a review of existing literature on risk in finance, economics, insurance, medicine, operations research, and information systems. Adapting and extending a definition proposed by Kaplan and Garrick (1981), risk is defined as a quadruplet composed of possible scenarios, the likelihood of their occurrence, their associated consequences, and the risk mitigation mechanisms that can prevent them or attenuate their impact. Drawing on previous work on IT outsourcing in general and IT outsourcing risk in particular (Earl, 1996; Aubert *et al.*, 1998), as well as transaction cost theory (Williamson, 1985) and agency theory (Eisenhardt, 1989), we then apply the proposed definition of risk to IT outsourcing.

Risk defined

"Risk" is probably one of the most frequently used words today. Every day, under extremely different circumstances, we hear it used with respect to the variability of investments, predisposition for cardiovascular disease, or the dangers in air travel. These various uses have different underlying meanings, such as the probability that an undesirable event will occur, the severity of its consequences, or the variability of returns on assets. As illustrated in Table 1, the same observation can be made of the meanings given to risk in a variety of fields of research, such as finance and economics, operations research, insurance, medicine, and information systems. Such a variety of meanings may create confusion, calling for conceptual clarification.

March and Shapira (1987) propose two perspectives for defining and studying risk: the economic perspective and the managerial perspective. In the economic perspective, risk is the variance of a probability distribution of possible gains and losses associated with a given alternative. In the managerial perspective, uncertainty about positive outcomes is not considered important (as they constitute the attractiveness of a given alternative); risk is associated with negative outcomes. Risk is therefore perceived as a "danger or hazard." Table 1 presents definitions of risk according to these two perspectives.

	Economic perspective: Risk as variance	**Managerial perspective: Risk as danger or hazard**				
	Finance and Economics	**OR/MS**	**Insurance**	**Engineering**	**Medicine**	**Software engineering and information systems**
Conceptual definition	Likely variability of future returns from an asset Possibility that some unfavourable event will occur	Comparison of utility functions of two alternatives with random consequences Likelihood of occurrence of events	Probability of loss that results from dishonest character or asymmetric information	Likelihood of occurrence of events Consequences comparison	Likelihood of occurrence of some event linked to a certain dose of medication Probability of an individual developing a disease	The possibility of loss The severity of the loss The combination of probability of project failure and the magnitude of potential loss due to project failure
Measure	Variance, Beta from CAPM	Frequency * estimated consequence of an event	Risk premium	Index aggregation of negative outcome Probability of occurrence of events and their consequences	Population proportion, dose-response, risk score	Risk exposure = p(undesirable outcome) * loss (undesirable outcome) Software development project = project uncertainty * magnitude of potential loss
Application	Economic and financial markets	Transportation, hazardous material	Damage/life insurance	Construction, occupational safety manufacturing, transportation	Cancer assessment, nursing, neurotoxicology	Software project development
Object of interest	Variability of asset returns, economic aggregates	Accidents	Moral hazard and adverse selection	Project failure, accidents, project performance criteria	Neurotoxic effects, cancer	Project failure, schedule, cost and quality failure
Source of data	Historical data, statistics	Historical and statistical data	Actuarial data, statistics on individual characteristics	Delphi, historical and statistical data	Pedigree data, selected data on neurohistological effects	Expert knowledge, historical data
References	Copeland and Weston (1993)	Ertugrul (1995)	Smith (1994), Dionne and Harrington (1992), Bowers et al., (1986)	Williams (1993), Linnerooth-Bayer and Wahlstrom (1991)	Steck *et al.*, (1993), Gail *et al.*, (1989)	Boehm (1989), Barki *et al.*, (1993), Davis (1982), McFarlan (1981), Alter and Ginzberg (1978)

Table 1: Conceptualisation and Measurement of Risk

Finance and economics adopt the economic perspective, defining risk as the variability of future returns from an asset, equity, or investment (Copeland and Weston, 1993). Accordingly, the more uncertain or variable a portfolio's return, the higher the associated risk. Hence, investors would prefer to diversify their portfolios so as to neutralize these variations.

As shown in Table 1, the managerial perspective prevails in various domains. In operations research/management science and engineering, risk is often conceptualised as the likelihood that an undesirable event will occur (Ertugrul, 1995; Williams, 1993; Linnerooth-Bayer and Wahlstrom, 1991). For instance, in hazardous materials transportation, risk is defined as the probability of harm to an exposed receptor (people, property, etc.).

