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A Conjoint Approach to Understanding IT Application Services Outsourcing*

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Abstract

The sourcing of application development is becoming increasingly complex. While much prior work has investigated sourcing in a homogeneous marketplace, sourcing choices have increased in complexity, with a myriad of choices ranging from insourcing to domestic outsourcing to engaging Application Service Providers (ASP) to offshoring. In this study, based upon four organizational theories (Transaction Cost, Resource-Based View, Resource-Dependence View, and the Knowledge-Based View of the Firm), we suggest 10 attributes that firms consider when deciding upon outsourcing of applications. We tested the attributes' strength by performing conjoint analysis on data collected from 84 IS executives. We constructed profiles, which are combinations of attributes having different levels. Each executive responded to 18 such distinct profiles and selected corresponding outsourcing choices. Our results found that the three most significant drivers of an IT application service choice were cost, risk, and vendor capability. However, the importance of these drivers varied across the different sourcing options. Based upon this, we offer implications for decision-makers and researchers, along with directions for future research.

Keywords: Outsourcing, Conjoint Analysis, Transaction Cost View, Resource-based view, Resource-dependence View, Knowledge-Based View

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A Conjoint Approach to Understanding IT Application Services Outsourcing

"You must be careful not to pursue offshore outsourcing capabilities for the purpose of saving costs. These savings are like a drug....once you start taking them, it is very hard to ever quit. You just keep looking for more and more. Look for other reasons or benefits that can be derived."

Bill Tucker, VP of Systems Delivery, Nordstrom, Incorporated

1. Introduction

The decision on the sourcing of an application service is becoming increasingly complex. With a myriad of choices, including sourcing the application from an Application Service Provider, using domestic outsourcing, or relying upon offshore development, corporations are increasingly faced with a multifaceted decision about the most appropriate sourcing solution for an IT application service. Clearly, the IT outsourcing market has evolved to be more heterogeneous when compared to that of just a few years ago. In the current marketplace, ASPs, domestic outsourcing, and offshore vendors are all accepted sources for software development and deployment.¹ However, firms must consider the different characteristics of ASPs, domestic outsourcing, and offshore outsourcing before making a decision to outsource an application service.

From a research perspective, a variety of theoretical lenses have been used to understand firms' motivation for engaging in particular outsourcing arrangements (cf. Dibbern, et al. 2004). However, while these theories aid in our understanding of the attributes and criteria used, research has not, to this point, considered how managers weight each of these criteria relative to one another in the decision process. Further, given the emergence of offshoring and the re-emergence of the ASP market (possibly in the form of cloud computing as suggested, for example, by Hoover and Martin, 2008), there is a paucity of research that has empirically examined the decision criteria vis-à-vis one another when considering the choice of an outsourcing arrangement (e.g. ASP, domestic, or offshore) (Soliman, 2003).

It has been suggested that research adopting theoretical explanations of the combinations of critical criteria and their potential influences would provide valuable knowledge for making better decisions (Lord and Maher, 1990). Thus, the objective of this research is to provide theoretical rationalizations on the confluence of pertinent attributes when selecting an external source for an application service. Specifically, we do so by developing a theoretically justified model to understand how different economic, organizational, and technical attributes influence decision-makers when they evaluate the three general options available in the IT outsourcing market. Methodologically, to assess the influence of the attributes in the decision-making process, we then apply a technique little used in IS research—conjoint analysis—to determine how the individual attributes combine to help shape the final decision.

Conjoint analysis allows us to present to the respondents combinations of multiple organizational attributes, task attributes, and application sources. Such combinations, called profiles in conjoint methodology, model different organizational scenarios of an IT application service sourcing decision. Because organizational decision-makers are faced with different application service sourcing choices, the responses to these profiles offer a level of insight not normally available from traditional questionnaire studies. Although conjoint analysis is widely used in marketing research, it has been rarely applied in IS research, with a few notable exceptions (e.g., Money et al., 1988; Bajaj, 2000; Tiwana and Bush, 2007).

Creation of valid scenarios to be used in conjoint analysis requires the definition of a set of attributes that we hypothesize to influence the buying (or in our case, sourcing) decision. To arrive at a theoretically justified set of attributes, we draw from four organizational theories – transaction cost economics, the resource-based view of the firm, the resource-dependence view, and the knowledge-

¹ Of course the landscape is even more complex than these three external options. Organizations can use outside contractors (who may be either short-term or long-term), nearshore outsourcing vendors, rural outsourcers, and "multisourcing" vendors, e.g. "Online Service Marketplaces" such as RentACoder.com (cf. Gefen and Carmel, 2008). But for this study, we focus solely on ASPs, domestic outsourcing, and offshoring.

based view. Our reliance upon these four theories derives from three backdrops. The first is primarily based on Grover et al. (1996), who proposed a theoretically based contingency model of outsourcing that combined four theories to assist in the understanding of the outsourcing decision. This model was also used as the basis to explore ASPs as a sourcing option (Kern and Kreijger, 2001; Kern et al., 2002). The second is Jayatilaka et al. (2003), which employed a slightly modified version of the model to further understand the motivations for ASP sourcing. Finally, we follow the general approach taken by Tiwana and Bush (2007) in applying conjoint analysis to determine the relative importance of theoretically derived factors used by managers when making a sourcing decision. This paper builds on the previous ones by crafting a model that draws factors from four complementary theoretical sources, extending the model to encompass a wider range of outsourcing alternatives (i.e., ASP, offshore, and domestic), and empirically testing it by means of the conjoint methodology.

Thus, it is the objective of this research *to understand the relative strength of attributes that are considered by an executive when deciding on a given sourcing option (i.e., ASP, offshore, and domestic provision) for an IT application service*. Drawing from organizational theory, we will suggest that there are 10 underlying attributes, and then test the relative strength of these attributes in ASP, domestic, and offshoring contexts. In so doing, we hope to provide a broader theoretical understanding of the motivations of decision-makers when considering outsourcing alternatives.

The remainder of this paper is structured as follows. A discussion of an IT application service and outsourcing arrangement follows this introduction. Next, we provide a review of the relevant literature on outsourcing decision making. We then discuss the theoretical foundations of the model and present the research method. Finally we discuss and explore implications of the findings for practice and further research.

2. IT Application Services and Outsourcing Arrangements

IT applications can range from relatively simple, generic off-the-shelf software packages to highly complex and interrelated applications that are customized for an individual firm. The knowledge of an individual firm's other IT applications, functions, and processes that is required for the development and implementation of a particular application varies from minimal to extensive. The nature of the application itself can, likewise, vary from strategic to supplemental or support. There is obviously a great deal of difference between the extremes of these characteristics, so it follows that there will be differences in the respective sourcing approaches that firms undertake to access, acquire, or develop particular applications. The focus of this investigation is the factors that motivate a decision-maker to choose a particular mode of outsourcing for a given IT application service. Specifically, we define an *application service* as all services associated with the acquisition, development, and deployment of an IT application. The current marketplace offers three broad options to organizations considering outsourcing IT application services: (1) *off-shoring*; (2) *domestic outsourcing*; and (3) using *Application Service Providers*.

An examination of outsourcing over the last few decades shows that the nature of outsourcing has changed from facilities management in the early days to more emphasis on services and business processes. Currie and Seltsikas (2001) view the changes occurring in three stages; facilities management, business-centric outsourcing, and industry-centric outsourcing. In an exhaustive review of the outsourcing literature, Dibbern et al. (2004) cite well over 100 studies that have examined domestic outsourcing, with far less academic research focusing on ASPs (Currie and Seltsikas, 2001; Ekanayaka et al. 2003), application development (Aubert, et al., 1996; Beath and Walker, 1998; Heiskanen, et al.; 1996; Nelson, et al., 1996; Wang, et al., 1997; Whang, 1992; Grover, et al., 1994) or the determinants of offshore outsourcing (Rottman and Lacity 2004; Carmel and Agarwal 2002; Sahay et al. 2003). Thus, there is a need to have a better understanding of off-shore outsourcing relative to our understanding of domestic outsourcing and ASP provision.

In order to avoid some of the confusion and imprecision present in much of the public discourse concerning sourcing, the following definitions will be used throughout this paper. It should be noted that these definitions are intended as general archetypes. We acknowledge that there may well be

variations or exceptions to each, but in general, the definitions serve to differentiate three distinct approaches to sourcing an IT application service.

2.1. Application Service Provider

We define an *Application Service Provider* as a firm that "manages and delivers application capabilities to multiple entities from a data center across a wide area network (WAN)" (Susaria et al. 2003, p. 92). The Application Service Provider (ASP) approach is a form of application outsourcing that involves hosting an application on a server that is centrally located and managed by the vendor. ASP customers access the application remotely via a private network or the Internet.

The ASP phenomenon first gained prominence in the late 1990s. The market was characterized by a large number of start-up ASPs that were under-capitalized and lacked the financial resources to survive over the long term. There were several different business models and pricing alternatives, which proved to be confusing to potential customers. Furthermore, most ASPs utilized a traditional IT architecture internally, while employing the Internet as a delivery mechanism. At that time, however, the Web services architecture was emerging, providing a more efficient alternative that existing ASPs could not take advantage of due to their large financial commitments to their existing infrastructures. Thus, this first wave of ASPs was volatile, immature, and short-lived (Currie et al., 2004; Hagel, 2002).

A second wave of ASPs is now appearing in the marketplace (Currie et al., 2004). However, this wave is still in its infancy, and the ASP domain is in a state of flux. At present there are numerous variations of the ASP model, including, among others, vertical (industry-specific applications such as health care software), horizontal (general business-oriented applications such as accounting or marketing packages), enterprise (sophisticated applications such as enterprise resource planning and supply chain management), and pure-play (Web enabled applications such as email and security packages) (Currie et al., 2004). A recent extension of the ASP model that is attracting significant interest is the "cloud computing" concept. Although definitions of cloud computing vary widely, there is general agreement that it encompasses any subscription-based or pay-per-use service delivered over the Internet (Brodikin, 2008; Gruman, 2008; Hayes, 2008). This is clearly consistent with the ASP model but extends it to include the sourcing of an application service from the "cloud" (e.g. Google Applications). We believe the emergence of cloud computing is further indication of the re-emergence of the ASP market.

