The information technology outsourcing risk: a transaction cost and agency theory-based perspective

BOUCHAIB BAHLI

Decision Sciences and Management Information Systems, The John Molson School of Business, Concordia University, Montreal, Canada H3G 1M8

SUZANNE RIVARD

HEC Montreal, 3000 Chemin de la Cote-Ste-Catherine, Montreal, Canada H3T 2A7

Many firms have adopted outsourcing in recent years 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 conceptualization of the 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 that is widely used in engineering. The proposed conceptualization of risk is then applied to the specific context of IT outsourcing using previous research on IT outsourcing as well as transaction cost and agency theory as a point of departure.

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 are increasingly turning to external suppliers in order 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 have failed to meet expected service levels and deliver the expected cost savings (Earl, 1996; Willcocks *et al.*, 1999). A number of studies published on the risks associated with IT outsourcing have provided useful insights into the phenomenon (Earl, 1996; Aubert *et al.*, 1998; Willcocks *et al.*, 1999). Notwithstanding their contribution, systematic efforts at refining the conceptualization 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 the IT outsourcing risk. Adapting and extending a risk definition used in engineering and proposed by Kaplan and Garrick (1981), it defines risk 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. The proposed definition of risk is then applied to IT outsourcing drawing on previous work on IT outsourcing in general and the IT outsourcing risk in particular (Earl, 1996; Aubert *et al.*, 1998; Lacity and Willcocks, 2001; Kern *et al.*, 2002b) and using transaction cost theory (Williamson, 1985) and agency theory (Eisenhardt, 1989) as theoretical foundations.

Risk defined

'Risk' is probably one of the most frequently used words today. It is heard every day, under extremely different circumstances, with respect to the variability of investments, predispositions for cardiovascular disease or the dangers of air travel. These various uses have different underlying meanings, such as the probability of occurrence of an undesirable event, the severity of its consequences or the variability of returns on assets. In a comprehensive paper on risk March and Shapira (1987) proposed 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). Rather, risk is associated with negative outcomes. Risk is therefore perceived as a 'danger or hazard'.

Kaplan and Garrick (1981) adopted such a managerial perspective in their widely cited paper from the engineering discipline titled 'On the Quantitative Definition of Risk' and argued that a complete risk assessment requires that three questions be addressed. These questions are as follows.

(1) What can happen?
(2) How likely is this outcome?
(3) If it does occur, what are the consequences?

They proceeded by proposing 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). Hence, in assessing the risk of a given situation, one would make a list of outcomes or 'scenarios', as suggested in Table 1, where the ith line is a triplet $<s_i, p_i, x_i>$, where s_i is the scenario, p_i is the probability of occurrence of scenario s_i and x_i is the consequence of the occurrence of scenario s_i.

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 (Lacity and Willcocks, 2001; Kern *et al.*, 2002a). 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 (1981) definition of risk is therefore extended with a fourth component and risk is 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 $<s_i, p_i, x_i, m_i>$, where s_i is the scenario, p_i is the likelihood of that scenario, x_i is the consequence and m_i is the risk mitigation mechanism.

While in some instances it is possible to estimate the likelihood of a given scenario on the basis of past

performance of the object under study, it is not feasible to do so in several areas (Barki *et al.*, 1993). Consequently, several risk assessment methods adopt the approach of approximating the probability of undesirable outcomes by identifying and assessing the factors that influence their occurrence (Barki *et al.*, 1993). The degree to which each factor is present in an endeavour will contribute to the increased likelihood of a given scenario. Once this list is drawn, risk management methods will consist of devising and using mechanisms that will either diminish the loss related to the scenario itself or decrease the likelihood of its occurrence by reducing the level of the risk factors (Aubert *et al.*, 2002).