In medicine, risk is defined as the likelihood that an adverse effect or disease will occur due to certain factors (Gail, Brinton and Byar, 1989). For instance, assessing cancer risk within a population entails an evaluation of the carcinogenic properties of environmental agents and the extent of exposure to these agents.

Insurers define risk in a variety of ways: a probability of loss resulting from dishonesty or asymmetric information (Bowers, Gerber, Hickman *et al*., 1986); a condition in which there is a possibility of adverse deviation from a desired outcome (Smith, 1994); the chance of loss (Athearn, Treavis and Joan, 1989); and the dispersion of actual from expected results (Vaughan and Vaughan, 1996).

In IS, risk has mainly been studied in the context of software development and is defined from three perspectives. Some authors view risk as the possibility of negative outcomes in a software project, and they focus on assessing project characteristics conducive to such negative outcomes (Alter and Ginzberg, 1978; Davis, 1982). Others focus on the negative outcomes *per se* and their severity (McFarlan, 1981). A third group includes both the probability of negative outcomes in a software project and the magnitude of their consequences (Boehm, 1989; Barki, Rivard and Talbot, 1993).

In their widely cited paper "On the Quantitative Definition of Risk," Kaplan and Garrick (1981) criticized the rather limited definitions of risk often used in various fields. First, they deplored the fact that risk definitions often took into account the sole probability of occurrence of an undesirable event. Second, they considered the traditional expected-consequence representation of risk (generally referred to as risk exposure) inappropriate, since it assumes a risk-neutral decision maker. According to Kaplan and Garrick, most people would judge a low-probability/high-consequence scenario as more undesirable than a high-probability/low-consequence scenario, even if the expected consequences of the two events were equal. In other words, concepts like frequency-severity diagrams have the undesirable property that very different situations get mapped into identical diagrams, even though a rational risk-adverse decision maker might well have a clear preference between them.

Kaplan and Garrick argued for addressing three questions when assessing risk:

(i) What can happen?
(ii) How likely is this outcome?
(iii) If it does occur, what are the consequences?

They proposed a general definition of risk as a complete set of triplets involving scenarios, the likelihood of each scenario, and the consequences or an evaluation measure of each scenario (that is, a measure of the damages). To answer these questions, one would make a list of outcomes or "scenarios" as suggested in Table 2, where the i^{th} line is a triplet:

$$< p_i, s_i, x_i >$$

Where

s_i is the scenario
p_i is the probability of that scenario
x_i is the consequence

Likelihood	Scenario	Consequence
p_1	s_1	x_1
p_n	s_2	x_2
.	.	.
.	.	.
p_n	s_n	x_n

Table 2: Scenario List (Kaplan and Garrick, 1981)

In IT outsourcing, the scenarios suggested by transaction costs and agency theory are not "acts of God;" they are within the client's "feasible" limits of control. They can therefore be acted upon using risk mitigation mechanisms that reduce their likelihood of occurring or help prevent them altogether (Lyytinen *et al.*, 1996; Lyytinen *et al.*, 1998). In other words, if a risk mitigation mechanism m_i were introduced, the corresponding scenario might not occur. Hence, risk measurement requires that these mechanisms be taken into account. Kaplan and Garrick's definition of risk is therefore extended with a fourth component, and risk defined as a set of quadruplets including scenarios, the likelihood and consequences of each scenario, and the corresponding risk mitigation mechanisms. Formally, risk is defined as:

$$< p_i, s_i, x_i, m_i >$$

Where

s_i is the scenario
p_i is the likelihood of that scenario
x_i is the consequence
m_i is the risk mitigation mechanism

Information Technology Outsourcing Risk

Kaplan and Garrick's extended definition was applied to IT outsourcing risk. Potential scenarios in an IT outsourcing project and their associated consequences were identified, the likelihood of each scenario was determined through the risk factors leading to them, and risk mitigation mechanisms that could help avoid or attenuate their likelihood were identified. Table 3 presents the resulting risk assessment framework. Following on and extending the work of Aubert *et al.* (1998), the linkages shown in Table 3 are anchored in transaction cost theory (Williamson, 1985) and agency theory (Eisenhardt, 1989).