An exhaustive exploration of ASP types is beyond the scope of this paper.² Rather, we will follow the approach taken by others and confine ourselves to a concise discussion of key differences between ASPs and traditional outsourcing (e.g., Susaria et al., 2003). These differences include that fact that ASPs provide software as a service, while traditional sourcers generally provide software as a product or function. ASPs assume total responsibility for delivery of the service, providing the application bundled with IT infrastructure and support services (Susaria et al., 2003). The ASP vendor owns or licenses the software, and provides it to customers on a subscription basis. The applications are typically standardized or non-customized. Multiple customers access each application, and the access is governed by rental, lease, or pay-per-usage agreements (Currie and Seltsikas, 2001; Kern et al., 2002; Tebboune, 2003).

The term outsourcing generally refers to the use of external or third party agents to perform one or more organizational activities (Dibbern et al., 2004). We have adapted this for use in the IT application service domain to reflect the utilization of an external vendor that performs some or all of a firm's software development and/or support activities. Again speaking generally, this differs from the ASP model in that the software is owned or licensed by the customer, the application is often customized for the customer, the service focus is one-to-one (outsourcing) rather than one-to-many (ASP), and the contract is more complex and for a longer period of time.

² Readers interested in a more in-depth treatment of ASP types are referred to Currie et al., 2004, and Hagel, 2002.

2.2. Domestic vs. Offshore Sourcing

While an ASP offers a customer the ability to rent an application service, the alternative is for the firm to host the application internally. Thus, a corporation will have two choices: (1) *off-shoring*, which we define as the utilization of an external vendor that performs most or all of the programming in a country other than the one where the client is located or (2) the use of a *domestic outsourcer*, which we define as an external vendor that performs most or all of the programming in a country where the client is located. Focusing on where the work is actually done, rather than on issues of ownership (e.g., captive offshoring), is in line with other research on offshore outsourcing of IT applications (e.g., Neiderman et al., 2006; Carmel and Tjia, 2005).

2.3. Comparing the Three Approaches

Another noteworthy difference among the three approaches relates to risk. While there is risk associated with all three, it varies by approach. For ASPs, a significant customer concern is related to the volatility of the ASP market and the financial stability of vendors therein (Brodsky and Tan, 2003; Smith and Kumar, 2004). Customer-perceived risks for both domestic and offshore outsourcing revolve around cost escalation (paying more than expected) and service debasement (delivered services are of lower quality than expected) (Brodsky and Tan, 2003; Lacity and Hirschheim, 1993a, b). However, offshoring introduces additional communication risks, exacerbated by distance and, often, language and culture differences (Iacovou and Nakatsu, 2008; King and Torkzadeh, 2008; Matloff, 2005), and additional cost risks associated with higher than expected communication, coordination, and control costs (Dibbern et al., 2008; Gefen and Carmel, 2008).

Legal risks also differ depending on the approach. The ASP market is relatively immature compared to the outsourcing market; contractual and legal issues have not been as thoroughly "shaken-out" (Brodsky and Tan, 2003; Kern et al., 2002). This is particularly relevant in the case of vendor bankruptcy, as customer data could potentially be classified as an asset belonging to the vendor, to be used to satisfy creditors (Brodsky and Tan, 2003). For offshore outsourcing, legal risk includes questions about the appropriate jurisdiction for resolving disputes. Other location-specific issues that must be taken into account when considering offshoring include political, cultural, and resource factors. The Gartner consulting firm summarizes assessment of location-specific issues as "country before company" (Terdiman, 2002).

Finally, there is an additional element of technical risk present in the use of ASPs and offshore outsourcing. Because ASPs generally provide commodity rather than core or competitive advantage-type applications (Tyler, 2001), their success is more dependent on the underlying technology as opposed to the applications being hosted (Bendor-Samuel and Goolsby, 2000). Furthermore, ASP customers are typically dependent on the Internet for service provision to a greater extent than any other forum of delivery. Thus, they are exposed to network slowdowns and outages that are beyond the control of either themselves or their vendors, and face additional coordination issues among telecommunications firms, network providers, software vendors, consultants, other customers of the ASP, and, of course, the ASP host and the customer itself (Brodsky and Tan, 2003; Kern et al., 2002; Smith and Kumar, 2004). A stable telecommunications network with ample bandwidth is also critical for offshore outsourcing. However, telecommunications infrastructure and capabilities are not uniform throughout the world, introducing another variable into the risk management equation for this approach (Bennett and Timbrell, 2000; Rao, 2004).

For more details on the differences between the three types of sourcing arrangements see Table 1.

Table 1. Comparison of ASP, Domestic, and Offshore Outsourcing Archetypes

	Application Service Provider	Domestic Outsourcing	Offshore Outsourcing
Scope	Limited to software	Can include software, hardware, people, and processes	
Target Customers	<ul style="list-style-type: none"> Primarily Small and Medium Enterprises (SMEs) No internal IT function 	<ul style="list-style-type: none"> Primarily large and Fortune 500 firms Internal IT departments 	
Relationship Model	<ul style="list-style-type: none"> One service provider to many customers One application to many customers 	<ul style="list-style-type: none"> One customer to one service provider One/few applications to one customer 	
Ownership of Software	Service Provider	Customer	
Extent of Customization	None/minimal ("one size fits all")	Varies - determined by customer ("custom-tailored")	
Hardware Owner	Service Provider	Customer	
Location of IT Assets	Service Provider	Service Provider or Customer	
Location of IT Support	Service Provider	Service Provider or Customer	
Type of Applications	<ul style="list-style-type: none"> Packaged Non-critical 	<ul style="list-style-type: none"> Packaged, Proprietary, and/or Legacy Critical and/or non-critical 	
Focus	<ul style="list-style-type: none"> Narrow Application-centric 	<ul style="list-style-type: none"> Wider Business aspects of the relationship 	
Contract	<ul style="list-style-type: none"> Short-term Standard; Performance measures set by service provider 	<ul style="list-style-type: none"> Long-term Individually negotiated 	
Pricing	<ul style="list-style-type: none"> Based on usage (utility model) Minimal up-front costs 	Generally based on business metrics	
Risk Factors	<ul style="list-style-type: none"> Volatility of ASP market Uncertain legal issues Dependency on the Internet Low switching costs 	<ul style="list-style-type: none"> Cost escalation Service debasement Medium/high switching costs 	<ul style="list-style-type: none"> Uncertain Legal jurisdiction Data privacy and intellectual property concerns Telecommunications infrastructure and capabilities are not uniform throughout the world Medium/high switching costs Unanticipated communication, coordination, and control issues and costs
Social Factors (language, customs, and culture)	Homogenous	Homogenous	Heterogeneous

This table was constructed based on the following: Bennett, 2000; Bennett and Timbrell, 2000; Brodsky and Tan, 2003; Currie and Saltsikas, 2001; Dibbern et al., 2008; Iacovou and Nakatsu, 2008; King and Torkzadeh, 2008; Matloff, 2005; Patnayakuni and Seth, 2001; Rao, 2004; Smith and Kumar, 2003; Susaria et al., 2003; Tebbourne, 2003; Yao and Murphy, 2002.

Next, we explore how a firm chooses a particular sourcing arrangement.

3. Theorizing the Outsourcing Decision

Eminent scholars of organizational analysis have long recognized that the task of “deciding” pervades the entire administrative organization (Simon 1947). Organizational decisions are commitments to action (Mintzberg et al., 1976) aimed at achieving organizational goals. As such, the survival and evolution of an organization are driven by these decisions (March and Simon, 1958). Prominent IS researchers have also recognized the critical importance of establishing appropriate IT decision rights to direct and coordinate an organization's effective use of and exploitation of IT (Sambamurthy and Zmud, 1999).

Despite the importance of decisions, however, decision-making associated with IT outsourcing has received little, if any, systematic treatment. Little is known about how an executive, faced with an outsourcing decision, accounts for a given set of features about an outsourcing vendor and then subsequently makes a decision. We suggest that the lack of knowledge about the decision-making process involved in IT outsourcing is an increasingly serious obstacle for both theoretical and practical development in this area.

Specifically, we are interested in understanding how an executive, when faced with a set of attributes from an outsourcing vendor, weighs those attributes when deciding whether or not to select that vendor. Bettman et al. (1998) argue that when individuals make a decision, they encounter four choices:

1. Whether to make a detailed consideration of all available information, or cursory reflections on a limited amount of the information;
2. Whether to consider different amounts of information for each attribute, or the same amount for each attribute;
3. Whether to focus on multiple attributes of one alternative before considering another, or focus on a single attribute of multiple alternatives; and
4. Whether a positive attribute outweighs a negative attribute, or if there is no compensation for a poor attribute.

The outcome of those choices results in multiple decision strategies. Furthermore, a decision-maker can combine strategies (Bettman, 1979; Bettman et al., 1991, 1998; Payne, et al., 1993).

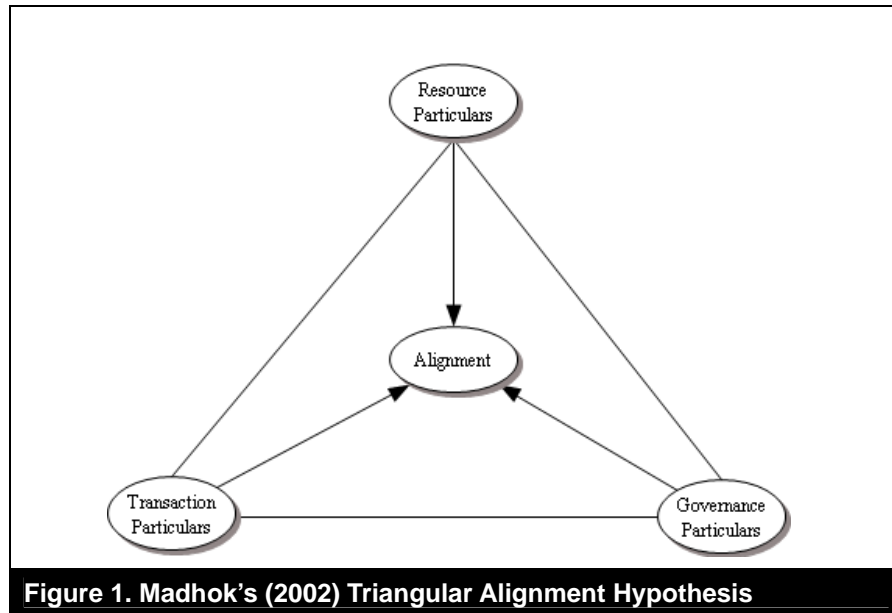
It is our thesis that there is little *real* understanding of how an executive makes an outsourcing decision. Simply put, an executive may rationally assume a simple processing strategy, attempting to reduce cognitive load when making a decision, and evenly weigh all attributes, not giving preference to one over another. Alternatively, an executive may be an adaptive decision-maker and assume a more complex processing strategy. Here, he/she will discern a set of attributes of the outsourcing decision that are most relevant, and these attributes will differ depending upon the alternatives.

