Examining the Outsourcing of Information Systems
Functions from Diverse Theoretical Perspectives

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Abstract

In recent years there has been a significant increase in the incidence of information systems (IS) outsourcing. Technological uncertainty, cost reduction, the need to concentration on core business, and the increasing quality and competition among a growing cadre of service providers, (e.g.) are often discussed as key outsourcing motivators. While a number of theoretical frameworks have been used to structure studies on this phenomenon, the efforts have often been piece-meal and disjointed.

IS outsourcing involves multiple facets, including the initial decision, choice of governance structure and the management of the ongoing relationship. This study attempts to provide a view of outsourcing from three theoretical lenses – resource/knowledge-based, transaction costs, and agency theory, focusing on key variables espoused by these theories and their relevance to the different facets of outsourcing. It is suggested that resource/knowledge-based theory can help explain strategic initial IS outsourcing decisions and some IT determinants of sustained competitive advantage related to those decisions. Transaction costs theory can help explain cost-reduction strategies for initial IS outsourcing decisions and point out different governance mechanisms for a variety of IS outsourcing relationships (e.g., supplier-firm and contract type choices). Agency theory can help design and explain adequate and costliest ways (i.e., compensation schemes) to manage IS outsourcing and/or internalized (i.e., internal procurement) relationships. Collectively, it is hoped that this effort will serve to integrate disparate approaches to this important and growing phenomenon.

Keywords: Information Systems Outsourcing, Outsourcing theory, research model
1. Introduction

Outsourcing of the information systems (IS) functions is defined as a firm’s decision to turn over or transfer part or all of a firm’s IS functions to one or more service providers. Requested services (or IS functions), supplied by such third parties for a certain amount of time and money, might involve different combinations of people (e.g., managers, programmers, analysts, and technical specialists) and/or technological resources (such as, hardware, software, and technology platforms) (Huff 1991, Dué 1992, Grover and Teng 1993, Khosrowpour et al. 1996, Willcocks et al. 1996, Willcocks and Kern 1998).

Several reasons can be pointed out to justify the recent IS outsourcing proliferation trend and a significant number of studies (e.g., Cheon et al. 1995, Teng et al. 1995, Aubert 1996, Looff 1997, Poppo and Zenger 1998, Willcocks and Kern 1998, Hirschheim and Lacity 2000) have been conducted based on management and economic theories. These studies attempt to explain IS outsourcing decisions and determinants of outsourcing. Some commonly espoused reasons include the increasing inefficiency and ineffectiveness of firms in dealing with IS internally, the complexity of today’s IS environment, the catalytic effect of highly publicized IS outsourcing cases (e.g., Eastman Kodak, Copperweld and Dial, General Dynamics, and McDonnell Douglas) involving outsourcing deals of high magnitude, complexity and potential irreversibility, and firms’ increasing e-business initiatives.

While a number of theoretical frameworks have been used to study outsourcing, their treatment has been mostly piece-meal and has focused on one facet of the phenomena. Given the multi-faceted nature of outsourcing, we believe it would be useful to carefully review theories from management and economics that can be used to interpret the IS outsourcing phenomenon, identify key variables, and understand how these perspectives might better explain different facets of the IS outsourcing process.

Three broad theoretical lenses are reviewed: (1) resource/knowledge-based perspective, (2) transaction cost perspective, and (3) an agency perspective. The next section provides strategic interpretation of the IS outsourcing decision from a resource/knowledge-based perspective, and a transaction costs perspective (sections 2.1. and 2.2. respectively). Section 3 looks at design and management issues
concerning IS outsourcing relationships from an agency perspective. Section 4 tries to integrate the three theoretical perspectives previously studied (in sections 2.1, 2.2, and 3) into a broader conceptual model for studying outsourcing. In each section, an attempt is made to highlight key tenets of the theory, and its research and practical implications for IS outsourcing.

2. Frameworks for IS Outsourcing Decisions: Resource/Knowledge-Based and Transaction Costs Theories

In IS outsourcing, firms need to address key outsourcing decisions like: (1) the IS activity choices – what activities should be handled to supplier-firms and which ones should be kept in house and (2) the kind of relationship (e.g., type of contract, contract terms and governance) that should be established with external supplier-firms (Aubert et al. 1996).

Two theories – resource/knowledge-based and transaction costs have been used to explain IS outsourcing decisions and its determinants since they seem to provide insight into the outsourcing decision, both in terms of the nature of IS activities that could be outsourced and the relationship that should be cultivated. Both consider that efficient production might need specialized investments in particular assets (e.g., physical and human) since the development of firm-specific assets helps firms reducing production costs, innovating, and meeting production specifications (Poppo and Zenger 1998).

Although the rationale for the theories differs, they both agree that the building of a specific asset base would be better conducted in-house as a part of the firm, than outsourced or as a part of the market.

2.1. Resource/Knowledge-Based Theory

Theoretically, firms are regarded as collections of productive, e.g., physical, human, information, and organizational capital resources, and might be able to gain competitive advantage if: resources and capabilities differ across competing firms (i.e., resource heterogeneity); and it is extremely expensive for competing firms to eliminate those differences (i.e., resource immobility). Sustaining such competitive advantage, however, will only be possible for firms with valuable, rare, imperfectly

To improve their competitive positioning, firms should exploit their available resources and capabilities because, by doing so, on one hand, they may gain and defend their advantageous positions with respect to resources that are important to the production and distribution of products and services. On the other hand, if firms’ stock of resources does not correspond to what was expected from it, firms could externally acquire (i.e., outsource) some complementary resources to fill the gaps.

Due to their magnitude, complexity, and potential irreversibility, IS outsourcing decisions have been taken as important strategic issues facing IS management since handing over part or all of a firm’s IS functions is now considered to be a valid and viable option to make firms gain and/or sustain competitive advantage (Teng et al. 1995). For buyer-firms strategic advantages may exist in the form of rapid access to otherwise unavailable state-of-the-art technologies, avoidance of the risk of obsolescence, benefits from outside provider’s economies of scale, and the ability refocus on core business and strategic use of IT.

However, such outsourcing of IS functions may not be appropriate from a resource based perspective if convincing possibilities of gaining advantages do not exist or if firms are not willing to commit enormous resources and risk the loss of control over their IS management function through outsourcing. This is particularly true if information is a source of improved performance and sustained competitive advantage, if well used and managed.

Capital needed to develop and apply IT, proprietary technology, and managerial IT skills1 are some of the features that can possibly make IT be a source of sustained competitive advantage (Mata et al. 1995). These inimitable and immobile resources could be evaluated as critical due to the existence of:

(i) Capabilities and skills to manage technical and market uncertainties efficiently (i.e., capital needed to develop and apply IT). This will let firms make risky IT investments and gain sustained competitive advantage.