Transaction cost theory provides much of the theoretical background for research on IT outsourcing (Lacity and Hirschheim, 1993; Aubert *et al.*, 1996, 1998). This theory is centred on governance structures, suggesting that the most efficient structure to govern a transaction – either the market or the firm – depends on transaction costs, which are, themselves, related to some key characteristics of the transaction. Transactions differ in a variety of ways by the degree to which relationship-specific assets are involved, the amount of uncertainty about the future and the actions of other parties, measurement problems, the relatedness of IT operations, and the number of suppliers in the market.

Risk Factors	Scenarios	Consequences	Mitigation mechanisms
• Asset specificity • Small number of suppliers	Lock-in	Cost escalation and service debasement	• Mutual hostaging • Dual sourcing
• Uncertainty	Costly contractual amendments		• Sequential contracting • Contract flexibility
• Uncertainty • Client's degree of expertise in IT operations • Client's degree of expertise in outsourcing contracts • Relatedness	Unexpected transition and management costs		• Clan mechanisms • External expertise procurement
• Measurement problems • Supplier's degree of expertise in IT operations • Supplier's degree of expertise in outsourcing contracts	Disputes and litigation		• Alternative methods of dispute resolution • Clan mechanisms • Procurement of external expertise

Table 3: IT Outsourcing Risk Assessment Framework

Transaction cost theory is based on two behavioural assumptions (Williamson, 1985). First, it operates on the assumption of bounded rationality, which refers to how the cognitive limitations of the human mind rule out a complete evaluation of the consequences of all possible decisions. In an outsourcing context, the impact of bounded rationality depends in part on the knowledge and skills the client can draw on in specifying requirements, selecting appropriate suppliers, and in managing and controlling the relationship. Second, the theory operates under the assumption of opportunism, which posits that people do not only act in self-interest, but that they also act with guile. For instance, IT suppliers may lie about their capabilities or use their knowledge advantage to sell IT resources to clients who have little experience and/or knowledge about their needs or market prices.

The second economic theory of interest is agency theory (Eisenhardt, 1989). The major issue in agency relationships is ensuring that the agent acts in the interests of the principal. The theory would assume, in the case of IT outsourcing, that each party in the relationship has their own profit motive, because the parties' goals are not congruent. The principal cannot perfectly and without cost monitor the actions of the agent (Sappington, 1991).

Risk scenarios. The literature suggests four main risk scenarios associated with outsourcing: a lock-in situation, contractual amendments, unexpected transition and management costs, and disputes and litigation. In turn, these scenarios lead to two undesirable consequences: cost escalation and service debasement.

Lock-in refers to a state or situation where a client cannot get out of a relationship except by incurring a loss or sacrificing part or all of its assets to the supplier (Aubert *et al.*, 1998). Because of the supplier's opportunistic behaviour in extracting a quasi-rent from the client, there will be costs to safeguarding contractual agreements (Grossman and Hart, 1986).

Costly contractual amendments refer to any alterations, redrafting or changes made at any time during the contract to part or all of its clauses whenever a contractual party (the client and/or IT supplier) deems it necessary. Contracting parties are rationally bounded and cannot foresee all eventualities, so writing and enforcing complete contracts is impossible. As a consequence, both parties must rely on incomplete contracting and any amendment will be made at a cost (Williamson, 1985). Amendment costs include the direct costs of communicating new information, renegotiating agreements, or coordinating operations to reflect new circumstances (Walker and Weber, 1984).

Unexpected transition and management costs are hidden and/or underestimated costs (Lacity and Hirschheim, 1993). Transition costs include set-up, redeployment or relocation costs, sales tax on equipment purchases, equipment transfers, leasing costs, etc. Management costs include the human resources devoted to managing an outsourcing contract (Klepper and Jones, 1998).

Finally, disputes and litigation refer to any controversy concerning the association or representation of the contracting parties in negotiating, fixing, maintaining, changing, or seeking to arrange terms or conditions of a contract, and the process of bringing and pursuing a lawsuit (Klepper and Jones, 1998).

Consequences. A review of the literature on IT outsourcing, transaction cost, and agency theory led to the identification of two main negative consequences associated with the four risk scenarios: cost escalation and service debasement (Aubert *et al.*, 1998; Lacity and Hirschheim, 1993; Earl, 1996; De Looff, 1995). Cost escalation refers to all costs incurred in the completion of the outsourced activity that overrun originally contracted costs and occur throughout the period covered by the contract. Cost escalation is not limited to increases in the cost of actually performing the IT activity; it covers a broad range of costs that are not present when an activity

is performed in-house, including the development and maintenance of an exchange relationship, monitoring exchange behaviour, and guarding against opportunism in an exchange situation (Williamson, 1985).