4. Attributes of the Outsourcing Decision

We argue that executives are adaptive decision-makers, employing a complex processing strategy when assessing the attributes involved in making outsourcing decisions. What are these attributes? Scholars have considered a long list of attributes that influence the outsourcing decision (Dibbern et al., 2004).

In deciding which attributes to consider for the current study, we take our cue from recent work in organizational strategy, which argues that there exists a triangular alignment between transaction, resource, and governance attributes. The interdependence among the attributes has implications for firm boundaries (Madhok, 2002; see Figure 1).

Madhok (2002) proposed the triangular alignment hypothesis as a bridge between transaction cost and resource-based organizational theorists. We suggest that a similar bridge is needed within the study of outsourcing. Thus, we have adapted Madhok's triangular alignment hypothesis for use in the outsourcing context.



Both Madhok's bridge and ours recognize the importance of transaction and resource attributes. However, our bridge differs from Madhok's in that Madhok examines the general case of organizing the firm's economic activity. In contrast, we focus on the narrow context of sourcing application development. Accordingly, we have made two modifications to Madhok's hypothesis. First, the category of "Resource Particulars" is broadened from consideration of only Resource-Based Theory attributes to include Resource Dependence Theory (RDT) attributes. Our reasoning is that one of Madhok's objectives is to illuminate the hitherto overlooked interrelationship between Transaction Cost Theory and Resource-Based Theory, particularly as they relate to the internal vs. external organization of economic activity. In contrast, we are proceeding on the assumption that the decision has already been made to externalize the economic activity, and the next decision is focused on what form that will take (e.g., ASP, outsourced, or offshored). In making this decision, consideration of the availability and suitability of external resources is fitting. This is consistent with the use of RDT in prior IS outsourcing research (Grover et al., 1994; Teng et al., 1995).

The second modification to Madhok's model is the substitution of relevant knowledge attributes for the broader category of governance structure. This is appropriate because, at the macro level, organizational theorists suggest that knowledge is perhaps the most strategically significant factor in a firm's competitive position (Grant, 1996). At the micro level – that is, within the context of application development – the process of software creation is an interdependent series of complex and creative activities that are facilitated by integrating knowledge throughout the process (Balaji and Ahuja, 2005; Sambamurthy and Kirsch, 2000). As Madhok himself stated, "...the decision with respect to the appropriate governance structure rests not just on costs, but also on productivity benefits tied to skills and *knowledge*" (*italics added*) (Madhok, 2002, p. 541). Our adaptation of Madhok's model is presented in Figure 2.

While the hypothesis does help to define three broad classes of attributes, these three elements lack specificity: What dimensions of resources? What types of costs? What elements of knowledge? To answer these questions, we reviewed the past literature on outsourcing using the triangular alignment hypothesis as a lens.

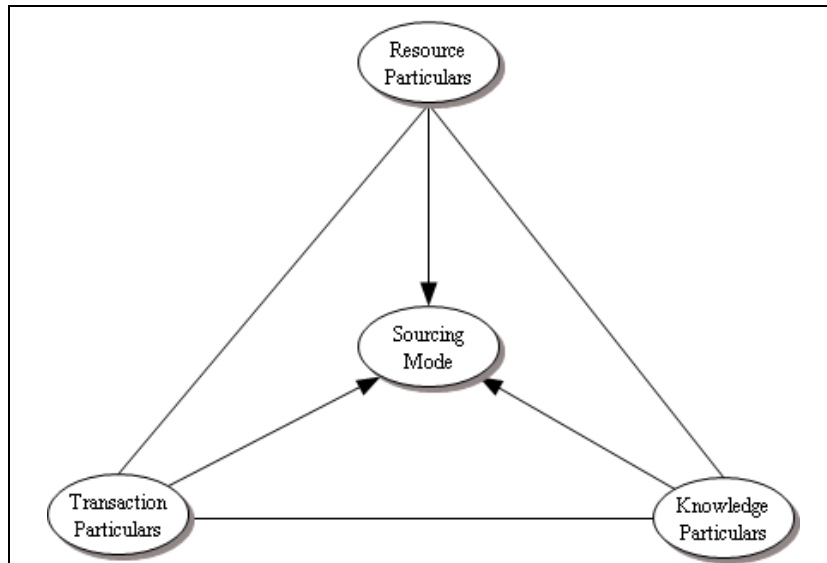


Figure 2. Sourcing Mode Triangular Alignment Hypothesis

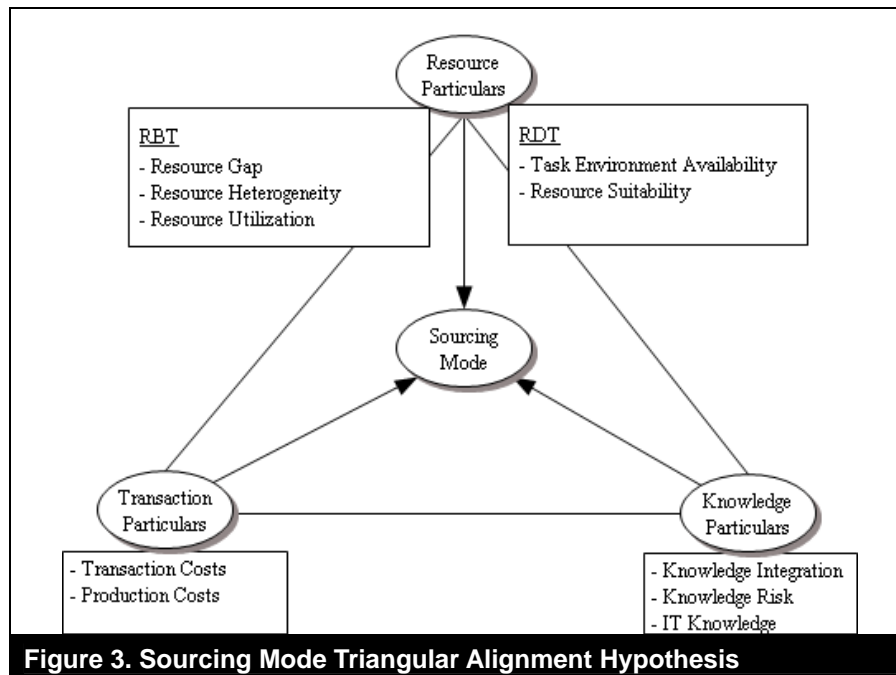
5. Sourcing Mode Triangular Alignment Hypothesis

As we have pointed out thus far, there are variations between the three sourcing options. The premise of our argument is that different attributes come into play when individuals are deciding upon a sourcing approach. To illustrate this, consider the following examples:

- Offshore outsourcing has become attractive due to the availability of skills in other countries at wages significantly lower than domestic wages (Carmel and Agarwal, 2002; Robinson and Kalakota, 2004; King and Torkzadeh, 2008).
- Using the economies of scale argument, ASP can be thought of as more cost effective because a vendor can provide services to multiple companies at a time using the same hardware and software (Kern et al., 2002).
- Domestic outsourcing is often sought for many reasons, including cost reduction, access to new or specialized expertise, and facilitating the firm's focus on core competencies (Lacity and Hirschheim, 1993a,b; 1995; Fisher et al., 2008).

But each of these options has various and unique drawbacks as well (Dibbern et al., 2004). Thus, there is reason to believe that the rationale for engaging in each of these forms of outsourcing should vary.

When considering outsourcing, managers cite a variety of reasons for the decision, not the least of which includes an effort to lower costs (Gupta and Gupta, 1992; Huff, 1991). To capture this perspective, sourcing decisions have been investigated from a transaction cost perspective (Lacity and Willcocks 1996). However, in the case of the sourcing of an application service, this perspective alone is inadequate due to the complexities introduced by factors such as business and application knowledge, strategic use of applications, and the skills necessary to successfully implement IT applications. These factors do not occur in isolation. A combination of transaction costs, availability of resources, need for internal resources, and knowledge reasons may act as determinants of an application service outsourcing decision (Jayatilaka et al., 2003). Past studies (e.g. Jayatilaka et al., 2003; Cheon et al., 1995) have attempted to integrate these attributes. We are not integrating the attributes *per se*, but rather postulating that, when making a sourcing decision (whether it is ASP, domestic, or offshore), a decision-maker will simultaneously examine these attributes to decide whether or not to engage in that specific outsourcing solution, as illustrated in Figure 3.



We will next turn to a discussion of each set of attributes.

5.1. Transaction Particulars

Transaction Cost Economics (TCE) (Coase, 1937; Williamson, 1975, 1981, 1985) proposes that the primary objective of a firm is to structure governance arrangements to economize the cost of transactions (transactions in this case are the exchange of goods or services between independent economic actors, either internal or external to the firm). TCE argues that, in determining whether to produce or acquire an asset internally vs. from an external supplier, a company will calculate the sum of *transaction costs* (the costs of negotiating, monitoring, and managing transactions) plus the sum of *production costs* (the costs of capital, labor, and materials necessary to produce the goods or services) for each option, and then determine which source will minimize these costs.

Outsourcing and TCE

Generally speaking, TCE suggests that outsourcing will reduce production costs, primarily due to the economies of scale a service provider can attain by concentrating specialized resources to perform IT-related activities. Conversely, outsourcing tends to increase transaction costs, due to the potential for a third party service provider to engage in opportunistic behavior, since the hierarchical (internal) nature of the firm lends itself more readily to controlling such behavior (Lacity and Willcocks, 1996).

From the TCE perspective, "outsourcing creates a market-contracting, interorganizational relationship between a firm and its external service provider, and requires the firm to incur substantial costs of negotiating, monitoring, and supervising external contractual parties" (i.e., transaction costs) (Ang and Cummings, 1997, p. 239). Extending this reasoning suggests that when choosing among ASPs, domestic outsourcing, and offshore outsourcing, firms need to evaluate the relative transaction costs of each option. However, the ASP business model poses risks that differ from domestic and offshore outsourcing options (Currie and Seltsikas, 2001). These risks include the relative volatility of the ASP market (Currie and Seltsikas, 2001; Kern et al., 2002) and the unresolved nature of certain legal issues (Brodsky and Tan, 2003; Smith and Kumar, 2003). It follows that the activities required to "negotiate, monitor, and supervise" ASPs will entail transaction costs different from those required for domestic and offshore outsourcing. Furthermore, differences in the natures of domestic outsourcing and offshore outsourcing — primarily questions of telecommunications capability, legal jurisdiction, and security (Rao, 2004) — likewise dictate differences in transaction costs for these two options.