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1 Managerial IT skills “include management’s ability to conceive of, develop, and exploit IT applications to support and enhance other business functions”. Only those skills that cannot be written down, codified, or transferred at low cost with little loss in richness or understanding can probably be a source of sustained competitive advantage (Mata et al. 1995).
(ii) Proprietary technology that is protected through secrecy. However, IT diffusion (made possible through, e.g., workforce mobility, reverse engineering, and formal and/or informal technical communication) limits proprietary technology’s ability of being a source of competitive advantage because it acts to reduce secrecy.

(iii) Managerial IT skills that might be relevant to establish valuable linkages between different firms (e.g., strategic alliances to get IT-based competitive advantages) and between firms and their customers since, socially complex linkages that are possessed only by few competing firms can be a source of sustained competitive advantage.

Consequently, if a firm’s information capital falls short of expectations IS outsourcing may become a viable alternative (Cheon et al. 1995, Teng et al. 1995).

In conclusion, resource-based perspective provides a framework that highlights the importance of (i) evaluating firms’ valuable and difficult-to-imitate resources and capabilities; (ii) identifying which resources are missing; and (iii) assessing what resources and/or capabilities should be extended and upgraded (e.g., through outsourcing), in order to make firms gain and/or sustain competitive advantage.

2.1.1. Knowledge-Based Theory

The knowledge-based view of the firm is a specialized perspective of the broader resource-based theory. It focuses on firm-specific investments that have the potential of being a source of valuable knowledge and capabilities. Amongst a firm’s IS resources and capabilities, human capital is key to this perspective, with special relevance being given to individuals’ skills and know-how (i.e., knowledge), and their transference when those individuals cooperate in joint production (i.e., human assets embedded in firm-specific routines, language, and skills).

According to knowledge-based theory, IS outsourcing decisions might be influenced by the governance mechanism (e.g., market or firm) that causes firms to apply the most valuable understanding (net of applicable costs) to business activities,
based on the combination of both knowledge-substitution\textsuperscript{2} and flexibility\textsuperscript{3} effects, and independent of opportunism.

For instance, under firm settings, control will be exercised by an “authority relationship” that causes an individual to use the knowledge of another before the former fully integrates it. Under market settings, control will be exercised by an “autonomous relationship” that obliges knowledge to be integrated before a party agrees to change its actions on the basis of such knowledge. Hence, costs of knowledge integration associated with knowledge-substitution effects will probably be lower under firm settings.

Significant differences in parties’ perspectives will increase the costs of adjusting to duties and responsibilities in response to uncertain or unanticipated events (especially under market governance), often forcing market contracts to be short and costly with a greater likelihood of frequent and important changes in the market environment, or knowledge that will be needed in the future (Conner and Prahalad 1996).

Beyond market and firm governance mechanisms, some theorists (e.g., Grant and Fuller 1995) argue that there exits another form of governance – subcontracting network agreements (based on inter-firm collaboration), under which utilizing and integrating specialized knowledge might be more efficient than under both market or firm. This network is a labyrinth of, usually, medium or long-term (of about one year) semiformal contracts between buyer and supplier-firms up and down the vertical chain. Usually, such “inter-firm network” arrangements are not fully determined by ownership.

Subcontracting networks should be considered into the IS outsourcing decision-making process if (Besanko et. al 1996, Grant and Fuller 1995):

(i) Markets pose some efficiency problems to explicit knowledge transfer and integration – subcontracting networks can permit repeated exchanges of knowledge on a reciprocal basis.

\textsuperscript{2} Knowledge-substitution effect concerns to “how parties’ starting knowledge endowments are blended and used” (Conner and Prahalad 1996).

\textsuperscript{3} Flexibility effect concerns to “how learning or developments occurring during the course of the work are taken into account” (Conner and Prahalad 1996).
(ii) Knowledge embodied in products is imperfect – subcontracting networks can support market governance achieve efficient knowledge integration.

(iii) There is a high mismatch between the firm’s products and knowledge domains – subcontracting networks can facilitate the access to and the integration of knowledge that is, usually, more efficiently provided by other firms; they can also induce fully utilization of knowledge that is only partially deployed within firms.

(iv) Firm’s perceived uncertainty about future knowledge requirements of its present set of products is high – the benefits of subcontracting networks compared with internalization, as a means of accessing and integrating additional knowledge, increase with the firm’s perceived uncertainty.

(v) Early-mover advantage is quite beneficial in technically-dynamic industry environments – the potential of subcontracting networks compared to internalization, as a means of reconciling rapid access and integration of relevant new knowledge with long time frames needed for knowledge creation and integration, increases with early-mover advantage benefits.

It is also suggested by knowledge-based theory that the more specific a firm’s activity is, the greater use it makes of firm-specific language and routines, and hence the more efficient is firm (or hierarchical) governance. However, Poppo and Zenger (1998) empirically demonstrate that, under rapidly changing technological environments (which characterizes many IS functions), increasing specificity of an IS activity can even damage firm’s efficiency and performance. For instance, routines and languages surrounding mainframe computer systems and long-entrenched software within firms might have promoted efficient dialogue and governance within firms; however, those same routines and languages have also deterred critical new knowledge acquisition by firms, which requires a new language and set of routines.

Therefore, under high technological uncertainty, markets might be preferred to firms as, (e.g.) they are more likely to make groups of individuals directly benefit from new knowledge formation, to be more flexible and skillful than firms are at adapting to rapid technological changes. The internalization of an IS specific activity
will only be beneficial when valuable knowledge can be generated by the formation of such languages and routines (Poppo and Zenger 1998).

2.1.2. Implications for Research Models

Resource/knowledge-based perspective focus on how the possession and acquisition of IS valuable resources and capabilities (e.g., staff skills, know-how and quality, cost effectiveness, financial condition, facilities, and machinery) might be a firm’s source of competitive advantage. Such perspective suggests that outsourcing should be regarded as a strategic decision that can be used to diminish differences between desired and actual firm’s IS resources and capabilities when their performance falls short of expectations (Teng et al. 1995, Cheon et al. 1995). Thus, from a strategic-theoretic perspective, every time an IS outsourcing decision is about to be taken the following question can be formulated:

I. Which factors possibly influence the IS outsourcing decision-making process?

Question I addresses the resource attributes (i.e., factors) that might affect governance mechanism choices (market, firm or subcontracting network). The dependent variable would then be the outsourcing decision, i.e., should the firm hand over to an external provider a particular IS function, or should it be internalized. Value, rareness, imperfect reproducibility, and non-substitutability are some of the attributes that, usually, make IS resources and capabilities (e.g., physical, human, information and organization) differ from firm to firm. Hence, value, rareness, imperfect reproducibility, non-substitutability, and resource allocation can be regarded as independent variables, upstream to the outsourcing decision, since they are critical to make firms gain or sustain competitive advantage.