Service debasement refers to any reduction in the quality of services received by a client (Aubert *et al.*, 1998). Service quality may decline throughout the contract or may just fall below agreed-upon levels. Several scenarios may lead to this result, including opportunistic behaviour on the part of the supplier in the case of a locked-in client, haggling and disputes between the parties over service quality assessment, and contractual amendments where the supplier may have more leverage.

Likelihood of each scenario. While in some domains, such as insurance, the probability of an undesirable outcome can be estimated on the basis of past performance characteristics, but doing so in several other areas is often difficult, if not impossible. In such circumstances, several risk assessment methods approximate the likelihood of undesirable outcomes by identifying and assessing factors that influence the probability of their occurrence (Anderson and Narasimhan, 1979; Barki *et al*., 1993; Aubert *et al.* 1998). This study also adopts this approach; hence the importance of identifying the risk factors associated with a given scenario. Once again, IT outsourcing, transaction costs and agency theory were instrumental in revealing these risk factors (see Table 4).

Risk factors related to a lock-in scenario. A lock-in situation is associated with two principal risk factors. The first is asset specificity, which concerns investments made specifically because of a given contract and which have a much higher value because of the contractual relationship. If one party were to breach the contract, the value of the relationship-specific investments would fall. This is the so-called lock-in effect, where much can be lost to one or both parties if the relationship dissolves (Williamson, 1985). The second risk factor often associated with lock-in is a restricted number of suppliers, since the bargaining power of suppliers increases as their number decreases (Porter, 1985). Often a lack of alternative sources of supply is the primary cause of a client's dependency on its supplier (Williamson, 1985). Transaction costs can arise when the presence of competitors does not constrain the supplier from behaving opportunistically (Walker and Poppo, 1991).

Risk factors related to a contractual amendments scenario. Contractual amendments are closely associated with uncertainty about future events and the other party's actions. Two types of uncertainty exist. The first is environmental volatility, or the rapidity of market and demand changes. Environmental uncertainty coupled with bounded rationality diminishes the ability of partners to plan effectively and therefore increases the transaction costs surrounding contractual amendments (Pilling, Crosby and Jackson, 1994). In the second case, uncertainty is tied to technological discontinuity (technological changes and breakthroughs that may render the technology of the original contract obsolete). Such changes may force the parties to amend their contract, at a certain cost (Earl, 1996; Aubert *et al*., 1998). Hence, any increase in uncertainty

provides an incentive for opportunistic behaviour when contract clauses need to be amended (Williamson, 1985).

Risk factors related to an unexpected transition and management costs scenario. The literature suggests three factors as antecedents to the occurrence of unexpected transition and management costs; the client's lack of expertise with respect to the outsourced activity or with outsourcing itself and the degree of relatedness of the outsourced activity. As suggested by Aubert *et al.*, (1998), a client's lack of expertise may lead to hidden costs and, therefore, cause a loss of control over costs. The authors also suggest that a client's lack of expertise in contract management may lead to increased costs of service. According to Klepper and Jones, a client who does not have relevant expertise in outsourcing may expect to incur more costs transferring and relocating people and transferring equipment, leases and software licenses. This results in unexpected transition and management costs (Klepper and Jones, 1998).

Relatedness, also called interdependence or connectedness, refers to the interconnections between tasks, business units or functions, such as the performance of one discrete piece of work that depends on the completion of other discrete pieces of work (Wybo and Goodhue, 1995; Van der Vliert, 1998). Some consequences of relatedness may have a negative impact on business performance through inflexibilities and poor responsiveness to market changes. The greater the interdependence, the greater the need for co-ordination, joint problem solving, and mutual adjustment, and this may impede cost control (Milgrom and Roberts, 1992). Such obvious costs may be small compared to hidden costs and constraints such as the time managers must spend explaining decisions to top management or time spent in committees and on task forces co-ordinating with sister units (Porter, 1985).

There are two types of relatedness in IT outsourcing. First, an outsourced IT operation may have a direct (or indirect) link to an in-house IT operation. Second, an outsourced IT operation may have a direct (or indirect) link to another outsourced IT operation. When IT operations are interdependent, the outsourcing of one may subtly weaken the ability of the other to perform successfully (Earl, 1996). For instance, interfaces between systems provided by the supplier and those provided in-house can be difficult and complex to build, maintain and operate. If an outsourced shareholder system batch-processes mutual fund buy/sell transactions that are then fed into an in-house trust accounting system, the timeliness and accuracy of system output will depend on the timeliness and accuracy of the output from the mutual fund system. Coordinating the interface, timing and data structures will become difficult due to the separation of facilities and the companies' different agendas (Lowel, 1992). The client's ability to deliver its own products will therefore depend on the supplier delivering the required data processing services.