Transaction costs are driven by three factors: frequency of occurrence, asset specificity, and uncertainty. Of special interest in application service are asset specificity and uncertainty. Asset specificity refers to "the degree to which an asset can be redeployed to alternative uses and by alternative users without sacrifice of productive value" (Williamson, 1991, p. 281). The ASP business model is based on providing generic software; that is, a "commoditized" application of relatively low asset specificity. This condition lends itself to lower transaction costs than a condition involving a more specialized application service (Cheon et al., 1995). Asset specificity, and by extension, transaction costs, for domestic and offshore outsourcing will range from somewhat higher to significantly higher, depending on the extent of an application's customization.

The other major contributor to transaction costs, uncertainty, is particularly relevant in application service (Hancox and Hackney, 1999). Uncertainty is relatively low for ASPs, given that they provide a standardized product. The uncertainty factor, and the related transaction costs, goes up as the application becomes more complex and more customized. Applications with these characteristics tend to be sourced more to domestic and offshore outsourcers than to ASPs. Furthermore, offshoring of an application service presents unique management challenges when compared to domestic projects, especially in the areas of change management, communications, and decision making (Kliem, 2004). Therefore we suggest that transaction costs are a contributing factor in deciding the approach to take in outsourcing an application service.

In addition to transaction costs, TCE also argues that another type of cost is important in an outsourcing context: production cost. This is the direct cost of actually acquiring the desired products or services from an external vendor – "the cost of delivering IS functions" (Cheon et al., 1995, p. 214). Many researchers agree that outsourcing results in lower production costs, primarily due to the vendor's economies of scale (e.g., Ang and Cummings, 1997; Ang and Straub, 1998; Poppo and Zenger, 1998). For ASPs, the production costs are further reduced because the ASP "product" and delivery model is more standardized, spreading fixed costs across a number of customers. The ASP model also lends itself to volume discounts, since the ASP owns or leases the software, rather than a single entity owning or leasing the application. For offshore outsourcing, the wage differential between offshore and domestic IS personnel is such that production costs are lower. This leads to the expectation that production costs will be an attribute to consider in determining which approach to choose when outsourcing application services.

Table 2. TCE Implications, Insights, and Limitations

Attribute	Implications for ASP	Implications for Offshore	Implications for Domestic	Insights Offered	Limitations
Transaction Cost	Business model is built upon generic software (i.e., low asset specificity), thus ASP should offer lower transaction cost.	The unique management and coordination challenges lead to increased uncertainty and the potential for higher transaction costs.	The amount of customization could potentially increase the asset specificity, and by extension transaction costs, for domestic sourcing.	Focus on the costs involved with the sourcing decision	Focus on cost comes at the expense of examining the resources that contribute to the cost, the knowledge issues involved, and the difficulty of accurately quantifying the costs involved
Production Cost	The standardization of the ASP 'product', standardized delivery model, and potential for volume discounts should offer lower production costs.	The wage differential between offshore and in-house IS personnel potentially decreases the production costs for the application.	The high number of pooled staff at the vendor devoted to developing the application potentially should decrease the production costs for the application.		

To summarize the TCE perspective, there are two attributes that we hypothesize firms assess in determining which option to select when outsourcing an application service:

- **Transaction costs:** The costs incurred in searching, creating, negotiating, monitoring, and enforcing a service contract between buyers and suppliers.
- **Production costs:** The comparative cost of internalizing the application vs. the price the firm has to pay vendors for the same application.
- In Table 2, we have summarized the attributes within TCE; the implications of each of the attributes for ASP, Offshore, and Domestic; the insights offered by the theory; and the limitations. This table highlights how TCE assists in our understanding of the sourcing decision, yet there are attributes that this approach neglects, which leads us to the next set of particulars – Resource Particulars.

5.2. Resource Particulars

Resource-related attributes relevant to the sourcing decision spring from two theoretical perspectives: Resource-Based theory, and Resource Dependence theory. The Resource-Based Theory (RBT) views the firm as a collection of resources. It proposes that a firm can gain competitive advantage by acquiring and deploying resources that are rare, valuable, difficult to imitate, and relatively immobile and non-substitutable (Penrose, 1959; Barney, 1991). Thus, the RBT perspective argues that a firm seeks to identify sources of competitive advantage grounded in the resources and capabilities it possesses or has access to (Day, 1994).

Employing a resource-based strategy entails assessing the firm's existing resources and evaluating them in light of current and future needs. If the firm concludes that new or complimentary resources are necessary, it may prefer to acquire them from an external source rather than expend the resources to develop them in-house (Grant, 1991). This is especially applicable when the firm and its environment are subject to rapid and unpredictable change. In these circumstances, firms must be able to quickly acquire and integrate resources to maintain or improve their competitive posture. In this case, firms prefer to acquire desired resources through intermediate agents, in lieu of developing the capabilities internally (Barney, 1991).

RBT and Outsourcing

The relevance of this to outsourcing is evident. As part of the outsourcing decision-making process, firms go through an evaluation procedure that includes assessing their internal IS resources and capabilities, weighing them against current and anticipated needs and against resources and capabilities available in the outsourcing marketplace (Lacity and Hirschheim, 1993a, b). If a firm determines that its IS capabilities do not match up with its needs, it enters into arrangements with external vendors to resolve the situation (Grover et al., 1994).

At first glance, it may appear that the applicability of RBT to the ASP outsourcing model is limited. If ASPs provide "plain vanilla" applications, where is the competitive advantage? The answer is that even if the firm has no explicit gaps in its IS capabilities, retaining capabilities in-house that have a low strategic value may necessitate the use of internal resources that might be used to better advantage elsewhere (i.e., focus on core competencies) (Roy and Aubert, 2002). Thus, if the skills and expertise required to support an application are relatively common, outsourcing to an ASP is a likely possibility. If the application requires relatively rare technical skills and expertise, the work is more likely to be outsourced to a "full-service" vendor.

Furthermore, if a firm attains competitive advantage through an application that is heterogeneous — that is, unique, immobile, and inimitable, in terms of firm-specific attributes — then it is more likely to be outsourced to a full-service vendor. If the application is low in heterogeneity, it is more likely to be outsourced to an ASP (Bennett and Timbrell, 2000; Ekanayaka et al., 2003).

To summarize the RBT perspective, there are three attributes that we hypothesize firms assess in determining which option to select when outsourcing application services:

- **Resource gap:** The extent to which there are internal people with technical skills to provide

the application service.

- Resource heterogeneity: The extent to which the application differentiates the firm.
- Resource utilization: The extent to which resources are efficiently and effectively utilized.

In Table 3, we have summarized the attributes within RBT; the implications of each of the attributes for ASP, Offshore, and Domestic; the insights offered by the theory; and the limitations. This table highlights how RBT assists in our understanding of the sourcing decision, yet, as was the case with TCE, there are attributes that this approach neglects. Thus, we consider the next theory – Resource-Dependence Theory.

Table 3. RBT Implications, Insights, and Limitations

Attribute	Implications for ASP	Implications for Offshore	Implications for Domestic	Insights Offered	Limitations
Resource gap	Common application skills and expertise will result in application being outsourced to an ASP	Relatively rare application skills and expertise will result in offshore or domestic sourcing, with the decision depending upon which source provides the best set of skills		The focus on resources recognizes the role of an external provider to fill a gap internal to the firm.	The internal focus does not acknowledge the availability of external marketplace resources, nor does it account for the inability to explain direct costs.
Resource heterogeneity	Low heterogeneity will result in the application being outsourced to an ASP.	High heterogeneity will result in offshore or domestic sourcing.			
Resource utilization	Drawing upon a standardized application enables the customer to achieve efficiency by building a broad internal use of expertise at a low cost.	The relative cost of the application per user will dictate whether the decision should be offshore or domestic.			

According to Resource Dependence Theory (RDT) (Pfeffer and Salancik, 1978), a firm cannot produce all of the resources needed for its operation and hence is dependent upon the external environment. The core argument of RDT is that organizations will respond to demands made by entities upon whose resources they are dependent, and that the objective of the firm is to minimize the amount of this dependence (Pfeffer, 1982). Viewed in this light, the survival of the organization depends upon its ability to procure critical resources from the external environment. Multiple tactics exist for procuring these resources and managing the dependence on external organizations (Casciaro and Piskorski, 2005).

RDT and Outsourcing

Within the context of outsourcing, RDT suggests that “based on the firm’s resource attributes and allocation of IS, gaps in existing IS resources and capabilities might exist. These would create the need for adoption and implementation of market governance through an outsourcing arrangement” (Grover et al., 1994, p. 180). The choice of an outsourcing approach is a strategic choice intended to create the dependence of one organization upon another in order to obtain critical resources.

The essence of RDT is outward focused – that is, on the external environment and the resources

available. Teng et al. (1995) note that "through outsourcing, an organization can obtain scarce IS human resources and technological resources from the external environment to enhance its long term survivability" (p. 81). If we dissect RDT in an IS outsourcing context, two attributes are important: (1) the external environment and (2) the suitability of the resource(s) provided by the outsourcing vendor.

Table 4. RDT Implications, Insights, and Limitations

Attribute	Implications for ASP	Implications for Offshore	Implications for Domestic	Insights Offered	Limitations
Task environment availability	The stability of the ASP marketplace and the perception of the availability of firms within that space will influence the decision to utilize an ASP approach.	The degree to which the firm views the offshore market as offering appropriate resources will be considered.	The ability of the firm to locate competent partners domestically is an issue to be examined.	The focus on the external market accounts for whether the required resources are available, as well as ensuring that the provided resources are appropriate for what is needed.	There is no view of the knowledge required to build the application or assimilate this in to the organization; there are no considerations given to cost; the ability for the application to provide a competitive advantage is not accounted for within this perspective.
Resource suitability	The extent to which the ASP can guarantee network uptime will be a consideration in the sourcing decision. While this is true to a certain extent for all types of sourcers, it is more critical for ASPs. Since their fundamental business model is the delivery of standard software, their differentiator is the dependability and availability of their network.	The time, distance, and reliability issues associated with the network capabilities of the offshore provider will be an attribute in assessing suitable resources. While this is a factor for all types of sourcers, it is more critical for offshore vendors due to perceived customer uncertainty regarding telecommunications and network infrastructure issues that are not present with domestic or ASP vendors.	Domestic vendors must satisfy basic customer concerns regarding network availability and reliability. However, ASP and offshore vendors face heightened concerns in these areas.		