Deciding what governance mechanism should be chosen for a particular IS function might also be influenced by both knowledge-substitution and flexibility effects. Net value of knowledge-substitution and net value of flexibility should then be regarded as independent variables to be considered in every IS outsourcing decision-making process. If the net value of these effects is positive outsourcing might be considered.
In addition, uncertainty (which refers to the volatility of the environment that cannot be anticipated) may be high due to unpredictable market, technological or economic trends, contractual complexity, and quality of outputs (Aubert et al. 1996, Besanko et. al 1996, Conner and Prahalad 1996, Looff 1997, Poppo and Zenger 1998). Therefore, uncertainty and industry competitiveness should also be added to the set of independent variables since, if high, they are usually responsible for parties’ differences in perspectives and event unpredictability, which may largely impact the firm’s productivity and profitability, and, hence, its IS outsourcing decisions.

Some authors (e.g., Grant and Fuller 1995, Poppo and Zenger 1998) argue that the size of the knowledge set required for a particular IS function might also affect the performance of different governance mechanisms. For instance, the larger the knowledge set size needed to perform an IS activity, the worse firm’s performance will be. Also according to some knowledge-based theorists (e.g., Grant and Fuller 1995) explicit knowledge transfer and integration barriers, level of knowledge embodied in products, extent of capacity utilization of knowledge and dynamics of early-mover advantage might lead the decision-making process to a subcontracting network agreement.

Table 1 summarizes the potential variables represented in this discussion.

Table 1 – Variables conditioning IS outsourcing choices, under resource/knowledge-based perspective

<table>
<thead>
<tr>
<th>Question #:</th>
<th>Dependent Variable:</th>
<th>Independent Variables:</th>
</tr>
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| 1.          | IS outsourcing decision | Firm’s IS resource attributes:  
- Value  
- Rareness  
- Imperfect reproducibility  
- Non-substitutability  
- Human capital attributes:  
  - net value of knowledge-substitution  
  - net value of flexibility  
  - size of the required knowledge set  
  - explicit knowledge transfer barriers  
  - explicit knowledge integration barriers  
  - level of knowledge embodied in products  
  - extent of capacity utilization of knowledge  
Resource allocation  
Industry competitiveness  
Uncertainty  
Dynamics of early-mover advantage |
2.1.3. Practical Insight

In general, resource/knowledge-based theory suggests that buyer-firm’s IS resources and capabilities should be extended and/or upgraded through outsourcing as long as this process keeps on covering differences between buyer-firm’s desired and actual IS resource and capabilities, making it gain and/or sustain competitive advantage.

Because IS products and services, usually, require a large set of different skills and know-how, and most of these can be used in more than one IS product/service, only a few firms are able to make a close match between their knowledge set and their IS needs. Consequently, resource/knowledge-based perspective suggests that managers should seriously consider the outsourcing possibility if: the size of the knowledge set required to develop a specific IS function is quite large; additional knowledge is expensive to acquire and would rarely be used on other firm’s products/services; and “taking the first move” is advantageous in that firm’s industry.

However, since firms must defend their possible source of sustained competitive advantage, care should be taken if the IS product/service (to be handed over) is quite distinct (e.g., valuable, unique, difficult to imitate and/or non-replaceable) from others usually used by competing firms. In this case, theory suggests subcontracting network arrangements between buyer-firm and IS provider(s) could be a possible solution. If such an IS product/service is highly integrated with core business processes and buyer-firms are interested in acquiring new knowledge, resource/knowledge-based theory advocates that such function should be internalized.

2.2. Transaction Cost Theory

IS outsourcing decisions have also been studied under an efficiency-based perspective – the transaction cost view of the firm by Williamson (1989). This economic perspective assumes that firms profit maximizing (or cost minimizing) entities when selecting amongst competing strategic options. Some authors suggest that cost-reduction strategies motivate IS outsourcing decisions (Aubert et al. 1996). On the supplier side these include pooling of demands that allow supplier firms to exploit economies of scale and scope and utilize excess capacity in the face of demand. On the buyer side these include elimination of large fixed costs during recessions and transferring adjustment costs from buyer to supplier-firms when a new
technology is adopted. On both sides, outsourcing could allow firms to concentrate on their core businesses (which makes it easier for specialized firms to attract highly skilled professionals, which are regarded as a source of efficiency and productivity). While the US auto industry provides compelling evidence of outsourcing primarily driven by cost reduction (Christian, 1997), some evidence exists that IS outsourcing is also primarily motivated by the need to reduce costs and generate cash (Smith, et.al., 1998).

Transaction cost theory focuses on the transaction (i.e., the exchange of goods and/or services between economic actors). These transactions can be found inside or outside the firm. The theory provides a framework to explain and justify managers’ cost-reduction based IS outsourcing decisions by examining the impact of transaction features, e.g., asset specificity\(^4\), uncertainty, and frequency, on alternative governance mechanisms’ (e.g., hierarchical or firm, market, and clan\(^5\)) performance (Poppo and Zenger 1998). The organization of economic activity then primarily depends on balancing production costs\(^6\) against transaction costs (or coordination costs) (Looff 1997). Thus, economic actors seeking to minimize costs and maximize performance (where Costs = Transaction Costs + Production Costs) will match different transactions to different governance mechanisms.

Transaction costs encompass costs of organizing information, planning and adapting task completion, negotiating and contracting, measuring, monitoring, enforcing, and policing contracts, coordinating behavior, safeguarding the interests of the transacting parties, inducing appropriate behavior adjustments (Aubert et al. 1996, Looff 1997, Pitelis 1998). These costs can vary depending on human bounded rationality\(^7\) and opportunistic behavior\(^8\), environmental uncertainty, difficulties in

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\(^4\) Asset specificity being present in every transaction measures the degree to which, e.g., human, physical, site, company-specific routine and/or knowledge assets can be redeployed to alternative uses and by alternative users without sacrificing productive value (Nam et al. 1996).

\(^5\) Clans are groups of economic actors with a shared culture that institute procedures to balance the goals, interests, and values of the contracting parties, where transactions are based on trust and oral agreements (Aubert et al. 1996, Looff 1997).

\(^6\) Production costs refer to the direct costs of producing and delivering a product and/or service; it may also reflect differences in scale or production capability (Poppo and Zenger 1998).

\(^7\) Bounded rationality refers to agents’ inability to find or process all the information available regarding a transaction, which makes it difficult to fully evaluate the consequences of all possible decisions and actions (Williamson 1989, Looff 1997).

\(^8\) Opportunistic behavior refers to “self-interest seeking with guile” (Williamson 1989), which includes distorting and hiding of information, shirking and failing to fulfill promises or obligations, and Machiavellian intentions (Aubert et al. 1996, Nam et al. 1996, Besanko et al. 1996).
measuring\(^9\) goods or services being exchanged, and/or number of supplier-firms in the market (Poppo and Zenger 1998). Theoretically, it is suggested that outsourcing (or market governance) should dominate over other governance mechanisms when expected governance and coordination costs of the relationship with the future supplier-firm(s) are lower than the production cost advantage that supplier-firm(s) may bring (Roodhooft and Warlop 1999).