Risk factors related to a disputes and litigation scenario. The literature review revealed three risk factors that were particularly apt to cause disputes and litigation; the supplier's degree of expertise in handling the outsourced operation, its degree of expertise in outsourcing, and measurement problems.

In the Collins Cobuild English Dictionary, expertise is defined as "special skill or knowledge that is acquired by training, study, or practice." Expertise is normally defined within task-specific domains on the basis of experience in these domains. In an attempt to differentiate between the expertise and experience of PC users, Thompson, Higgins and Howell (1994) stated, "experience and expertise (or skill) are closely related, but separate, concepts. The length of time the individual has used a PC may be correlated with their experience, but it is the expertise component that will provide more information (for interpretations and enforcement)" (p. 175). The authors argue that in IT use, expertise is more relevant than experience, hence the importance of measuring skill level, length of time of use and the comfort of use (King and Xia, 1997). This is how expertise is understood in this paper.

Several studies show the effect of expertise (often used interchangeably with experience) on productivity enhancement (Starr, 1988), on perceptions of media appropriateness (King and Xia, 1997), on PC utilization (Thompson *et al.*, 1994), on managers' use of information and decisions (Perkins and Rao, 1990), and on the performance of problem-solving groups (Littlepage, Robison and Reddington, 1997). In IT outsourcing it was suggested that a lack of supplier expertise with the outsourced activity may lead to disputes and litigation (Aubert *et al.*, 1998). A supplier may not be able to respond to a rapid change in business conditions, may not have a firm grasp of the client's business and objectives, or the necessary range of expertise to fulfil its needs (Clark, Zmud and McGray, 1995), causing disputes between the parties over the services rendered. The supplier may overestimate its capabilities and/or be unable to handle the operation as technology changes (Aubert *et al.*, 1998). If the supplier's skills do not improve, service quality will most probably decline, the potential for cost-reduction will be compromised and target setting will be sub-optimal (Earl, 1996). Therefore, failure to meet performance requirements will affect the quality of service received. If the supplier lacks expertise with the business aspect of the activity, the client is exposed to business risk, which may affect profitability. Since the supplier does not possess comparable knowledge of both internal and industry requirements, the client has to train the supplier's personnel and explain user requirements, thereby incurring additional costs.

According to the definition of expertise given above, the main sources of the parties' expertise in outsourcing are their skills, the frequency of their contracting arrangements and their comfort in the process. Examining the outsourcing of logistics functions, Boyson, Corsi and Dresner (1999) found that the inclusion of contractual provisions such as performance metrics, cost of service, and termination clauses improved effectiveness at managing these provisions and were essential to good contract performance. An entire set of people, processes, tools, and systems are needed to make the relationship work and create a climate for the kind of active cultivation and maintenance of close working relationships that foster continuous improvement and peak performance (Klepper and Jones, 1998).

The supplier's information advantage concerning IS processes and contract subtleties gives experience and knowledge that represent a clear advantage. The supplier may therefore hide

information that will appear later in the contract. Clark *et al.* (1995) found that when a supplier began to cut services, the client's relationship managers responded very poorly to employee complaints, because they simply had no idea what the internal users had come to expect. They had no first-hand experience of the contract's planning or negotiation. On the other hand, if the IT supplier lacks expertise in outsourcing contracts, it may lead to disputes and litigation (Aubert *et al.*, 1998). An inexperienced supplier may haggle with the client over contract provisions, performance, service expectations, planning demand, and so on.

Disputes and litigation are also associated with measurement problems. Alchian and Demsetz (1972) identified measurement problems where it was impossible to evaluate the individual contributions of each party and measure their fair value. When performance cannot be easily assessed, the market can be "inefficient," because it is not known what to reward, or how (Williamson, 1985). The accuracy with which buyers measure the quality of the products or services determines the efficiency of market exchanges. In the absence of an accurate measure, buyers must engage in a costly process of monitoring, or suppliers must engage in a costly process of signalling (Brazel, 1982); the ability to easily measure outcomes is therefore critical to the overall performance of markets. Genus (1997) examined aspects of the contractual relationship between the principal actors in a construction project. Differences about how to interpret the supplier's performance led to disputes between the parties. The conflict focused on how to interpret contractual clauses concerning "optimisation," or the achievement of the best balance between capital and operating costs.