First, examining the external environment requires understanding what resources are available in the marketplace. The essence of the theory is that the firm is entering into an exchange relationship with another firm for resources (Grover et al., 1994). Therefore, one factor to consider is the extent to which there are vendors available that are capable of offering the application services being sought. Next, we must also consider the nature of the resource being provided by the vendor. Given the need within an outsourced context to coordinate an application service remotely, and the need to communicate with both the application itself and the service provider, we suggest that a key resource is the telecommunications and network infrastructure upon which the vendor relies, which would enable the two firms to coordinate work and/or deliver the application or prohibit this.

To summarize the RDT perspective, there are two attributes that we hypothesize firms assess in determining which option to select when outsourcing an application service:

- **Task environment availability:** The degree to which there are a number of vendors available to offer the application/service.
- **Resource suitability:** The degree to which the vendor has access to a sufficient degree of telecommunications/network capabilities.

In Table 4, we have summarized the attributes within RDT; the implications of each of the attributes

for ASP, Offshore, and Domestic; the insights offered by the theory; and the limitations. This table highlights how RDT assists in our understanding of the sourcing decision, yet there are attributes that this approach neglects. These are discussed next in the Knowledge-Based Theory.

5.1. Knowledge Particulars

The Knowledge-Based View of the firm (KBV) argues that the competitive advantage of a firm arises from how well it creates, stores, and applies knowledge. Firms that are better at creating and mobilizing knowledge will achieve competitive advantage over those that do not leverage the knowledge in their organizations (an idea originally discussed by Drucker, 1978, and more recently by Collison, 1997). Utilizing the KBV to examine the IT application service function involves focusing on the knowledge required for the development, deployment, and use of the IT application. It also provides a perspective that allows us to be more specific when assessing certain risks relevant to an outsourcing arrangement.

KBV and Outsourcing

To be strategically important, business processes and the knowledge associated with them must be unique or differentiated from knowledge commonly available to competitors. While it may be argued that the specificity of knowledge and resources associated with strategic applications are accounted for in TCE, the fact is, past research has not confirmed the relationship between asset specificity due to knowledge needs and degree of outsourcing (Dibbern and Heinzl, 2001). Moreover, Lacity and Willcocks (1996) note that out of 62 companies studied in their research, only 35 realized the expected cost savings, which suggests the need for an alternative or complimentary theoretical perspective to TCE.

According to KBV, “managers choose problems while identifying knowledge sets or existing technology either within or outside the firm that are potentially useful in searching for solutions to that problem” (Nickerson and Zenger, 2004, p. 619). As they are seeking the solution to the problem at hand (in this case, obtaining the application service), there are two aspects to knowledge transfer that must be considered: (1) within the firm, and (2) between the firm and the provider.

Within the firm, application software has been characterized as a business process enabler (Davenport, 1993). The applications are embedded within business processes to facilitate knowledge flow. This *integration* of knowledge within the firm can be a critical source of competitive advantage (Grant, 1996). The degree to which an application facilitates internal knowledge flow helps differentiate applications. Stand-alone applications that are less integrated within the firm, and hence less situated to pass on knowledge, are considered to be more suitable for outsourcing via ASPs (Ekanayaka et al., 2003). The more integrated an application (that is, the more the application facilitates knowledge flow), the more suitable it is for outsourcing to a domestic or offshore vendor.

When viewing knowledge transfer between the firm and the provider, we are referring to the business-specific knowledge required to develop and run the software. Extracting and transferring idiosyncratic knowledge is impeded by organizational and individual constraints (Cohen and Levinthal, 1990). The more generic the application (i.e., the less business-specific knowledge it requires) the more fitting it is to utilize an ASP (Ekanayaka et al., 2003). Conversely, the more business-specific knowledge required to service the application, the more suitable a full-service provider is. Furthermore, knowledge transfer is enhanced by a commonality of language, experience, shared behavioral norms, and culture (Grant, 1996). Thus, there is a further differentiation of appropriate sourcing options in terms of domestic and offshore providers, depending on the extent of business-specific knowledge required.

In addition to the knowledge required to service the application, the application itself contains knowledge. While the generic, standardized applications typical of ASPs contain little or no firm-specific knowledge, legacy or proprietary applications are unique. They are the manifestation of expertise, procedures, routines, algorithms, and strategies developed by the firm over time. As a consequence, these types of applications potentially confer on their owners a knowledge-based

competitive advantage. Sharing or revealing this knowledge to a third party might put the firm at risk if that party discloses it. This is of particular concern when there are questions regarding legal jurisdiction and the protection of intellectual property. While concepts of risk are traditionally focused on within the context of TCE (Aubert et al., 1998, 1999, 2001) or resource-based theories (e.g. Duncan, 1998), we suggest that the risk of sharing the knowledge resident in the application is a specific type of risk that firms take into account when making a sourcing decision. Hence, we suggest that the degree of knowledge risk is an attribute considered when outsourcing.

To summarize the KBV perspective, there are three attributes that we hypothesize firms assess in determining which option to select when outsourcing an application service:

- **IT knowledge of service or product:** The extent to which there is business-specific knowledge needed to service the application
- **Integration:** The degree to which the application helps the knowledge flow within the firm
- **Knowledge risk:** The degree to which there is knowledge specific to the organization that might put the firm at risk if disclosed by an external provider

Table 5. KBV Implications, Insights, and Limitations

Attribute	Implications for ASP	Implications for Offshore	Implications for Domestic	Insights Offered	Limitations
IT knowledge of service or product	The more generic the application (i.e., the less business-specific knowledge it requires) the more fitting it is to utilize an ASP	The more business-specific knowledge required to develop the application, the more suitable a full-service provider is, however, the extent to which language, experience, shared behavioral norms, or culture is embedded will dictate if the choice will be domestic or offshore.		The focus upon knowledge is beyond that available through the RBV and offers insights into concepts of risk beyond that offered from TCE.	Does not consider the direct costs to the firm, nor the resources internal or external to the firm.
Integration	An application that is less integrated within the firm, and hence are less situated to pass on knowledge, are considered to be more suitable for outsourcing via ASPs	The more integrated an application (that is, the more the application facilitates knowledge flow), the more suitable it is for outsourcing to a domestic or offshore vendor.			
Knowledge risk	Knowledge risk associated with ASPs revolves around the potential loss of access to or disclosure of sensitive knowledge in the event of an error by the vendor (ASPs typically provide similar services to more than one customer), or the vendor going out of business (the ASP market is still somewhat unsettled).	Concerns related to privacy and confidentiality of sensitive knowledge are heightened with offshore vendors due to (1) cross-border transfer of data, (2) uncertainties regarding legal jurisdiction and issues, and (3) perceived challenges on the customer's part regarding monitoring of vendor security.	The market of domestic vendors is, generally speaking, more stable than that of ASPs. Domestic vendors do not face the same perceived challenges of uncertain legal issues and security monitoring as do offshore vendors.		

In Table 5, we have summarized the attributes within KBV; the implications of each of the attributes for ASP, Offshore, and Domestic; the insights offered by the theory; and the limitations. This table highlights how KBV assists in our understanding of the sourcing decision.

5.2. Justification of the Sourcing Mode Triangular Alignment Hypothesis

From a review of past outsourcing research, we identified a number of attributes that we believe practitioners consider when making a sourcing choice for IT applications. We believe that some attributes more prominently influence outsourcing decisions than others. To see whether our conceptual understanding of the outsourcing decision choice makes sense, we compared our sourcing mode triangular alignment model (Figure 3) with the detailed analysis of the IT outsourcing literature undertaken by Dibbern et al. (2004). They developed a comprehensive framework for synthesizing the large body of empirical research on IT outsourcing. Their framework classified outsourcing research according to three underlying elements: (1) the main *research objectives*, (2) the *theoretical foundations*, i.e. the applied reference theories, and (3) the *methods* used in the studies on outsourcing. At the highest level, the framework distinguished between two phases of outsourcing: (1) *decision process* and (2) *implementation*. As our research focuses on decision-makers choosing between different outsourcing alternatives, only the first phase of Dibbern et al.'s framework is relevant. Therefore, we do not consider the second phase.

Dibbern et al. divide phase 1 (the decision process) into three stages labeled: *why*, *what*, and *which*. *Why* refers to why an organization might consider outsourcing its IS function; i.e., what are the conditions or situations (i.e., the *determinants* or *antecedents*) that might lend themselves to a decision to outsource? What are the *risks and rewards*, or *advantages and disadvantages*, associated with outsourcing? *What* refers to what is it that is to be considered for outsourcing and requires at least two different options to choose from and some selection criteria by which to choose among the different options. This involves evaluating various outsourcing alternatives. *Which* refers to the procedures the organization adopts in making its outsourcing choice. It involves the step-by-step process for arriving at an outsourcing decision; *guidelines* to help the decision-makers assess the various selection criteria and their choice; and the actual *selection* of the final decision.

Although a number of underlying themes emerged from the Dibbern et al. analysis, we focus on the five that relate to the decision or choice phase of the outsourcing process. More specifically, the authors identify many determinants of outsourcing. We synthesize these into five overarching themes that characterize why organizations adopt outsourcing. The five themes are: (i) *knowledge*, (ii) *costs*, (iii) *resources*, (iv) *strategy*, and (v) *agency*. These themes embrace a number of elements of the outsourcing choice that can be described as follows. (i) Companies possess much tacit *knowledge*, and this knowledge is needed to successfully develop systems. Integration suggests that the vendor possesses some understanding of the customer's business. Opportunism and asset specificities are risks associated with a company's knowledge, i.e., the risk of the knowledge becoming available to other competitors. (ii) *Costs* are directly related to transaction and production costs, and companies try to reduce these costs. (iii) Companies seek *resources* due to the intrinsic resource gaps that exist between what they have and what they need. Research has found that resource characteristics such as immobility and heterogeneity affect the decision criteria for outsourcing choices. (iv) *Strategy* relates to the strategic role of IS and can affect the outsourcing decision, especially as it relates to resource needs. (v) *Agency* relates to issues after the outsourcing decision is made such as contracts negotiation, contact and performance measurement, and contractual control. Because these agency issues typically come after the decision on the choice of outsourcing is made, we omit them from our study.

We believe that the first four themes identified in Dibbern et al. are appropriate, as they focus on the decision to outsource and the choice of a particular outsourcing alternative (i.e., ASP, domestic outsourcing, offshore outsourcing). Table 6 summarizes Dibbern et al.'s literature analysis and maps it into our 10 outsourcing attributes.