Four different types of outsourcing relationships (or contracts) can be established between IS buyer and supplier-firms:

(i) **Arms-length contracts** – similar to a sale, where buyer and supplier-firms exchange a discrete, homogeneous product or service.

(ii) **Neo-classical contracts** - the ones that establish a mechanism for solving disputes, e.g., third-party arbitration, to resolve arguments and evaluate performance since, elements of a transaction are often difficult to evaluate and future contingencies cannot be completely spelled out.

(iii) **Relational contracting** - a bilateral contract where mutual obligations are spelled out but may also be adapted as the relationship between buyer and supplier-firms changes over time. Joint ventures or strategic alliances, e.g., are a way of organizing complex business transactions collectively without sacrificing each party’s autonomy (Aubert et al. 1996, Besanko et. al 1996).

(iv) **Subcontracting networks**.

The subsequent sections will elaborate on the basic rationale of transaction cost theory and cover some important factors, e.g., uncertainty, asset specificity, measurement problems, and frequency that characterize transactions.

### 2.2.1. Uncertainty, Bounded Rationality and Opportunism

Transaction costs purports that uncertainty, bounded rationality and opportunism can make arms-length transactions (e.g., complete and sequential contracts) very costly.

Complete contracts may be unfeasible since it is quite difficult and/or may be extremely expensive, \textit{ex ante}, to specify the whole list of contingencies that might happen and the probabilities attached to each one; \textit{ex post}, to manage and legally enforce such contracts. Sequential contracts (in which parties wait until the state of nature is known before contracting) face the risk of opportunistic behavior. Parties will have imperfect incentives to commit themselves, and may refuse a prior agreement since they worry about making irreversible investments or commitments (i.e., the hold-up problem). That is, parties can later be forced to accept disadvantageous contract terms, and future adaptations of renegotiations might not be in their best interest (Aubert et al. 1996, Besanko et. al 1996).

The approach also suggests that firms should internalize extremely expensive and risky arms-length contracts but such contracts can also be accomplished through neo-classical, relational contracting, or subcontracting networks. Relational contracting, e.g., is likely to be expected when (Aubert et al. 1996, Besanko et. al 1996, Pitelis 1998):

(i) High frequency and asset specificity combine with not as high uncertainty and measurement problems.

(ii) The development and production of a good or service requires close coordination among different areas of expertise and skills from all of those areas.

(iii) It is very costly for any firm alone to develop all the necessary know-how.

Uncertainty characterizes the provision of IS functions. It may be caused by unpredictability of IS markets, technological change and development, and unpredictable developments in buyer-firm’s business processes and environment, affecting alternative governance mechanisms’ performance. Uncertainty is high if IS functions, e.g., support complex business processes, or if they are technically complex (e.g., requiring many types of hardware and software to interconnect a large, disperse, and heterogeneous community). In such instances a firm’s operations may have been altered in completely unanticipated ways due to advances in computing, communications, image processing, data base management and expert systems (i.e., rapid technological changes) (Looff 1997, Poppo and Zenger 1998). Once an IS transaction requires extensive coordinated adaptation and knowledge transfer, the
uncertainty could jeopardize the performance of market governance more than firm governance.

The level of bounded rationally present in IS transactions depends on buyer-firms’ ability to fully assess the consequences of all possible decisions in selecting, managing, and controlling IS supplier-firms. Such ability is partly based on buyer-firm’s knowledge about, their IS activities requirement and their ability to incorporate that knowledge into the contract.

Opportunism is present in IS outsourcing transactions since supplier-firms sometimes misrepresent their abilities or abuse their knowledge advantage to sell hardware and/or software that buyer-firms do not need or could get elsewhere by a cheaper price. For instance, once buyer-firms want to change system development requirements or want to decrease the volume of network capacity usage, supplier-firms may abuse their bargaining position (Looff 1997).

Relational kind of contracting is sometimes established between buyer-firm and software houses when outsourcing of data center operations and application support is involved. Some authors have suggested that suggest that relational contracting is better suited for technically mature10 and highly integrated IT activities11 (Lacity et al. 1996).

For instance, mainframe-based data center operations and accounting systems are examples of highly mature IT activities. If such IS activities are highly integrated with core business processes, buyer-firms incur higher risks and must develop a close relationship with supplier-firms in order to keep the integrity of interfaces (Lacity et al. 1996).

2.2.2. Asset Specificity

Specialized, or specific, investments may involve, e.g., human and physical asset specificity and/or dedicated assets (Aubert et al. 1996, Besanko et. al 1996). Depending on the transactions’ level of specialization, transaction costs perspective suggests that they can be classified into three categories (Looff 1997):

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10 Technical maturity determines buyer-firm’s ability to precisely define requirements, and negotiate detailed contracts in which supplier-firms will be responsible for the management and delivery of an IT activity (Lacity et al. 1996).
(i) Non-specific – transactions that require standard equipment and non-specialized knowledge.

(ii) Idiosyncratic – transactions that require specific investments in human, physical, site and/or dedicated assets.

(iii) Mixed – transactions that have attributes from both non-specific and idiosyncratic transactions.

Theoretically, non-specific transactions do not require supplier-firms to make heavy investments in order to manage buyer-firms’ operations, therefore, buyer-firms’ asset specificity can be avoided and outsourcing contracts can exploit cost saving opportunities (e.g., supplier-firms’ economies of scale and pooling demand, and sharing expertise), which makes such contracts easy to negotiate. Non-specific exchanges usually involve high levels of competition among many supplier-firms, thereby reducing potential opportunism through market governance. Arms-length contracts will be best suited for these occasionally frequent non-specific transactions; markets tend to be more efficient than firms (Looff 1997, Aubert et al. 1996, Nam et al. 1996).

Idiosyncratic transactions are complex activities that, generally, involve firm’s specific expertise and know-how, and require an understanding of the firm’s environment, routines, structures, and information being processed (Aubert et al. 1996, Looff 1997). Transaction costs framework suggests that such transactions make parties’ relationship change from “a large numbers” bidding situation to a “small numbers” bargaining situation, and, because of this, once the relationship has been established, parties can no longer switch trading partners costlessly. In such cases assets would have to be reconfigured to be valuable in a new relationship and there are sunk costs (usually high) associated with the previous relationship. High levels of uncertainty are another characteristic of idiosyncratic transactions that may lead to opportunism since buyer-firms cannot oversee all possible alternatives and prescribe the necessary actions a-priori. Thus, buyer-firms postpone decisions about appropriate actions till problems arise, and, by then, supplier-firms will be in a better negotiating position and may abuse their resulting bargaining power. Theoretically, idiosyncratic transactions require a governance mechanism to protect and prevent the investor from

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11 Highly integrated IT activities are those activities that support other business processes and technical systems, and cannot be completely separated from them (Lacity et al. 1996).
being locked in the transaction but governance mechanism choices for such transactions will also depend on the transaction’s level of uncertainty and recurring character (Aubert et al. 1996, Besanko et. al 1996).