Because most IT activities involve teamwork, it is impossible to adequately assess the effort invested (Alchian and Demsetz, 1972; Barzel, 1982). This leads the parties to argue over the quality of measurement instruments and criteria (Aubert *et al.*, 1998). If it is difficult to evaluate the supplier's contribution, disagreements may arise between the client and the supplier concerning the quality/price ratio. This can lead to service deterioration. Thus, each party may find it difficult to accept the other's approach to measuring this parameter.

Risk Mitigation Mechanisms

The four scenarios described above are not "acts of God;" they are within the limits of what can "feasibly" be controlled by the client. They can therefore be affected by the use of risk mitigation mechanisms that would influence their likelihood of occurring or help prevent them altogether (Lyytinen *et al.*, 1998). Hence, risk assessment can only be meaningful if a scenario is less likely to occur because of a would-be effective mitigation intervention. In other words, the measurement of risk implies taking these mechanisms into account. A review of the literature on IT outsourcing as well as transaction cost and agency theory led to the identification of seven mitigation mechanisms that can influence the likelihood that the four IT outsourcing risk scenarios occur.

Risk mitigation mechanisms associated with a lock-in scenario. Clients may be exposed to a lock-in scenario if specific investments involve a small number of suppliers and a single source of services (Klein, Crawford and Alchian, 1978). Two mechanisms may be used to influence the

likelihood of this scenario. The first is reciprocal exposure to specific assets, that is, mutual hostaging (Koss and Eaton, 1997). A credible commitment to mutually advantageous exchange may be achieved, however, if both parties have symmetric exposure to specific investments through partial redistribution of specific investment costs to the potentially opportunistic party. The second mechanism is dual sourcing (Richardson, 1993). This multiple vendor strategy can be traced to Porter's recommendation to use several competing vendors to insure low cost, high performance levels and acceptable service quality (Porter, 1985). The argument posits that the ever-present threat of losing business to the other supplier will induce each vendor to provide a higher level of performance and quality (Ngwenyama and Bryson, 1999). Dual sourcing is often seen as a mechanism for mitigating the effects of a lock-in scenario, in that it protects clients from complacency on the part of the single source (Currie and Willcocks, 1998; Aubert *et al.*, 1998).

Risk mitigation mechanisms associated with a scenario of costly contractual amendments. Under highly volatile conditions and to avoid costly contractual amendments, parties can develop sequential relationships (Heide and John, 1990) and agree to flexible contracts (Harris, Giunpero, Hult *et al.*, 1998). An essential aspect of cooperation in the face of unanticipated change is that the parties to a contract forego short term, unilateral advantages. Such forbearance is easier when the firm is confident that bilateral expectations of continuity provide the capacity to retaliate against opportunism and reciprocate forbearance. Uncertainty requires procedures for sequential decision making within an ongoing relationship, thereby simplifying the adaptation process (Williamson, 1985). The second mitigation mechanism is flexible contracting. Harris *et al.*, (1998) assert that the prime rationale for creating flexible outsourcing contracts is to recognize that uncontrollable external factors may intervene. This leaves parts of a contract open for renegotiation because of the parties' changing circumstances or the change mechanisms built into the contract to protect both the client and the supplier.

Risk mitigation mechanisms associated with unexpected transition and management costs, disputes, and litigation scenarios. When bounded rationality and opportunism are combined with asymmetries in information, perceptions of inequity may arise (Ouchi, 1980). Sometimes the measurement of behaviour, outcome, or both may be impossible (Eisenhardt, 1989). This leads to unexpected transition and management costs as well as disputes and haggling over who is right. The literature proposes three risk mitigation mechanisms that can potentially prevent these scenarios from occurring or attenuate their severity; the hiring of external technical and legal expertise (Lacity and Hirschheim, 1993), clan mechanisms through socialization and shared organizational norms and values (Ouchi, 1980), and the use of alternative means for dispute resolution (Klepper and Jones, 1998).