Table 6. Summary of the Dibbern et al. outsourcing literature analysis

Theme	Elements of Outsourcing Choices	Outsourcing Factors
Knowledge	Tacit knowledge - human assets - individual process knowledge - software knowledge	IT knowledge of service or product Integration requirements
	Business understanding	Integration requirements
	Asset specificity – human and technical assets Opportunism risk	Knowledge risk
Costs	Transaction costs	Transaction costs
	Perceived gains in production economics	Production costs
	IS cost structure Reduce costs IS performance/economic efficiency	Transaction costs (vs. production costs)
Resources	Required skill sets Discrepancy in support staff/quality Discrepancy in information quality Upgrade and transform existing resources and skills Technical benefits – access to scarce resources introduction of new resources and skills	Resource gaps
	Specialized technology/advanced development environment	Resource utilization Resource heterogeneity
	Systems heterogeneity	Resource heterogeneity
	Supplier presence	Task environment Telecommunications and network infrastructure capabilities of vendor
	Common applications	Task environment
Strategy competitiveness	Strategic role of IS	Resource utilization Resource heterogeneity
	Moderating effect of the strategic role of IS on gaps	Resource gaps
Asset/Agency	Measurability – for mixed or physical assets Difficulty of measuring both types of assets Absence of agreement inducement Difficulty in contractual resolution Difficulty in structuring the contract Difficulty in goal alignment , Difficulty in monitoring vendor Control risk	These are more related to the choice of in- vs. outsourcing and when deciding on the contract. Hence, are not considered

5.3. Summary

We have identified ten attributes that we theorize decision-makers utilize in deciding whether or not to outsource a given application. However, while previous work has attempted to create a factor-based or integrative model to determine how each of these attributes predicts an intention to or the actual practice of outsourcing, we are instead interested in understanding the relative weight that executives give to each attribute in making an outsourcing decision. To make this determination, we need a corresponding methodology that would allow us to achieve this objective. We believe the conjoint methodology would accomplish this.

6. Research Method

6.1. Objective of Methodology

The objective of the research methodology is to determine the relative strength of each of the 10 attributes in an outsourcing decision associated with the choice of ASP, off-shoring, or domestic

outsourcing. For instance, if all 10 attributes were equally considered, we would expect that each attribute would contribute a weight of 10 percent in the decision process – previous approaches have not explored the weighting associated with the decision-making process. Further, in selecting the conjoint analysis approach, the objective is to obtain a response from the individual that is as realistic as possible. Knowing that decision-makers consider several attributes together when making a decision, this methodology will allow us to uncover the strength of each of these attributes.

6.2. Conjoint Technique

Since the 1970s, the marketing literature has employed the use of conjoint analysis as an approach designed to understand the relative strength of attributes and the trade-offs that a consumer makes when making a purchase decision. The basic idea of a conjoint analysis is to present a subject with a profile of a product and ask the subject to rate its different attributes. For example, in a consumer domain, one might ask an individual about an automobile and include attributes of the car such as the color, make, horsepower, and other options. The individual rates the car based upon those attributes and the researcher decides which of the attributes is driving the decision purchase.

In our study, senior IS executives evaluated a series of hypothetical profiles describing an outsourcing option in terms of the 10 attributes mentioned above (with each describing an attribute of a provider) and the three sourcing options. The respondents rated the likelihood of selecting a vendor given the conditions described to them (on a scale of 0 to 100). Attributes and their definitions were provided to the subjects, but the first step in our methodology required the selection of levels for each of the attributes. Attribute levels were chosen to represent variation that typically occurs in the decision of an outsourcing vendor, thereby maintaining believability and response validity. The attributes, definitions, and levels are found in Table 7.³

6.3. Pre-Test

To ensure that the attributes and levels reflected a real-life situation, we employed a pre-test of our instrument with academics involved in outsourcing research and senior executives who were experienced in outsourcing. Via e-mail, we first provided the levels and attributes to 13 academics involved in outsourcing research. Based upon their feedback, we made minor changes to the wording and the levels and finalized the associated attributes in the form above (Table 7). Additionally, the academics offered advice on phrasing of the recruitment letter and research instrument. Next, we provided via email the research instrument, attributes, and levels to senior level IS executives representing the target audience for the survey. Fifteen executives provided feedback on the instrument, resulting in language changes intended to increase participation. The pre-test allowed us to ensure that the instrument contained no ambiguous attributes and the task was appropriate for executives. Further, these two steps also ensured face validity of the profiles.

6.4. Research Instrument

For the conjoint research instrument, we used an orthogonal factorial design to reduce the number of attribute combinations and make the task manageable (Green and Srinivasan, 1990). Utilizing a full profile approach would require each respondent to assess every possible combination of the attributes and their levels. As a result, the data quality would degrade due to the large number of tasks. Earlier work in the management literature has required individuals to rate up to 39 profiles (e.g., Shepherd, 1999). However, more recent studies on choice-based conjoint analysis have indicated that limiting the number of tasks to 20 does not cause a degradation of data (McCullough, 2002). In this study, mindful of the demands on an executive decision-maker's time, but still concerned with obtaining good quality data, we employed an orthogonal factorial design to reduce the number of profiles that each respondent would need to see, adopting a partial-profile design with the

³ We have selected orthogonality of the factors over level balancing the attributes. We derive support for this approach from Sandor and Wedel (2001) who found that "sacrificing strict level balance enables us to generate more efficient designs than enforcing this criterion does" (p. 431).

Table 7 Attributes, Definitions, and Levels for Conjoint Analysis

Theory	Attribute	Definition of Attribute	Levels for Conjoint Analysis
Transaction cost theory	Transaction costs	The costs incurred in searching, creating, negotiating, monitoring, and enforcing a service contract between buyers and suppliers <i>Note – we are purposively focusing upon negotiating</i>	<ul style="list-style-type: none"> ♦ Limited resources (including effort, time, and costs) would be involved in negotiating an agreement between your organization and an external party for that application ♦ Moderate resources (including effort, time, and costs) would be involved in negotiating an agreement between your organization and an external party for that application ♦ Significant resources (including effort, time, and costs) would be involved in negotiating an agreement between your organization and an external party for that application
	Production costs	The comparative cost of internalizing the application versus the price it has to pay vendors for the same application	<ul style="list-style-type: none"> ♦ Using a vendor would be more than building the application internally ♦ Using a vendor would be the same cost as building the application internally ♦ Using a vendor would be less than building the application internally
Resource-based view	Resource gap	The availability of people with technical skills to develop the application	<ul style="list-style-type: none"> ♦ The application requires people with technical skills that are relatively common ♦ The application requires people with technical skills that are relatively rare
	Resource heterogeneity	The extent to which the application differentiates the firm	<ul style="list-style-type: none"> ♦ The application does not provide a competitive advantage ♦ The application provides a competitive advantage
	Resource utilization	The number of users that access the application	<ul style="list-style-type: none"> ♦ A small number of users access the application ♦ A medium number of users access the application ♦ A large number of users access the application
Resource-dependent view	Task environment availability	The degree to which there are a number of vendors available to offer the application/service	<ul style="list-style-type: none"> ♦ The number of reputable vendors that offer the application is limited ♦ The number of reputable vendors that offer the application is significant
	Telecommunications and network infrastructure capabilities of vendor	The degree to which the vendor offers a sufficient degree of telecommunications/network capabilities	<ul style="list-style-type: none"> ♦ The vendor offers a limited degree of telecommunications/networking capabilities ♦ The vendor offers a sufficient degree of telecommunications/networking capabilities ♦ The vendor offers a significant degree of telecommunications/networking capabilities
Knowledge-based view	IT knowledge of service or product	The extent to which there is business-specific knowledge needed to develop the application	<ul style="list-style-type: none"> ♦ No business-specific IT knowledge is needed to develop the application ♦ Limited business-specific IT knowledge is needed to develop the application ♦ Significant business-specific IT knowledge is needed to develop the application
	Integration requirement	The degree to which the application helps the knowledge flow within the firm	<ul style="list-style-type: none"> ♦ Does not help the knowledge flow within the firm ♦ Moderately helps the knowledge flow within the firm ♦ Significantly helps the knowledge flow within the firm
	Knowledge risk	The degree to which there is knowledge specific to the organization that might put the firm at risk if disclosed by an external provider	<ul style="list-style-type: none"> ♦ No knowledge specific to the organization is in the application that would put our firm at risk if it were disclosed by an external provider ♦ Significant knowledge specific to the organization is in the application that would put our firm at risk if it were disclosed by an external provider

10 attributes. Utilizing an orthogonal factorial algorithm, we determined that we needed four “blocks” or rotations of a set of nine profiles. Each respondent was randomly assigned to one of the “blocks” of rotations and shown nine profiles per source. Further, in addition to the 10 attributes identified below, we also randomly rotated the source of the vendor (ASP, offshore, or domestic). In the end, each respondent evaluated 18 profiles, i.e., nine profiles per vendor and two vendor sources. After reading each profile, the subject rated the likelihood of outsourcing an application with a profile depicted in the instrument (likelihood of outsourcing was our dependent variable). An example of the profile is in Figure 4.

If you were considering an application that:

- »Moderately helps the knowledge flow within the firm
- »Requires no business-specific IT knowledge to develop
- »Has a small number of users
- »Includes significant knowledge specific to the organization that would put our firm at risk if it were disclosed by an external provider
- »Does not provide a competitive advantage

And,

- »The technical skills required to develop the application are relatively rare
- »Significant resources (including effort, time, and costs) would be involved in negotiating an agreement between your organization and an external party for that application
- »Using a vendor would be less than building the application internally
- »The number of reputable vendors that offer the application is limited
- »The vendor offers a limited degree of telecommunications/networking capabilities

What is the likelihood that you would use an ASP to deploy this application?

Please rate the likelihood from 0 to 100, where 0 means that you would not choose this option and 100 means that you would definitely consider this option. You may use a number anywhere between 0 and 100.




Figure 4 Example of Conjoint Profile

6.5. Sample

We conducted a national survey to collect data for this study. The population of interest was Chief Information Officers or senior IS managers in firms with budgets conducive to outsourcing.⁴ We followed a systematic approach in constructing the mailing list for our survey. We utilized a web survey for data collection that randomly assigned the respondent to answer one of the profile sets.