Information technology outsourcing risk

Kaplan and Garrick's (1981) 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 2 presents the resulting risk assessment framework. Following on and extending the work of Aubert *et al.* (1998), the linkages shown in Table 2 are anchored in transaction cost theory (Williamson, 1985) and agency theory (Eisenhardt, 1989). In that Table 2 is not exhaustive, since it is limited to the suggestions of two closely related theories. It is recognized that it would be possible to study IT outsourcing risk from other theoretical and empirical perspectives, such as contract theory and law. For instance, following Crocker and Reynolds (1993), Aubert *et al.* (2003a) examined the costs and benefits of contract completeness as a risk-reducing mechanism. The perspective of law could also be adopted. Collins (1999) and Vincent-Jones (2000) discussed the use of private law for protecting consumers within the context of the market and the role and limitations of the law of contract as a form of regulation. In addition, counter-posing discrete and relational contracts each associated with their own distinctive modes of legal reasoning, MacNeil (1983) developed a comprehensive analysis of the sources of 'bindingness' in contractual relations. While it is recognized that IT outsourcing risk could be studied from these and other stances, this paper limits the analysis to the perspective of transaction cost and agency theory.

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 for governing a transaction – either the market or the firm – depends on

Table 1 The scenario list (Kaplan and Garrick, 1981)

Scenario	Likelihood	Consequence
s_1	p_1	x_1
s_2	p_2	x_2
.	.	.
.	.	.
.	.	.
S_n	P_n	x_n

Table 2 The IT outsourcing risk assessment framework

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

transaction costs, which are related to some key characteristics of the transaction themselves. 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.

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 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 – or exaggerate - their capabilities or use their knowledge advantage in order to sell IT resources to clients who have little experience and/or knowledge about their needs or market prices. They may also do so because they want to enter a new market, to dominate a market segment or to lock out competitors (Kern *et al.*, 2002b). Research has shown that these two behavioural assumptions are indeed relevant in the context of IT outsourcing. For instance, Aubert *et al.* (2003b) analysed the case of an insurance company – Emptor - the unfortunate decisions of which regarding supplier selection, asset transfer, performance measures and arbitration mechanisms led to excessive costs for both partners, unrealistic deliverables and

deadlines, poor service quality and, ultimately, contract failure. While the analysis emphasized the role played by the supplier's opportunism, bounded rationality, in terms of the client's lack of expertise with outsourcing, also played an important role in this case.

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 monitor the actions of the agent perfectly and without cost (Sappington, 1991).

Risk scenarios and their associated risk factors

Agency theory and transaction cost theory suggest four main risk scenarios that can be associated with outsourcing: (1) lock-in, (2) contractual amendments, (3) unexpected transition and management costs and (4) disputes and litigation. These correspond to those identified in the literature on the IT outsourcing risk (Aubert *et al.*, 1998). Since the probability of occurrence of a given scenario is estimated on the basis of risk factors, the presence of which would be likely to increase this probability, each scenario is presented here along with the associated risk factors (see Table 2).

The term lock-in refers to a 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).

Three main risk factors are conducive to a lock-in situation. 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; Kern *et al.*, 2002b). The very nature of the outsourced activity may contribute to increasing the degree of asset specificity. The client's idiosyncrasies may be such that, even for a supplier with much experience, it constitutes a new environment (Kern *et al.*, 2002b). Having invested a great deal of time and effort in getting the initial supplier fully operational, the client itself may be reluctant to do so with a new supplier. Since some clients do not retain in-house competencies with the outsourced activity, they may even be unable to do so (Aubert *et al.*, 2003b). 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). Finally, the client's lack of expertise with outsourcing contracts may also lead to a lock-in (Aubert *et al.*, 1998). The term expertise is used here to refer to a combination of skill level with a given activity and length of time the activity has been performed (Thompson *et al.*, 1994). A client with little expertise may make decisions that will directly lead to a lock-in situation. Such is the case of allowing a long initial term (5–10 years) without adequate termination for poor performance or termination for convenience clauses or not having asset buy-back or employment offer provisions, no disengagement and handover obligations, no intellectual property clauses governing the supplier modifications in event of termination, thus rendering the removal system inoperable or no usable source code in escrow.