Investments in technology are commonly quite specialized (Poppo and Zenger 1998). Examples of specific assets implied by those investments are: the know-how that the analyst must develop in order to perform a particular task adequately; highly specific software; and assembly lines to manufacture specialized integrated circuits (Aubert et al. 1996, Besanko et. al 1996). However, transactions involving hardware assets can, generally, be regarded as non-specific since both equipment and operating systems standards are already widespread. Absence of specific investments was found when operations, running on a standard machine (i.e., an IBM 3090), were transferred to the supplier-firm’s computer. Systems operation transactions, generally, allow supplier-firms to keep and operate machines (e.g., IBM AS/400) owned by buyer-firms. Telecommunication services, EDI networks, PC installation, and PC physical maintenance are other examples of such non-specific transactions.

Usually, there are many buyer-firms willing to buy those IS functions, so supplier-firms can easily reallocate human and physical resources once a buyer-firm terminates its contract. As there are also many external vendors providing such IS functionality buyer-firms can, with low search costs, switch from one supplier-firm to another. For instance, in the banking industry Ang and Straub (1998) observed that in many of the non-specific outsourcing arrangements production cost advantages generated by vendors far exceeded the additional transaction costs incurred by the buyer-firm. These kind of outsourcing contracts, generally, utilize dated technology, and can provide buyer-firms with a large and diversified inventory of replacement parts and equipment (usually making assistance more reliable at lower cost than buyer-firm’s internal services would provide).

Software development activities are often less standardized than hardware activities. As one moves along the systems development life cycle, there are different software activities that entail high and low asset specificity (e.g., early phases of a software development project often involve more human asset specificity than coding phases do). Transactions involving software development can be regarded as mixed. However, transactions dealing with inventory and payroll systems development are considered to be of low specificity (Aubert et al. 1996).
Idiosyncratic transactions abound in IS outsourcing relationships encompassing IS activities that may require regular face-to-face contact between buyer and supplier-firms’ staffs (e.g., user support and training); a unique combination of tools (e.g., hardware, programming languages, database repositories, and systems operations); and specific knowledge and skills. IS planning and control, development of system architectures, operations scheduling and data management are usually idiosyncratic.

Supporting the thesis, Aubert et al. (1996) in their study observed that:

(i) Buyer-firms prefer handing over general IS structures and procedures to supplier-firms, keeping in-house the coordination and supervision of recurrent and highly uncertain activities, whose performance is quite difficult to measure.

(ii) Particularly due to human asset specificity, software development is not as frequently outsourced as hardware operations.

(iii) Asset specificity helps explaining the selection of hardware operations and software development activities to be outsourced and to be kept in-house.

2.2.3. The Measurement Problem

The transaction costs framework asserts that outsourcing should dominate over other governance mechanisms for low-levels of uncertainty, low-specific investments and clearly measurable transactions. Neo-classical contracts may be suited for occasionally frequent, mixed or idiosyncratic transactions but, when accurate measures cannot be found, and outsourcing is still preferred to internalization, clan governance mechanisms should be chosen, enabling parties to share information and align goals (Looff 1997, Aubert et al. 1996). Internal procurement is more likely to be expected when high level of asset specificity, and uncertainty combine with measurement problems. The firm will, therefore, tend to incur in set-up costs of organizing the transaction itself since market-contracting costs will rise to a greater extent than the costs of transacting internally (Aubert et al. 1996, Coles and Hesterly 1998).

IS outsourcing decisions seem to be related with a firm’s ability to measure information services. That is why many outsourcing contracts involving hardware operations, e.g., rely on measures (e.g., response time, disk space, period without
interruption, total time of possible use, time between failure, and error log), specify adequate levels of service for those measures, and include explicit provisions (e.g., fines, penalties, and contract termination) if the required service level is not maintained. As observed by Aubert et al. (1996), buyer-firms would choose to outsource a particular hardware operation if they were able to: (i) establish detailed and structured contracts, specifying all of the activities to be performed; (ii) observe and verify those activities.

Software development projects involve uncertainty over exact specifications, and user needs that are not well known at the beginning of the project. This makes them much more difficult to measure than hardware operations since: (i) parties cannot establish an indisputable scale to evaluate software development projects; (ii) it takes a long time for results to be visible; (iii) developer team’s effort is not observable; and (iv) time spent on the project does not provide an indication of the developer team’s efficiency. Predefined, mutually agreed-upon, and well-defined software evaluation measures can only be established if both buyer and supplier-firms are able to know exactly what the system will do, and once they understand the exact needs and measures of a software development project, it may be easier to choose, the activities in the project that should be outsourced (Looff 1997, Aubert et al. 1996).

2.2.4. Frequency

Frequency refers to the number of times a firm seeks to initiate a transaction. Frequency is an important factor when buyer-firms can outsource different operations, and outsourcing contracts can be renewed, changed and terminated (Looff 1997).

Transaction costs perspective suggests that recurrent transactions are more likely to be internalized by firms (i.e., internal procurement) because of sunk costs, which could make it cheaper to design an internal governance mechanism that is specifically adapted to a particular situation. On the other hand, low-frequency transactions are more likely to be organized through market interactions since it may be more costly to create a new internal governance mechanism or expand an existing one.

Frequency plays an important role in information planning and development, and implementation activities since most firms constantly have software development projects under way with activities that vary in complexity. For instance, software
projects may require a variety of skills that buyer-firm’s development team may or
may not possess, which means that required skills and their frequency of use should
be determined and considered for each project prior to the outsourcing decision (Looff

Supporting the theory, Aubert et al. (1996) observed that firms kept in-house
development activities involving frequently used skills while outsourcing those
involving special skills (i.e., expertise needed for a limited period of time) since, they
would not be willing to incur the costs of selecting, hiring, training, and laying off
employees if such expertise was needed for just one project.

2.2.5. Implications for Research Models

Assuming both IS buyer and supplier-firms’ bounded rationality and
opportunism, a transaction cost perspective can help explain firms’ efficiency-based
IS outsourcing decisions mainly driven by cost reduction strategies. The approach
provides insights on appropriate governance mechanisms (e.g., market, firm and clan)
for a particular IS function by analyzing their performance under different
transactional circumstances (e.g., asset specificity, uncertainty, and frequency).
Therefore, given an IS function, this theoretical framework might help answering the
questions that follow:

II. How can attributes of the transactions affect the IS outsourcing
decision?

III. What attributes of the transactions most affect the choice of different
contract types?

Transaction cost perspective states that asset (e.g., human, physical, site,
company-specific routine, and knowledge) specificity, production costs, economies of
scale and scope, uncertainty, measurement problems, frequency, and the number of
suppliers available to provide a given IS function might affect each governance
mechanism’s performance in different ways. In many IS services, for instance,
production efficiency is sensitive to scale, i.e., firm’s superior capabilities and larger
internal scale might probably increase its internal production efficiency, lowering the
production costs of a particular IS function and making firms perform better than
markets (Poppo and Zenger 1998). Question II focuses on the impact of these
transaction attributes as independent variables on the performance of different
governance mechanisms’ (e.g., market, firm, or clan) and thereby the outsourcing decision based on the lower transaction and/or production cost structure.