Following the methodology proposed by Dillman (1978, 2000), we employed the following steps. First, we sent all members of the sample a personalized e-mail. The purpose of this message was to inform our respondents that they had been selected for the survey. Respondents indicated their interest in participating by clicking on a link embedded in the email that directed them to the survey. There were 174 respondents who indicated an interest in participating. Approximately two weeks after we emailed the first invitation, we sent a follow-up invitation to all members of the sample. This resulted in 223 additional respondents who indicated an interest. Thus, the total sample for our survey was 397 firms.

We received a total of 84 usable responses for a response rate of 21 percent. This response rate is close to the minimum recommended level of 20 percent for organizational surveys (Grover, 1997; Yu

⁴ To assist us in the identification of these firms, we employed a market research firm, ListK, who utilizes *The Directory of Top Computer Executives* as the basis for their database of top IT executives. The Directory has been utilized in prior publications (e.g. Ravichandran & Rai, 2000) and hence, is a reliable source for our sample.

and Cooper, 1983) and similar to those obtained in many IS surveys (Pinsonneault and Kraemer, 1993). For the conjoint approach, a minimum sample size of 75 is usually recommended. However, there is no clear required minimum sample size (McCullough, 2002). The profile of the respondents is shown in Table 8.

Table 8 Profile of Respondents

Firm Size		Job Title		Industry	
No response	26	CIO	16	Agriculture, Forestry, And Fishing	1
Less than \$1 million	0	COO	2	Construction	11
\$1 - \$9 million	3	CTO	2	Manufacturing	25
\$10 - \$49 million	6	MIS/IT Director/Manager	18	Wholesale Trade	7
\$50 - \$99 million	5	EVP/VP of IT/IS	13	Construction	11
\$100 - \$249 million	7	Dir. of Applications/Infrastructure	5	Services	16
\$250 - \$499 million	9	Telecommunication specialist	6	Public Administration	1
\$500 - \$749 million	7	None specified	22	Other	12
\$750 - \$999 million	3	Total	84	Total	84
\$1 - \$1.49 billion	4				
\$1.5 - \$1.9 billion	2				
\$2 - \$9.9 billion	9				
\$10 - \$25 billion	3				
More than \$25 billion	0				
Total	84				

In terms of outsourcing experience, 39 percent of the firms in the study have outsourced at least one application to an Application Service Provider; 20 percent have used an offshore vendor; and 44 percent have outsourced to a domestic vendor.

6.6. Analysis

The likelihood for each of the profiles within each of the blocks was averaged across respondents to calculate the mean likelihood. We created dummy variables for each attribute within each profile and entered these into a regression equation. Regression decomposes the assessment into its underlying structure, as represented by the independent variables and their beta coefficients (Shepherd, 1999).

The output of the regression is beta weights for each of the levels of the attributes. After adjusting the beta weights such that the lowest was 0, we calculated the maximum weight for each of the attributes and summed them. The proportion of the beta weight accounting for each attribute reveals the relative strength of that attribute on the likelihood decision. Finally, to assess the statistical significance of the results, we examined the r^2 for each regression analysis.

6.7. Results

We repeated the above methodology for each of the sourcing choices. Overall, the r^2 for each of the sourcing options was high – for ASP, 82.7 percent; for domestic, 84.3 percent; and for offshore, 85.4 percent. This indicates that the attributes used in this research captured a high percentage of the variance associated with the application sourcing decision. The results also allowed us to compare the relative strength of the attributes for ASP, domestic, and off-shore application outsourcing choices. For example, transaction costs account for 18 percent of the likelihood that an application will be outsourced to an ASP. The relative strength of the transaction costs attribute is 7 percent and 11 percent for domestic and offshore sourcing, respectively. Table 9 contains the beta weights and relative strength for each of the attributes.

Table 9 Importance of Decision Criteria

		ASP		Domestic		Offshore	
		Maximum Beta	Relative Strength	Maximum Beta	Relative Strength	Maximum Beta	Relative Strength
T C U	Transaction costs	6.900015	18%	2.103453	7%	2.661642	11%
	Production costs	4.198519	11%	8.098409	26%	5.160807	20%
RBV	Resource gap	3.894459	10%	0.339951	1%	1.269098	5%
	Resource heterogeneity	0.349649	1%	1.294667	4%	0.855878	3%
	Resource utilization	3.516309	9%	3.446741	11%	1.190387	5%
R D >	Task environment	0.758345	2%	0.941256	3%	0.280904	1%
	Vendor Capabilities	6.055304	16%	6.988938	22%	6.851851	27%
KBV	IT knowledge of service or product	3.416697	9%	2.886895	9%	1.356823	5%
	Integration requirement	1.681705	5%	1.706221	6%	1.229291	5%
	Knowledge risk	6.924381	19%	3.480151	11%	4.439801	18%

An examination of the columns in Table 9 reveals that the three most important attributes when deciding to outsource an application via an ASP are knowledge risk (19 percent), transaction costs (18 percent), and vendor capabilities (16 percent). Collectively, these three attributes account for over half of the likelihood (53 percent) that the respondents will choose the ASP sourcing option. Similarly, the most important attributes when making the decision to outsource to a domestic vendor are production costs (26 percent) and vendor capabilities (22 percent). These two attributes together explain nearly half (48 percent) of the decision. For offshoring, vendor capabilities rank first (27 percent), followed by production costs (20 percent) and knowledge risk (18 percent). These three attributes account for almost two-thirds (65 percent) of the likelihood that the subjects will select an offshore vendor when sourcing a given application.

Examining the columns in Table 9 also discloses the *least* important attributes in application sourcing decisions. For ASPs, the least important attributes are resource heterogeneity (1 percent), task environment (2 percent), and integration (5 percent), collectively accounting for only 8 percent of the ASP sourcing decision. Likewise, resource gap (1 percent), task environment (3 percent), and resource heterogeneity (4 percent) together explain only 8 percent of the domestic outsourcing decision; while task environment (1 percent) and resource heterogeneity (3 percent) combine to explain 4 percent of the decision to source an application offshore. There are four other offshore attributes – resource gap, resource utilization, IT knowledge, and integration – that each had a low relative strength of 5 percent. In other words, six out of 10 offshore attributes explained less than one-fourth (24 percent) of the offshore decision.

The results also indicate that two attributes have minimal importance across all three sourcing options. Task environment has a relative strength of 2 percent for ASP, 3 percent for domestic sourcing, and 1 percent for offshoring; while resource heterogeneity's results across the table are 1 percent, 4 percent, and 3 percent. The results for integration, while slightly higher (ASP 5 percent, domestic 6 percent, offshore 5 percent), are also weak. Conversely, vendor capabilities was ranked in the top three most important attributes for all three sourcing options (ASP 16 percent, domestic 22 percent, and offshore 27 percent), as was knowledge risk, albeit to a slightly lower extent (ASP 19 percent, domestic 11 percent, and offshore 18 percent).

7. Discussion

The results from the conjoint analysis reveal some fundamental notions about how executives approach making outsourcing choices. Clearly they are concerned about the cost of outsourcing, regardless of the option chosen. In the case of ASPs, executives focused more on transaction costs (search and negotiation costs) than on production costs (the comparative costs of internalizing the application vs. the cost of sourcing), while the opposite was true for domestic and offshore outsourcing. Transaction costs are more closely tied to a vendor rather than an application, while production costs are more associated with the application itself. This suggests that our respondents

are concerned about the volatility of the ASP market, while they view the services provided by ASP vendors as somewhat generic (Brodsky and Tan, 2003). They are less concerned about vendor selection and negotiation issues for the domestic and offshore options, but more focused on application-specific costs in those instances. Results for the task environment attribute complement this. The low relative strength of the task environment attribute (ASP 2 percent, domestic 3 percent, offshore 1 percent) indicates that, in general, executives feel comfortable with the availability of reputable vendors. In short, the combination of transaction and production costs for each option plays a significant role in the sourcing decision across the board. While there is little concern about the availability of vendors, respondents felt that finding a suitable ASP vendor may require more time and effort than finding a domestic or offshore vendor.

A second attribute that was prominent in executives' minds for all three sourcing options was the risk associated with disclosure by the vendor of knowledge specific to the organization. This was relatively high for both the ASP (19 percent) and offshore options (18 percent), and somewhat lower for domestic outsourcing (11 percent). It is likely, however, that the perceived risk is different for ASPs than for offshore vendors. Firms contemplating the ASP option face potentially greater business risks associated with vendor insolvency and service discontinuation. For example, under the ASP model, if a vendor declares bankruptcy, customer data might be considered to be part of the vendor's assets and consequently set aside to help satisfy creditors' claims (Brodsky and Tan, 2003). In the case of offshoring, disclosure risks revolve around (1) potential loss of control over customer information and critical intellectual property (Greenemeier, 2004; Weinstein, 2004), and (2) lack of legal protection safeguarding personal and proprietary data, compounded by multiple legal jurisdictions (Swartz, 2004).

The third attribute that the respondents ranked highly was the networking and telecommunications capabilities of the vendor. This attribute rose in relative importance as the sourcing option moved from ASP (16 percent) to domestic (22 percent) to offshore (27 percent), indicating that the respondents became increasingly more concerned about the telecommunications and network capabilities of the vendor as the sourcing option shifted from a relatively standardized model (ASP) to those subject to more customization and complexity. The progression from ASP to domestic sourcing to offshoring can be viewed as a continuum, where the decision-makers' level of concern increases as their sense of control decreases and the distance, both geographic and social, increases.⁵

In addition to the availability of reputable vendors discussed above, two other attributes were considered minimally important across all three sourcing options: the availability of technically qualified individuals (resource gap), and the extent to which the application provides competitive advantage to the firm (resource heterogeneity). The lack of importance attributed to the resource gap is simple to understand. There is an abundant supply of IT personnel with adequate technical expertise, both domestically and abroad. In the minds of our respondents, the decision to outsource, whether it be to an ASP, domestically, or offshore, is driven not by a desire to gain access to technical expertise but rather to reduce costs. What is more difficult to explain, and potentially more troubling, is the finding that, when considering outsourcing alternatives, IT executives do not differentiate between applications that provide competitive advantage and those that do not. Could it be that the respondents agree with Nicholas Carr's (2003) argument that IT doesn't matter?

Nicholas Carr (2003) argues that IT doesn't matter.