The second risk scenario, costly contractual amendments, refers 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 in order to reflect new circumstances (Walker and Weber, 1984).

Contractual amendments are mainly due to the uncertainty about future events and the other party's actions. Three 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 for planning effectively and, therefore, increases the transaction costs surrounding contractual amendments (Pilling *et al.*, 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). The third type of uncertainty is related to the nature of the outsourced activities. An activity will be said to have a high level of uncertainty when it is difficult to describe with exactitude the outputs it should produce (Aubert *et al.*, 1998). Research in IT on the determination of user requirements has demonstrated how difficult such an activity is in the context of system development. Hence, any increase in uncertainty provides an incentive for opportunistic behaviour when contract clauses need to be amended (Williamson, 1985).

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, termination, handover and reimplementation costs of the next generation contract – these can certainly be significant switching barriers where there is a lock-in (Klepper and Jones, 1998).

The literature suggests three factors as antecedents to the occurrence of unexpected transition and management costs: (1) the client's lack of expertise with the outsourced activity, (2) the client's lack of expertise with outsourcing and (3) the degree of relatedness of the outsourced activity. As suggested by Aubert *et al.* (1998), a client's lack of expertise with the outsourced activity may lead to hidden costs and, therefore, cause a loss of control over costs. Authors also suggest that a client's lack of expertise in contract management may lead to increased costs of service (Lacity and Willcocks, 2001). According to Klepper and Jones (1998), a client without relevant expertise in outsourcing may expect to incur more costs transferring and relocating people and transferring equipment, leases and software licences. This results in unexpected transition and management costs (Klepper and Jones, 1998).

Relatedness, which is 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 coordination, 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 the time spent in committees and on task forces coordinating 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 in order 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 the 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 for delivering its own products will therefore depend on the supplier delivering the required data processing services.

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

Three risk factors are particularly apt to cause disputes and litigation: the supplier's degree of expertise (the term expertise is used here as defined in the case of client expertise) in handling the outsourced operation, its degree of expertise in outsourcing and measurement problems.

It has been 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 or may not have a firm grasp of the client's business and objectives or the necessary range of expertise to fulfil its needs (Clark *et al.*, 1995; Lacity and Willcocks, 2001), thereby 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 suboptimal (Earl, 1996). Therefore,

a failure to meet performance requirements will affect the quality of the 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.

Because of its awareness of the impact of contractual clauses, a supplier with much expertise with outsourcing contracts may very well haggle more than an inexperienced one during the process of reaching an agreement. On the other hand, while a supplier with less expertise will often not haggle much during contract negotiation, they may end up signing clauses that will, in the future, give rise to disputes and litigations (Aubert *et al.*, 1998). Examples of such clauses are (1) unlimited liability including consequential damages, (2) an obligation for back-to-back contracts with subcontractors even though the level of insurances, liabilities and financial guarantees are disproportioned to the work the subcontractor(s) is doing, (3) allowing a termination for convenience right without compensation before capital assets are fully amortized within the pricing regime, (4) agreeing to match benchmarked costs conducted by an independent organization without the right to agree the benchmarking methodology, source data and sample selection and without the right to disaggregate the unique contractual economic variants (i.e. forced to acquire more client staff than required, insurance levels, financial guarantees, etc.) between the sample and the contract, etc. (The authors are particularly grateful to one of the anonymous reviewers for suggesting this particular nuance, along with the examples of clauses.)

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. The market can be 'inefficient' when performance cannot be easily assessed, 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 (Barzel, 1982): the ability to measure outcomes easily 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 'optimization' or the achievement of the best balance between capital and operating costs. The case of Emptor cited earlier (Aubert *et al.*, 2003b) is another

illustration of the disputes that may result from measurement problems. A few months into the contract with its supplier, the volume of Emptor activities increased and batch window problems began to appear. Since there was not enough time at night to process the jobs and have the systems available in the morning, the supplier decided to skip some jobs and process them over the weekend. This resulted in major problems for Emptor and haggling over the definition of service level started. The supplier was arguing that its commitment was to have the system available 97% of the time and that if a batch run was skipped and the system was still on-line at 07.00 h the 97% target was met. Emptor's management obviously did not agree with that interpretation.