If the decision to outsource an IS function has been given a serious thought, buyer-firms should further determine the adequate type of contract for the relationship. Thus, question III addresses the transaction attributes that might impact contract type (e.g., arms-length, neo-classical, relational, and subcontracting networks) decision-making process. The dependent variable would then be the type of contract to be established between buyer and supplier-firms. Transaction costs theory suggests that uncertainty, frequency, asset specificity, number of different areas of expertise, and measurement problems are transaction attributes that can explain buyer-firms’ choice for a particular contract type, hence, they should be treated as independent variables.

Table 2 summarizes, per question, the previous discussion.

Table 2 – Variables conditioning IS outsourcing and contract type choices, under transaction costs perspective

<table>
<thead>
<tr>
<th>Question #:</th>
<th>Dependent Variable:</th>
<th>Independent Variables:</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.</td>
<td>IS outsourcing decision</td>
<td>Asset specificity</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Economies of scale and scope</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Uncertainty</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Measurement problems</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Frequency</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Production costs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Number of available suppliers</td>
</tr>
<tr>
<td>II.</td>
<td>Contract type</td>
<td>Asset specificity</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Uncertainty</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Measurement problems</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Frequency</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Number of different areas of expertise</td>
</tr>
</tbody>
</table>

2.2.6. Practical Insight

A transaction costs approach suggests that outsourcing (i.e. market governance) should be better suited for IS transactions characterized by low asset specificity, low environmental uncertainty, and low measurement problems, involving a large number of suppliers providing the IS product/service and are infrequent. Arms-length contracting would be adequate for occasionally frequent and non-specific IS functions involving for instance hardware equipment, operating systems and/or telecommunication services. Finally, firm governance is suited to extremely
expensive and risky IS transactions characterized by high asset specificity, high environmental uncertainty, and high measurement problems in which only a few IS supplier-firms are willing to invest (i.e., the “small numbers” bargaining situation) and recur frequently.

Keeping everything else constant, firm governance mechanism can be replaced (in order) by clan governance, subcontracting networks, relational contracting, or neoclassical contracting as the IS transaction levels of uncertainty, measurement problems and frequency deescalate. Such contract types could be recommended for certain types of software development and data management activities.

3. Framework for IS Outsourcing Relationships Management: 
   Agency Theory

Agency theory evaluates costs implied by principal-agent (i.e., firm-employee, buyer-supplier, or agency) relationships, hence, it can be used to explain determinants of those costs, and to help finding out appropriate designs (usually called compensation schemes) to manage a variety of IS outsourcing and/or internalized relationships (Aubert et al. 1996).

3.1. Agency Theory

Agency theory main focus is on how principals (i.e., buyer-firms) can design proper compensation schemes (rewards or incentives) in order to motivate efficient performance, which is usually unobservable or “hidden”, on the part of the agents. When agent’s (i.e., supplier-firm’s) effort is unobservable, he/she sends a message to the principal that may or may not correspond to his/her effort, meaning that principals usually have imperfect information about agents. Theoretically, an agent’s type or “nature” (i.e., good or mediocre), effort, and “luck” (e.g., market conditions) influence his/her performance. Only the agent observes its type, not the principal, therefore, the latter will not be able to obtain this information in full and without cost leading to information asymmetry (Rasmusen 1989, Gardner 1995, Seshadri 1995, Looff 1997).
Agency relationships can be defined as agreements under which the principal (a person or firm) hires another person or firm (the agent) to perform services on his/her behalf. Such relationship usually involves delegating some decision-making authority to the agent, and once the agent accepts the agreement (i.e., participation constraint), he/she can either put forth high or low effort (i.e., incentive compatibility constraint). Participation constraint makes precise what the incentives must be to get an agent to participate in a certain agreement with the principal since, when deciding to participate, agents prefer the agreement that maximizes their reservation utility. Incentive compatibility constraint makes precise what the incentives must be to get an agent to put forth a predetermined effort (Gardner 1995). Agency theory assumes that principals’ and agents’ interests are conflicting (i.e., they have discrepant goals) since agents are autonomous and prone to maximize their own interest at principals’ expense. That is, agents want to receive more money and put forth the lowest effort in order to get it (Gardner 1995, Looff 1997, and Sharma 1997).

Principal-agent relationships can be found within and between firms, i.e., agents can be either buyer-firm’s employees or supplier-firm, respectively: they are employees if buyer-firms choose to develop a particular activity under firm governance mechanism; and they are supplier-firms if buyer-firms choose to establish an outsourcing relationship. Therefore, the approach replaces the holistic notion of the firm as a profit-maximizing unit with a model of a firm as an agency relationship based on a set of agreements between principal(s) and agent(s), each one striving for their own goals. It farther examines the reasons for agency relationships and their inherent costs and problems.

Agency costs encompass (Cheon et al.1995, Aubert et al. 1996):

(i) Monitoring costs – costs incurred by the principal to assess agent’s effort.

(ii) Bonding costs – costs incurred by the agent to assure the principal of agent’s commitment.

(iii) Residual loss – the remaining loss resulting from an agent performing a task.

The magnitude of agency costs in principal-agent relationships can be influenced by outcome uncertainty, level of agent’s risk-aversion, programmability, goal discrepancy, performance measurability, and length of the agency relationship.
High outcome uncertainty may be due to materials’ and equipment quality, government policies, economic climate, technological change, and competitors’ actions. Level of agent’s risk aversion determines the amount of risk compensation buyer-firms must pay to make agents accept a risk-sharing agreement. Programmability is the degree to which agent’s appropriate behavior can be specified by the principal in advance. Higher programmability reduces the principal’s necessity and effort bonding, and monitoring the agent’s actions, which consequently reduces agency costs. Goal discrepancy will be higher if the principal and the agent work for different firms since each firm has its own profit motive. Performance measurability refers to the capacity of correctly assess agent’s asset values (e.g., physical and human, or outcomes), i.e., the extent to which buyer-firms can interpret agent’s message/effort, and agent’s action outcomes. Length of agency relationship determines whether buyer-firms can learn about agents and, thus, be able to assess agents’ behavior more accurately (Looff 1997, Poppo and Zenger 1998).

To ensure that agents act in principals’ best interest, compensation schemes design should be totally or partially dependent on agents’ performance (e.g., profits made or amount produced) (Sharma 1997). Three major categories of compensation rewards can be formulated (Gardner 1995, Looff 1997):

(i) Wage – with wage compensation schemes the agent gets paid a fixed salary that is independent of the pay-off of his/her effort, the principal takes all the risk, and the agent has no incentive whatsoever to do a good job.