External expertise procurement. Outsourcing technically immature operations may engender disastrous outcomes, because the client organization is not in a position to negotiate sound contracts with its supplier (Lacity, Willcocks and Feeny, 1996). The authors recommend buying expertise but also integrating external resources into an internally managed team. Johnson (1997) states that appointing a contract or relationship manager who has the responsibility to make it all

work can also be helpful. This manager should be knowledgeable about both overall company business as well as the outsourced activity. Any outsourcing agreement of substance will require consistent and robust management if its objectives and benefits are to be achieved. Hence, an expert is needed who understands the core contract management processes (White and James, 1996, p. 186). An outsourcing evaluation and negotiation requires technical, legal, management, negotiation, and outsourcing expertise (Lacity and Hirschheim, 1993, p. 246). The right consultants and lawyers can greatly simplify an outsourcing transaction for both parties (Klepper & Jones, 1998, p. 329). In addition, Key (1995) suggested establishing a team of experts to serve as watchdogs and advisors. They should be familiar with service details and capable of scrutinizing the vendor's performance. Ashton (1998) examined health care services using transaction cost analysis and found a negotiator who was also contracted to negotiate on behalf of the primary care groups.

Clan mechanisms rely on normative considerations to influence behaviour. Clan mechanisms are means to induce desirable behaviour through soft measures; they are associated with terms such as "informal control," "normative control," and "clan control," as opposed to formal control (Leifer and Mills, 1996). Influence comes in the form of shared goals, values, and norms. Since there is no explicit restriction on behaviour, clan mechanisms imply more interpersonal respect and less mistrust than are found in formal control mechanisms. Clan mechanisms often provide a supportive environment in which partner firms come to understand the process and objective of alliance management, which are often initially unclear (Doz, 1996). Where it is difficult to measure outcomes and/or supplier behaviour, clan mechanisms can be used if the parties share a vision, goals and norms.

Alternative dispute resolution refers to a variety of techniques for resolving disputes without litigation. Two of the better known ADR methods are mediation (in which parties voluntarily settle a dispute with the help of a skilled facilitator) and arbitration (in which a disinterested, neutral party is chosen to hear the case and give a legally binding ruling). In arbitration, a dispute is submitted to one or more impartial persons for a final and binding decision (Auer, 1999). Arbitration is an adversarial process that resembles litigation but is less formal; it is therefore generally less costly and time consuming. Mediation, however, involves an attempt to resolve a dispute with the assistance of a neutral third party; the parties must voluntarily and co-operatively resolve the case. The mediator plays an advisory role. Mediation facilitates the bargaining process by convincing the parties that they will be better off with a settlement than in continued litigation. The parties do not appear on a public court record or in the press; this strict confidentiality can be an important consideration on both sides.

For outsourcing contracts dealing with very technical matters, arbitration can be beneficial if it utilizes knowledgeable people from the industry as arbitrators (Klepper and Jones, 1998). The agreement should also contain sensible complaints and dispute resolution procedures to minimize the risk of future litigation and provide resolution procedures for matters that are best resolved by means other than litigation. Two measures should be considered: 1) a simple procedure to enable the parties to notify one another of a complaint and then (if necessary)

participate in a simple negotiation or mediation process, 2) an "expert clause" which enables disputes about particular matters to be resolved by an appropriate, nominated expert. Matters for resolution by an expert include disputes about the achievement of agreed levels of performance and availability, and whether proposed variations in workload are beyond pre-agreed bounds or should be provided free of charge.

Conclusion

This paper has proposed a framework for the conceptualisation and measurement of the risk construct and has applied this framework to IT outsourcing. The main underlying idea is that treating risk as a probability or an expected value of undesirable consequences is of limited usefulness. It should instead be viewed as a set of quadruplets composed of: scenarios (what can happen?), the likelihood of each scenario or risk factor occurring (how likely is this outcome?), risk mitigation mechanisms (what may prevent this scenario from occurring?), and the consequences of each scenario (if it does happen, what are the undesirable consequences?).

In relation to the existing literature, this framework sheds light on areas where risk assessment and the management of IT outsourcing can be improved. The conceptualisation of IT outsourcing risks presented here allows for the systematic capture of four risk dimensions: risk factors, scenarios, their consequences and risk mitigation mechanisms. It describes and establishes a comprehensive theoretical framework for assessing IT outsourcing risks that identifies the interrelationships between these dimensions. The proposed definition provides interesting avenues for future investigation and applications. Managers are also provided with a formal tool for assessing IT outsourcing risks, and our understating of this ill-defined construct has been improved.

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