Consequences

Two main consequences are associated with the four risk scenarios: service debasement and cost escalation (Lacity and Hirschheim, 1993; De Looff, 1995; Earl, 1996; Aubert *et al.*, 1998; Kern *et al.*, 2002a).

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. 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. It is not limited to 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).

All four scenarios may lead to either or both consequences. For instance, in a lock-in situation the supplier may very well be tempted to increase its costs unduly. Aubert *et al.* (forthcoming) gave the example of a large public corporation, whose supplier, at contract renewal time, proposed a contract where the costs were 50% higher than the second bidder's proposal. The supplier was convinced that its client was locked-in: the corporation had not retained any in-house expertise with the activity and relatively few suppliers were large enough to offer the breadth and depth of service required. In some instances the termination costs, along with handover and reimplementation costs of the next generation contract, can be such that they themselves constitute significant switching barriers. Because the client cannot easily turn toward another service supplier, a lock-in situation may also lead the supplier to renege on service levels.

Contractual amendments and contract renegotiation can indeed be very costly. As an extreme example, when renegotiation goes as far as contract cancellation the costs can become prohibitive. Transition and management costs can represent an important proportion of the total costs of an outsourcing agreement. According to some sources, percentages of between 5 and 7% of the value of an outsourcing contract may have to be devoted to these costs (Scheier, 1996). In some instances, these additional costs make the benefits a firm expected to gain from outsourcing its IT activities vanish altogether.

The extremely publicized lawsuit between EDS and Xerox (*Wall Street Journal*, 2001) illustrates how costly disputes and litigations can become. EDS brought suit against its client alleging that it breached its contract by bringing back some activities in-house that were part of the outsourcing contract. Not all disputes and litigations are as publicized, but they are indeed costly. Apart from the direct costs of lawyers' and experts' fees the costs of the in-house resources whose time is spent working on the litigation, indirect costs, associated with reputation effects, may also be incurred. Even when disagreements do not lead to open disputes and litigations, they can be costly. Kern *et al.* (2002b) gave the example of Clientco, a firm affiliated with a large petroleum company, where disagreements between the client's and the supplier's operation managers in charge of managing the relationships became ongoing confrontations, up to a point where both managers had to be replaced. According to Kern *et al.* (2002b) this was very costly for both the client and the supplier. Disputes can also lead to service debasement. For instance, because of its dissatisfaction with its supplier's performance, Detroit Medical Center recently sued to dissolve a 10-year $300 million contract with Provider HealthNet Services. According to the client, Provider HealthNet Services failed to achieve timely completion of medical records and to deliver a plan for training employees and for organizing the department for computerized records. Yet the supplier argued that it was the uncooperative and obstructive action by Detroit Medical Center officials that caused the performance problems (Morrissey, 2003).

The two consequences, service debasement and cost escalation, are closely related and one can lead to the other. For instance it may happen that, because of service debasement, the client has to step-in in a 'firefighting' mode and perform some of the operations that should normally be conducted by the supplier, hence incurring direct costs. On the other hand, faced with increasing costs, the decision may be made to decrease the service level.

Risk mitigation mechanisms

The four scenarios described above are not 'acts of God': rather 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. 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 of the occurrence of a scenario or decrease the severity of the consequence, should the scenario take place.

These risk mitigation mechanisms are listed in Table 2 and are limited to the suggestions of the two theories used in this study. Since the design, negotiation, implementation and monitoring of any given risk management mechanism can be costly, decision makers will have to compromise between the levels of risk they are assuming and the extent of use of each mechanism (Aubert *et al.*, 2003a). It is not possible to generalize with respect to the cost-effectiveness of a given mechanism: each situation ought to be analysed with respect to its particular cost/risk reduction situation.