(ii) Rent – with rent compensation schemes the agent receives the pay-off and the principal receives a fixed amount. Agents have the maximum incentive to do their very best but will also bear all the risk; risk-averse agents will only accept more risk if this is offset by a higher expected income.

(iii) Incentive-based – this compensation scheme involves risk sharing between agent and principal; it may include a fixed base salary and a bonus for actual performance.

IS outsourcing relationships can be regarded as agency relationships that might, usually, involve one or more of the following characteristics (Looff 1997):
(i) High outcome uncertainty – if buyer-firms are not able to specify wanted IS requirements in advance. The higher the outcome uncertainty, the higher the IS monitoring costs, which might entail for example, testing developed software, inspecting delivered documentation, and testing disaster recovery facilities.

(ii) Low level of agent’s risk aversion – if, an IS supplier-firm (i.e., agent) is willing to share the risk with the buyer-firm, making large initial investments in resources needed to satisfy that particular buyer-firm, the lower the level of agent’s risk aversion, the higher the bonding costs. The agent might not only incur initial investments but also costs of keeping buyer-firms informed about progress and performance, which include, e.g., progress reports, project meetings, quality reports, and reporting on networks availability and response time.

(iii) Large duration – the probability of lengthy agency relationships ending, as well as their agency costs, decrease as the duration of the attachment increases because skills accrue over time, and parties usually develop a common understanding, which facilitates supplier-firm’s evaluation in an IS outsourcing relationship (Nam et al. 1996).

(iv) High goal discrepancies and information asymmetries – are arguably higher in IS outsourcing relationships than in internalized ones since it is easier to monitor internal employees than to monitor external supplier-firms so information asymmetries can be reduced (Poppo and Zenger 1998).

The different kinds of compensation schemes mentioned earlier can be applied in an IS outsourcing context. When buyer-firms go for wage compensation schemes, internal, or hired, IS staff gets paid a fixed salary (or amount) and hired IS staff will only be paid during a fixed period of time. For instance, buyer-firms may hire programmers for latter stages of a new software development project (e.g., coding). Such compensation rewards, generally, specify required skills and costs per person. Rent compensation rewards are usually established when a supplier-firm rents a buyer-firm’s excess computer network capacity for a fixed fee and leases it to other buyer-firms. Or when an IS supplier-firm, in exchange for a one-time reduction of the development fee, is allowed to sell tailor-made software to other buyer-firms.
In IS outsourcing relationships ruled by incentive-based compensation rewards supplier-firms, are responsible for managing and delivering an IS function, and complementary goals are defined in the agreement to motivate supplier-firms’ good performance. For instance, if an IS supplier agrees to get paid a percentage of the buyer-firm’s savings in inventory costs for the development and operation of an inventory management system, it can be said that an incentive-based outsourcing relationship was established. The same is true for IS supplier-firms that provide buyer-firms with programmers whenever needed: supplier-firms’ performance motivation relies on a steady stream of revenue, while buyer-firms may enjoy some volume discount for not going out to bid when they need programmers. Incentive-based compensation schemes might also be appropriate for outsourcing relationships involving technically mature and highly integrated IT activities (Lacity et al. 1996).

The next sections will focus on two determinants of agency costs affecting IS outsourcing relationships – length of the agency relationship, and performance measurability.

3.1.1. Length of the Agency Relationship

Theoretically, it is argued that long-term outsourcing relationships make buyer-firms learn more about their supplier-firms(s), have a better understanding of supplier-firm’s working procedures, and easily evaluate supplier-firm’s performance (Looff 1997). However, a central question is how lengthy should these relationships be?

Lacity et al. (1996) found out that long-term relationships (of about ten years), where buyer-firms chose to outsource all IT functions (handing over, e.g., IT assets, staff, and management responsibility), experienced significant difficulties mainly due to ill-defined agreements and inflexibility in adapting to both business and technical changes. For instance, fixed prices defined in such agreements, were generally attractive for one year and out of step with the price or performance improvements after a few years. In general, limiting duration of outsourcing agreements can keep important technical requirements stable. After that, new management and/or new outsourcing arrangements should be required.
3.1.2. Performance Measurability

Agency theory suggests that market’s performance suffer more damage than firm’s performance does if performance measurability is not accurate since, within firms, managers can substitute authority and behavioral monitoring when complicated measurement problems arise, and markets fail because they lack such capacity. However, when performance can be accurately measured, markets deliver “high-powered” incentives through prices (Poppo and Zenger 1998).

Confirming agency predictions, Poppo and Zenger (1998) found out that low, or inaccurate measurability affects the performance of both IS outsourcing and IS internalized relationships. Performance measurability decreases if (Looff 1997): (a) software development projects take too long to be complete, (b) IS activities require joint team efforts, involving buyer and supplier-firm or different supplier-firms (e.g., if hardware, software, networks, and user training is being provided by different suppliers to a particular buyer-firm), and (c) the measures do not follow an objective and/or deterministic criteria (as in, e.g., information planning quality and user support performance measurement).

3.1.3. Implications for Research Models

It is assumed by agency theory that every relationship (within or between firms) involves delegating some decision-making power to the party (i.e. the agent, e.g., buyer-firm employee(s) or IS provider(s)) that is hired to perform an IS task on behalf of another party (i.e. the principal, e.g., buyer-firm). Based on such an assumption, the theory designs compensation schemes (e.g., wage, rent and incentive-based) capable of inducing agent’s efficient performance. Therefore, given a particular IS function to be undertaken by the agent, the following question arises:

IV. Under a chosen governance mechanism (market or firm), what factors determine the selection of a compensation scheme?

Question IV addresses agency relationship attributes (i.e., factors) that might influence principal’s decision for a particular compensation reward, hence, the dependent variable would be the compensation scheme to be established between parties.
Some of the attributes pointed that affect agency relationships cost structures are outcome uncertainty, level of agent’s risk-aversion, programmability, performance/outcome measurability, goal discrepancy, and length of the agency relationship. Hence, this can be the possible set of independent variables that might influence IS buyer-firm’s choice for a particular compensation reward. Principals are also supposed to pick the compensation scheme that induces agent’s highest possible effort at the lowest possible cost, net of agency costs.

Table 3 summarizes, per question, the previous discussion.

**Table 3 – Variables conditioning compensation scheme’s choices, under agency perspective**

<table>
<thead>
<tr>
<th>Question #</th>
<th>Dependent Variable:</th>
<th>Independent Variables:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Compensation scheme</td>
<td>Outcome uncertainty, Level of agent’s risk-aversion, Programmability, Performance/outcome measurability, Goal discrepancy, Length of the agency relationship</td>
</tr>
</tbody>
</table>

3.1.4. **Practical Insight**

Agency theory suggests that three different compensation rewards (i.e., wage, rent, and incentive-based) can be designed and used to manage both IS products/services outsourcing or internalization in order to induce or motivate IS providers’ best performance on IS buyer-firms’ behalf. Wage compensation rewards might be better suited when, e.g., IS products/services’ required skills and the respective costs can be easily spelled out; rent compensation schemes might be adequate, e.g., for buyer-firms interested in selling their excess of IS capacity; and incentive-based compensation rewards should be used if IS product/service’s goals are relatively easy to define, requirements to develop such an IS product/service are hard to specify so that the IS development process is left to be managed and delivered by skilled personnel, inside or outside the firm and results achieved through IS product/service usage can be reasonably measured.