Carr's argument, in short, says that sustained competitive advantage is derived from "not ubiquity, but scarcity" (p. 42), and, thus, IT cannot be a source of sustained competitive advantage, since the core

⁵ We offer two possible explanations for this finding. One possibility is that it is not so much a concern over difference in abilities, but rather a concern over a greater loss of control over the vendor (or perhaps loss of ability to monitor the vendor) as one moves offshore. If a firm cannot manage or monitor a task, executives within that firm tend to worry more about the capabilities of the vendor performing that task. The second possibility is that the level of concern increases when moving offshore due to worries about the communication capabilities of the vendor - not technical/network communications but social/cultural/linguistic communication.

functions of IT “have become available and affordable to all” (p. 42). At first glance, it seems as if the IT executives responding to this survey apply Carr’s arguments to applications. However, further reflection offers an alternative perspective. It may be that the executives have come to the enlightened realization that competitive advantage comes not from IT, but from the organizationally and socially complex linkages between IT and business processes both within the firm, and between the firm and its customers and suppliers (Clark and Stoddard, 1996; Mata et al., 1995). Put another way, competitive advantage is fostered by IT-dependent strategic initiatives that do not arise from individual applications but rather from “the configuration of interrelated and interlocking activities” (Piccoli and Ives, 2005, p. 748). When the results for resource heterogeneity are coupled with those for knowledge risk, a reasonable interpretation is suggested: The respondents are not necessarily hesitant to outsource unique applications, provided that appropriate safeguards are in place that protect the firm from unauthorized access or disclosure.

When the results are viewed on a theory-by-theory basis, some intriguing patterns emerge. First, there is no one single theory that predominates across all three sourcing options. TCE comes the closest to doing so, reflecting the maturation of the practice of outsourcing. For the most part, outsourcing has become an accepted means of filling an organization’s IT needs, and consequently, is itself becoming commoditized, at least for basic IT functions. As a result, cost considerations play a significant role, particularly in the domestic market.

Conversely, Resource-Based View attributes are not considered especially relevant. Again, this may be interpreted as an outgrowth of the maturation of outsourcing, with the attendant implications of adequate availability of qualified employees across vendors, acceptance of outsourcing regardless of the uniqueness of the application (with appropriate safeguards, as previously discussed), and leveraging of technology to support large numbers of users.

Results for the Resource Dependence attributes indicate that there is an adequate supply of qualified vendors, and that executives are focused on their capabilities. Note that, with the exception of transaction costs for ASP vendors, this is the only attribute associated with vendors that was found to be significant. The other noteworthy attributes (production costs for applications sourced to domestic and offshore vendors, and knowledge risk for all three options) are associated with the application, not the vendor.

The Knowledge-Based View attributes boil down to one: knowledge risk, or the degree to which the firm might be harmed if organization-specific knowledge were to be disclosed by the vendor. This suggests that the respondents value the criticality or sensitivity of knowledge embedded in the application to be much more relevant to the sourcing decision than the application’s reliance on business knowledge, or the extent to which it facilitates information flow within the firm.

Finally, considering the implications of the results for all four theories *in toto* suggests that the phenomenon of application sourcing is best viewed from a contingency perspective, in that no one theoretical perspective dominates. Rather, it is best explained by utilizing certain attributes from several different theories. The appropriateness of application outsourcing varies, based on cost attributes, vendor capabilities, and the level of knowledge risk.

8. Limitations

As with any empirical research, this work has limitations. First, we selected 10 theoretically derived attributes that we hypothesized impact executives’ decisions. While we grounded these 10 attributes in four organizational theories, we recognize that other latent attributes influence the decision-making process and could indicate different weightings of these (and other) attributes. However, we believe that our reliance upon these four theories is consistent with prior outsourcing work and, thus, has strong theoretical justification. Second, the low number of executives in our sample is a potential limitation. Nonetheless, given our conformance to generally accepted survey sampling methodology (Dillman, 1978; 2000), we feel comfortable in our sampling and data collection methodology. Finally, while we examined the direct effects of these attributes, given our data analysis choices, we could not

examine interactions between the attributes. We leave this dimension for other researchers to investigate.

9. Implications for Research

In this study, we outlined 10 attributes derived from four organizational theories that we hypothesized to influence an executive's decision to outsource to an ASP, a domestic, or an off-shore provider. Using conjoint analysis, we determined that, in the minds of an executive, the attributes that determine which type of provider to utilize differ depending on cost attributes, vendor capabilities, and the level of knowledge risk.. As a result, we believe that this work has a number of implications for future research.

First, this work was among the first to use the conjoint methodology to study IS phenomena, in this case, outsourcing of IS applications. While the marketing literature has focused upon this perspective for a number of years, the IS literature has rarely engaged in this type of study. We believe that the conjoint methodology is relevant (as these results are easily digestible to practitioner audiences) and academically rigorous (as the attributes are theoretically based and have implications for how we theorize about outsourcing decisions). Thus, we suggest that further application of the methodology by the broader community can help us better understand IT decision-making, and we encourage others to explore further, adopt, and utilize it to better understand other aspects of IS.

Next, theoretically, the results suggest a number of implications about the relative impact of theories. The strongest theories are Transaction Cost Economics and the Knowledge-Based view, while the weakest are the Resource-Based and Resource-Dependence theories. This suggests that the application outsourcing decision is more a process of balancing costs and potential risks of knowledge disclosure, and less about finding external resources to overcome internal limitations. The differences also indicate that the ASP model is transaction-based, while domestic and offshore sourcing is production-based. Vendor capabilities and knowledge risk are also key drivers of the overall sourcing decision, but vary in importance among the three options. This suggests that selective sourcing as a theoretical concept needs further (and deeper) reflection to better understand the nature of the sourcing providers themselves. For instance, one possible explanation for the concerns over market characteristics could be traced to the more widely available resources in the domestic IT environment, leading to a more munificent environment (from a resource dependency point of view).

Third, these results have implications for the study of outsourcing arrangements. For instance, while we aggregated responses using a descriptive lens, these could also be taken in a prescriptive sense. For example, hiring an offshore provider on the basis of its IT knowledge of a service or product could well be the wrong criterion to use and could lead to failure. Hence, in examining the decisions made by executives, one could determine whether the decision made was for the correct or for the incorrect reasons to determine if the arrangement will be successful.

Fourth, despite the call for increased attention on the Resource-Based View of the firm within the IS community (Wade and Hulland, 2004), our results indicate that this call may not necessarily reflect the nature of IS decision-making. Instead, our findings imply that our research should begin investigating the trade-offs between cost and knowledge risk. While TCE is one of the most utilized perspectives in outsourcing, KBV is the least. We suggest that outsourcing researchers (specifically) and IS researchers (more broadly) should shift their focus away from resource-based theories and instead examine the role of knowledge and knowledge transfer in other domains of IS decision-making. Given the networked nature of the firms of tomorrow, we cannot underestimate the risks associated with knowledge transfer and its importance in the minds of senior executives.

Finally, the nature of outsourcing has changed in recent years from a small marketplace with a small number of key competitors to a global marketplace, where firms are coordinating and collaborating with one another in unprecedented ways. This suggests that more emphasis should be placed on how these collaborations and interactions can be governed, and on the importance of outsourcing

governance tools. Currently, little research is being done in this area. Moreover, given the increased complexity of the outsourcing landscape, our implications suggest that some of the fundamental assumptions that have traditionally been made about the nature of the target services to be outsourced (i.e., core/non-core, strategic/non-strategic) should be questioned and empirically tested within these new contexts. Apparently, whether an application is core or non-core is not as important an issue in the outsourcing choice as has been previously thought.

10. Implications for Practice

We believe that our results have a number of implications for the practice of choosing whether to outsource to an ASP, a domestic vendor, or an offshore provider.

First, organizations need to consider that the outsourcing of applications is really more a balancing act between risk and rewards. The rewards primarily take the form of cost savings, while the risks embody the deleterious effects of knowledge transfer and potential disclosure to competitors. Risk also involves the transfer of knowledge from the client to the vendor, which might leave the client vulnerable. If risk is an overriding concern, the client organization should probably choose a domestic vendor, as this is perceived to be the least risky of the three options.

Second, organizations should not look to outsourcing vendors as vehicles for overcoming internal limitations (resource gaps). As noted in past research (e.g., Lacity and Hirschheim 1993a,b), deciding to outsource simply because a firm does not possess certain technical skills and expecting the outsourcing vendor to deliver these skills is problematic. Such skill asymmetry often leads to failure. Thus, despite the overwhelming amount of outsourcing vendor rhetoric to the contrary, organizations still focus on cost reduction as the key driver of their outsourcing decision.

Third, vendor capability, in terms of the vendor being able to deliver what it promises is a key aspect of outsourcing choice. This is especially true in the case of offshoring. Thus, prospective clients should look for hard evidence that the vendor possesses the capabilities it claims and search for concrete, successful vendor engagements, especially in the offshoring domain. Interestingly, finding a vendor with suitable capabilities appears to be a non-issue today, which suggests the maturity of the outsourcing market.

Fourth, while costs are clearly an important dimension in the choice to outsource, the types of costs vary depending on the outsourcing option. For example, firms considering an ASP will typically invest more effort in searching and negotiating with the ASP vendor (i.e., higher transaction costs) than with either domestic or offshore outsourcing. This may partly be because the ASP market is perceived to be more volatile.

A final point of interest to practitioners is the applicability of this research to variations on the archetypical forms of sourcing. For example, there is growing interest in cloud computing as a mechanism for delivering application services (this includes such things as Software as a Service (SaaS) and on-demand computing). Cloud computing has the same key attributes as the "standard" ASP model, and exposes the user to the same risks (Brodkin, 2008; Gruman, 2008; Hayes, 2008). Thus, the insight provided by this paper should be useful in evaluating emerging variants of the three base sourcing modes.

11. Conclusions

Drawing upon organizational theory and conjoint analysis, we have explored application service sourcing options. We believe that the results of this study shed new light on: (1) the theoretical assumptions that managers make in their outsourcing decisions, (2) our conceptualization of selective sourcing, and (3) the role of resource-based views in the IS discipline. Our research shows that the sourcing of an application service involves complexities that must be investigated further by taking into account how decision-makers assign different priorities to the different attributes. Our research suggests that in many ways, the effective sourcing of an application service is similar to the complex

issue of systems development – an area that the IS field has struggled with since the early days of its existence. Clearly, there are many issues that need to be resolved in order for practitioners to improve their sourcing decisions; however, the first step in finding solutions is asking the proper questions. We believe that this paper makes a good start by uncovering the relative values of attributes and issues around which many applications sourcing questions can be raised. While we have made a start at raising such questions, much more needs to be done. The field needs a richer understanding of the increasingly complex world of applications sourcing, so as to prevent our colleagues in practice from pursuing the intoxicating drug of cost savings through offshore outsourcing (as noted in the opening quote by Bill Tucker), instead of pursuing a balanced and well-justified strategy.

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