Risk mitigation mechanisms associated with lock-in

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 *et al.*, 1978). Two mechanisms may be used for influencing 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. For instance, the client may invest in the supplier's learning of the company's processes, tools and methods and the supplier may also invest in physical equipment, site relocation, human resources learning, etc. The second mechanism is dual sourcing (Richardson, 1993; Kern *et al.*, 2002b). This multiple vendor strategy can be traced to Porter's (1985) recommendation for using several competing vendors in order to ensure low-cost, high-performance levels and acceptable service quality. 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 (Aubert *et al.*, 1998; Currie and Willcocks, 1998). The well-documented example of dual sourcing at BPX is an example of the risk reduction role of this mechanism

(Cross, 1995; Lacity and Willcocks, 2001). Having an agreement with three suppliers BPX could deflect the impact of a service slowdown by spreading services between the suppliers and by keeping suppliers conscious of the company's ability to switch to another supplier (Aubert *et al.*, 2001). Aubert *et al.* (2003b) gave the example of Publix, a large public corporation that also opted for dual sourcing as a means of preventing lock-in.

Risk mitigation mechanisms associated with contractual amendments

Under highly volatile conditions and in order to avoid costly contractual amendments parties can develop sequential relationships (Heide and John, 1990) and agree to flexible contracts (Harris *et al.*, 1998; Kern *et al.*, 2002b). An essential aspect of cooperation in the face of unanticipated change is that the parties to a contract forgo short-term, unilateral advantages. Such forbearance is easier when the firm is confident that bilateral expectations of continuity provide the capacity for retaliating against opportunism and reciprocating 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, which consists of flexibility in price adjustment, contract provisions for renegotiation, termination of the contract and shortening the contract period. Harris *et al.* (1998) asserted 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 for protecting both the client and the supplier.

Risk mitigation mechanisms associated with unexpected transition and management costs, disputes and litigation

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 *et al.*, 1995). The authors recommend buying expertise, but also integrating external resources into an internally managed team. According to Johnson (1997), appointing a contract or relationship manager who has the responsibility for making 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). An outsourcing evaluation and negotiation requires technical, legal, management, negotiation and outsourcing expertise (Lacity and Hirschheim, 1993). The right consultants and lawyers can greatly simplify an outsourcing transaction for both parties (Klepper and Jones, 1998). In addition, Key (1995) suggested establishing a team of experts for serving as watchdogs and advisers. 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

Clan mechanisms rely on normative considerations for influencing 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 processes and objectives 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

Alternative dispute resolution refers to a variety of techniques for resolving disputes without litigation. Two of the better-known alternative dispute resolution 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 cooperatively 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.

Arbitration can be beneficial for outsourcing contracts dealing with very technical matters if it uses knowledgeable people from the industry as arbitrators (Klepper and Jones, 1998). The agreement should also contain sensible complaints and dispute resolution procedures in order 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 for enabling 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' that 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. Furthermore, in the absence of registered mediators and arbitrators skilled in the specific nature of the dispute, both parties need to negotiate the expert determination option.

Conclusions, limitations and research avenues

This paper has proposed a framework for the conceptualization 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. Rather, risk 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?).

The conceptualization 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.

The main limitation of the proposed framework is closely related to its strength. Indeed, the authors purposefully made the decision to base the analysis on strong theoretical groundings and chose transaction cost theory and agency theory for doing so. Notwithstanding the soundness and usefulness of this theoretical background, it is recognized that other theoretical frameworks are most relevant for the analysis and the understanding of IT outsourcing. For instance, the mitigation mechanisms proposed are limited to those suggested by agency theory and transaction cost theory. In reality, other mechanisms exist. For instance, by ensuring that the option of repatriating the activity is viable and cost-effective lock-in can be mitigated. Furthermore, even with a small number of suppliers, explicit legal power (disengagement, buy-back and handover) coupled with clear obligations and procedures to handover to another supplier on an agreed cost basis can mitigate lock-in against the incumbent supplier. Lastly, one of the greatest mitigation factors is the way the relationship is managed (Kern and Willcocks, 2002). The paper has already referred to contract completeness and to law as possible domains. It is recognized that other domains, such as political theory (Lacity and Hirschheim, 1993), would also be relevant. A first avenue for research would be to complete the framework developed here with insights from these areas.