However, the approach also refers that agency costs might be higher under market than firm settings since within markets, IS buyer(s) and provider(s) are independent companies ruled by divergent goals (i.e., goal discrepancies), IS buyer-firms usually lack the knowledge to evaluate IS providers, which makes it difficult for
IS buyer-firms to distinguish (at no expense) between good and bad IS providers (i.e., information asymmetries), and it is difficult to observe and evaluate IS providers’ effort or behavior. Within firms however, IS buyer and provider (both firm employees) are ruled by the same objectives, and knowing IS buyer-firm’s capacity to provide a particular IS product/service might not involve major agency costs.

Therefore, according to the theory, market based compensation schemes should be most effective when it is easy to monitor IS providers, IS requirements, costs, and intended results can be easily spelled out, IS provider’s work and/or results from work can be accurately measured, buyer-firms are able to specify IS provider’s task(s) in advance, both buyer and supplier-firms are willing to bear risk, and it is possible to limit contract’s length to a maximum of three years.

4. Integrated Model

The theories outlined above provide guidance into the complex outsourcing phenomenon. Specifically, the structure provided by resource/knowledge-based, transaction costs, and agency theories help in identifying key variables that can direct research and practice on a variety of different aspects related to IS outsourcing. The four questions posed are repeated below:

I. Which factors possibly influence the IS outsourcing decision-making process?

II. How can attributes of the transactions affect the IS outsourcing decision?

III. What attributes of the transactions most affect the choice of different contract types?

IV. Under a chosen governance mechanism (market or firm), what factors determine the selection of a compensation scheme?

Figure 1 provides an integrated model that can guide study on IS outsourcing. The model delineates the variables from the three theoretical perspectives. What is evident is that no single theory can provide a complete understanding of outsourcing. In fact the multifaceted nature of the phenomenon requires the recognition of multiple theoretical lenses to better understand antecedents to the complex decision making process and contracting arrangements.
As can be seen from the figure, resource/knowledge-based theory helps dealing with firms’ resources and capabilities that should be allocated, transferred and/or integrated to their IS, with special focus being given to human capital knowledge (see section 2.1.2’s Table 1) and all other resources that (as well as knowledge) might be source of competitive advantage. Such theoretical analysis can provide firms with their existing and lacking set of valuable, rare, hard-to-reproduce, and non-substitutable IS resources and capabilities, under a certain industry environment (e.g., competitiveness, uncertainty, and dynamics of early-mover advantage). Resource transfer and integration problems pointed out by resource/knowledge-based analysis should help explain firms’ decisions to “fill their IS gaps” through outsourcing and/or internalization, in order to make them gain and/or sustain competitive advantage. The central thesis here focuses on resource analysis and whether firms should acquire resources externally to fill gaps and provide them with competitive advantage within their specific competitive context. This is further accentuated by knowledge theory that emphasizes characteristics of the knowledge transfer process, where knowledge is a key resource, and the cost and efficiency of that transfer.

Assuming human bounded rationality and opportunistic behavior, transaction costs theory supplements the above perspective by focusing on cost-reduction and efficiency-based aspects of IS outsourcing, and changing the unit of analysis from resource and knowledge characteristics to a transaction and its features. This perspective also provides insight into the outsourcing decision process but focuses on transaction costs (and production costs) and ways to better match the governance mechanisms’ with these costs. Such analysis of such transaction features on governance mechanisms’ performance can help identify appropriate governance choices for various IS activities (i.e., governance – contract pairs). With the “strategic” perspective espoused by resource-based theories, a better understanding of the benefits and costs of IS outsourcing can be determined.

Finally, agency theory covers aspects related to the way IS buyer-firms can induce IS supplier-firms’ best effort on the former party’s behalf, therefore, providing some insights on how IS outsourcing relationships should possibly be managed. Conditioned on IS buyer-firms’ information about IS supplier-firms, and IS supplier-firms’ opportunistic behavior and level of risk aversion, this approach suggests the analysis of a series of factors that may cause agency costs to increase (or decrease)
under specific governance mechanisms. Such analysis can guide appropriate incentive schemes for various IS activities in order to better manage outsourcing relationships.

Figure 1 – A conceptual model for studying outsourcing
It is useful to note that these perspectives are not mutually exclusive. In fact many issues can be viewed from the vantage point offered by each theoretical frame. For instance, in examining the outsourcing of application development, resource-based theory will focus on the importance of the application to core competencies, resource gaps in the firm as well as the competitive issues in outsourcing within the firm’s competitive environment. Knowledge-based theory will emphasize the cost and value of knowledge flexibility and substitution in conducting the exchange. Transaction cost theory will also focus on the richness of the exchange (frequency, complexity) within a transactional context and the mechanism (market or firm) required to control for opportunism. Agency theory will focus on the structurability of the activities involved and the design of a contract and incentives that create desirable behavior. Collectively, insight is generated into the the decision process as well as management of the relationship.

5. **Conclusion**

IS Outsourcing has been growing since Kodak’s 1989 decision. The nature of outsourcing relationships however, are becoming increasingly complex with the rapidly changing nature of information technology. While research on IS outsourcing has been significant, studies often take a limited view based on a single theoretical perspective. It is our contention, that while it is appropriate to do this in order to manage the complexity of the phenomenon, it is at least equally important to recognize the richness of alternative theoretical lenses. In this study, our attempt was not to provide a snapshot of various theories and how they can be used to study different aspects of IS outsourcing.

Resource/knowledge-based, transaction costs, and agency are some of those approaches that, based on different perspectives, seem to cover different matters related to the outsourcing of IS functions, thus, complementing each other. Resource/knowledge-based view can help explain IS outsourcing decisions taken to make firms gain or sustain competitive advantage through IT usage. Transaction costs theory can help explain efficiency-based and/or cost-reduction driven outsourcing decisions (by pooling demands, e.g., supplier-firms can exploit economies of scale and scope, and also practice smooth production schedules) conditioned on parties’ bounded rationality and opportunism. Agency theory leverages three fundamental
concepts – agent’s opportunism, information and risk – along with efficiency, to define principal-agent relationships (with both parties engaged in cooperative behavior) so common to a wide variety of IS business exchanges. The integrated model offers a framework to support future IS outsourcing research and guide practitioners through outsourcing of the IS functions.

It is important to note that this study is not a comprehensive analysis of the reviewed theories and their determinants on IS outsourcing. However, we hope that it provides a foundation for further developing and refining key constructs and their relationships.
6. References