Future research also needs to address issues related to the dynamic nature of risk over time. For instance, the degree of a risk factor before signing a contract may change upwards or downwards throughout the contract period. In addition, legal issues regarding the complexity of contract behaviour should be included in the framework developed in this paper in order to have a more comprehensive view of the IT outsourcing risk. Finally, a rigorous empirical validation of the constructs developed in this study is needed in order to have a sound measure of the IT outsourcing risk.

Acknowledgements

References

Alchian, A.A. and Demsetz, H. (1972) Production, information cost and economic organization. *American Economic Review*, **62**, 777–92.

Ashton, T. (1998) Contracting for health services in New Zealand: a transaction cost analysis. *Social Science Medicine*, **46**(3), 357–367.

Aubert, B.A., Rivard, S. and Patry, M. (1996) A transaction costs approach to outsourcing: some empirical evidence. *Information and Management*, **30**, 51–64.

Aubert, B.A., Patry, M. and Rivard, S. (1998) Assessing IT outsourcing risk. In *Proceedings of the 31st Hawaii International Conference on System Sciences*, Watson, H. (ed.) IEEE, Hawaii.

Aubert, B.A., Patry, M., Rivard, S. and Smith, H. (2001) IT outsourcing risk management at British Petroleum. In *Proceedings of the 34th Hawaii International Conference on Systems Sciences*, Watson, H. (ed.) IEEE, Hawaii, January.

Aubert, B.A., Patry, M. and Rivard, S. (2002) Managing IT outsourcing risk: lessons learned. In *Information Systems Outsourcing: Enduring Themes, Emergent Patterns and Future Directions*, Hirschheim, R.A., Heinzl, A. and Dibbern, J. (eds) (Springer-Verlag, New York), pp. 155–76.

Aubert, B.A., Patry, M. and Rivard, S. Gérer le risque d'impartition des technologies de l'information. *Gestion*.

Aubert, B.A., Houde, J.F., Patry, M. and Rivard, S. (2003a) Characteristics of IT outsourcing contracts. In *Proceedings of the 36th Hawaii International Conference on System Sciences*, Sprague, R. (ed.), IEEE, Hawaii.

Aubert, B.A., Patry, M. and Rivard, S. (2003b) A tale of two outsourcing contracts: an agency-theoretical perspective. *Wirtschaftsinformatik*, **45**(2), 181–90.

Auer, J. (1999) Arbitration could be better alternative in IT contracts disputes. *Computerworld*, **33**(9), 58–9.

Barki, H., Rivard, S. and Talbot, J. (1993) Toward an assessment of software development risk. *Journal of Management Information Systems*, **10**(2), 203–25.

Barzel, Y. (1982) Measurement cost and the organisation of markets. *Journal of Law and Economics*, **25**(1), 27–48.

Clark, T.D., Zmud, R.W. and McGray, G.E. (1995) The outsourcing of information services: transforming the nature of business in the information industry. *Journal of Information Technology*, **10**(4), 221–37.

Collins, H. (1999) *Regulating Contracts* (Oxford University Press, Oxford).

Crocker, K.J. and Reynolds, K.J. (1993) The efficiency of incomplete contracts: an empirical analysis of air force engine procurement. *Rand Journal of Economics*, **24**, 126–46.

Cross, J. (1995) IT outsourcing: British Petroleum's competitive approach. *Harvard Business Review*, **73**(3), 95–102.

Currie, W. and Willcocks, L. (1998) Analyzing four types of IT outsourcing decisions in the context of size, client/

supplier interdependency and risk mitigation. *Information Systems Journal*, **8**, 119–143.

De Looff, A.L. (1995) Information systems outsourcing decision-making: a framework, organizational theories and case studies. *Journal of Information Technology*, **10**(4), 281–97.

Doz, L. (1996) The evolution of co-operation in strategic alliances: initial conditions or learning processes? *Strategic Management Journal*, **17**, 55–79.

Earl, M.J. (1996) The risks of outsourcing IT. *Sloan Management Review*, **37**(3), 26–32.

Eisenhardt, K.M. (1989) Agency theory: an assessment and review. *Academy of Management Review*, **14**(1), 57–74.

Genus, A. (1997) Unstructuring incompetence: problems of contracting, rust and the development of the Channel Tunnel. *Technology Analysis and Strategic Management*, **9**(4), 419–36.

Harris, A., Giunpero, C.L. and Hult, M.T. (1998) Impact of organisational and contract flexibility on outsourcing contracts. *Industrial Marketing Management*, **27**(5), 373–84.

Heide, B. and John, G. (1988) The role of dependence balancing in safeguarding transaction-specific assets in conventional channels. *Journal of Marketing*, **52**, 20–35.

Johnson, M. (1997) *Outsourcing in Brief* (Butterworth-Heinemann, Oxford).

Kaplan, S. and Garrick, B.J. (1981) On the quantitative definition of risk. *Risk Analysis*, **1**(1), 11–27.

Kern, T. and Willcocks, L (2002) Exploring relationships in information technology outsourcing: the interaction approach. *European Journal of Information Systems*, **11**, 3–19.

Kern, T., Willcocks, L. and Lacity, M.C. (2002a) Application service provision: risk assessment and mitigation. *MIS Quarterly Executive*, **1**(2), 47–69.

Kern, T., Willcocks, L. and Van Heck, E. (2002b) The winner's curse in IT outsourcing: strategies for avoiding relational trauma. *California Management Review*, **44**(2), 47–69.

Key, R. (1995) Outsourcing: how to contract with third party vendors. *ABA Bank Compliance*, **16**(4), 5–12.

Klein, B., Crawford, G. and Alchian, A. (1978) Vertical integration, appropriable rents, and the competitive contracting process. *The Journal of Law and Economics*, **1**, 297–326.

Klepper, R. and Jones, O.W. (1998) *Outsourcing Information Technology, Systems & Services* (Prentice-Hall, Upper Saddle River, NJ).

Koss, A.P. and Eaton, C.B. (1997) Co-specific investments, hold-up and self-enforcing contracts. *Journal of Economic Behaviour & Organisation*, **32**(3), 457–70.

Lacity, M.C. and Hirschheim, R. (1993) *Information Systems Outsourcing: Myths, Metaphors and Realities* (John Wiley & Sons, Chichester).

Lacity, M.C. and Willcocks, L.P. (2000) *Inside IT Outsourcing: A State-of-Art Report* (Templeton College, Oxford).

Lacity, M.C. and Willcocks, L.P. (2001) *Global Information Technology Outsourcing: Search for Business Advantage* (John Wiley & Sons, Chichester).

Lacity, M.C. and Willcocks, L.P. (2002) Application service provision: risk assessment and mitigation. *MIS Quarterly Executive*, **1**(2), 113–26.

Lacity, M.C., Willcocks, L.P. and Feeny, D.F. (1995) IT outsourcing: maximize flexibility and control. *Harvard Business Review*, **73**(3), 85–93.

Leifer, R. and Mills, K. (1996) An information processing approach for deciding upon control strategies and reducing control loss in emerging organizations. *Journal of Management*, **22**(1), 113–138.

Lowell, M. (1992) Managing your outsourcing vendor in the financial services. *Journal of Systems Management*, **43**(5), 23–33.

McFarlan, W. and Nolan, L. (1995) How to manage an IT outsourcing alliance. *Sloan Management Review*, **36**(2), 9–23.

MacNeil, I. (1983) Values in contract: internal and external. *Southern California Law Review*, **78**, 340–9.

March, J. and Shapira, Z. (1987) Managerial perspectives on risk and risk taking. *Management Science*, **33**, 1404–18.

Milgrom, P. and Roberts, J. (1992) *Economics, Organisation, and Management* (Prentice-Hall, Englewood Cliffs, NJ).

Morrissey, J. (2003) Not paying off. *Modern Healthcare*, **33**(19), 3.

Ngwenyama, K.O. and Bryson, N. (1999) Making the information systems outsourcing decision: a transaction cost approach to analyzing outsourcing decision problems. *European Journal of Operational Research*, **115**(2), 351–67.

Ouchi, W. (1980) Markets, bureaucracies and clans. *Administrative Science Quarterly*, **25**(1), 129–147.

Pilling, B.K., Crosby, L.A. and Jackson, D.W. (1994) Relational bonds in industrial exchange: an experimental test of the transaction cost economic framework. *Journal of Business Research*, **30**, 237–51.

Porter, M. (1985) *Competitive Advantage Creating and Sustaining Superior Performance* (The Free Press, New York).

Richardson, J. (1993) Parallel sourcing and supplier performance in the Japanese automobile industry. *Strategic Management Journal*, **14**(5), 339–350.

Sappington, D. (1991) Incentives in principal–agent relationships. *Journal of Economic Perspectives*, **3**(2), 45–66.

Scheier, R.L. (1996) Outsourcing's fine print. *Computerworld*, **30**(34), 70.

Thompson, L.R., Higgins, A.C. and Howell, M.J. (1994) Influence of experience on personal computer utilization: testing a conceptual model. *Journal of Management Information Systems*, **11**(1), 167–87.

Van der Vliert, E. (1998) Motivating effects of task and outcome interdependence in work teams. *Group and Organisation Management*, **23**(2), 124–143.

Vincent-Jones, P. (2000) Contractual governance: institutional and organizational analysis. *Oxford Journal of Legal Studies*, **20**(3), 317–51.

Walker, G. and Poppo, R. (1991) Profit centers, single-source suppliers, and transaction costs. *Administrative Science Quarterly*, **36**, 66–87.

Walker, G. and Weber, D.A. (1984) Transaction cost approach to make-or-buy decisions. *Administrative Science Quarterly*, **29**(3), 373–91.

Wall Street Journal (2001) EDS wins contract extension for Xerox project. 29 November, B8.

White, R. and James, B. (1996) *The Outsourcing Manual* (Gower Publishing Limited, Hampshire, England).

Willcocks, L., Lacity, M. and Kern, T. (1999) Risk mitigation in IT outsourcing strategy revisited: longitudinal case research at LISA. *Journal of Strategic Information Systems*, **8**, 285–314.

Williamson, O.E. (1985) *The Economic Institutions of Capitalism* (Sage Free Press, New York).

Wybo, D.M. and Goodhue, L.D. (1995) Using interdependence as a predictor of data standards: theoretical and measurement issues. *Information and Management*, **29**(6), 317–29.

Biographical notes

Bouchaib Bahli is Assistant Professor of Management Information Systems in the John Molson School of Business at Concordia University. His research interests include risk management of software development projects, information technology outsourcing and e-business security systems. Dr Bahli's publications appear in Communications of AIS, the *International Conference on Information Systems,* and *the Hawaii International Conference on System Sciences*, among others. He is an experienced systems developer.

Suzanne Rivard is Professor of Information Technology and holder of the Chair of Strategic Management of Information Technology at HEC Montréal. She received a Ph.D. from the Ivey School of Business, the University of Western Ontario. Dr Rivard's research interests are in the areas of outsourcing of information systems services, software project risk management, strategic alignment of information technology, and the adoption of information technology.

Address for correspondence: Bouchaib Bahli, Decision Sciences and Management Information Systems, The John Molson School of Business, Concordia University, Montreal, Canada H3G 1M8.