

JOURNAL OF INFORMATION SYSTEMS APPLIED RESEARCH

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Make or Buy: A Comparative Assessment of Organizations that Develop Software Internally Versus those that Purchase Software

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Abstract

This study reveals insights from 221 interviews to compare the perspectives of executives in organizations who generally tend to develop or maintain software in house versus those who tend to purchase software from vendors or outsourced providers. The key findings reveal that organizations that purchase software do not differ from those who develop software in their perspectives on the strategic importance of information technology and the role of information technology as a way to differentiate from their competitors. The findings do reveal that organizations that purchase software also are more likely to outsource IT and to use offshore labor. In addition the study reveals that organizations that develop software are perceived as being more efficient in the collection and storage of data to support business operations.

Keywords: make vs. buy, outsourcing, strategic use of IT

1. INTRODUCTION

The past decade has ushered in a change in the way many organizations approach major software investments. In the era of mainframe computing, most major information systems were developed in house or customized to suit the requirements set forth by the project team. With the rise of packaged enterprise systems and outsourced solutions, most organizations generally seek to purchase software rather than developing software in house. However, there are many organizations that remain committed to their customized software and find greater value in maintaining legacy systems or developing systems to suit their specialized requirements that a packaged or

outsourcing solution cannot offer. This study compares the characteristics of organizations that tend to "make" versus those that tend to "buy" software.

The make-or-buy decision is a classic management issue. Every firm uses thousands of inputs, and for each there is a potential to either manufacture the input or acquire it on the market. In its broadest interpretation, this decision includes choices like hiring a consultant or employing internal labor to perform a given task. If a firm decides to make an input, it will transact internally with a division or another part of the firm. If it decides to buy, it will contract with another organization. In either case, it is important to

understand the decision criteria behind the transaction. The make-or-buy decision is sometimes treated as an accounting or financial decision. While it is important to perform accounting analysis and to choose the low-cost approaches, it is more important to understand the long term ramifications of these decisions (Rubin, 1990).

In this paper we address the make-or-buy decision in the deployment and utilization of a firm's Information Technology [IT] resources. We begin with a consideration of IT as a part of corporate strategy and competitive positioning. The investment and management of IT is recognized together with IT resource management. These form the lead into a discussion of the outsourcing decision. We suggest a framework depicted in Figure 1 as a basis for examining the perspectives of executives and IT professionals on IT strategic issues, IT investment and resource management as affects for make-or-buy decisions. The focus of this particular study is on the Make-Buy quadrant and its relationship with the other metrics in the framework. Note that Figure 1 represents a model for investigating the current state of organizational computing, particularly as it relates to issues of strategic importance. The focus of this research paper, examining relationships related to organizations tendencies for software development or acquisition, is one of many relationships that could be studied within this framework.

The remainder of this research paper is organized as follows. In section two, we provide a detailed background on the practices of outsourcing, make or buy decisions, and their impact on organization strategy. In section three, we detail the methodology and research questions addressed in the study. In section four, we reveal the results of the analysis and related discussion. Lastly, in section five we provide conclusions, limitations, and opportunities for future research on this subject.

Figure 1: Make-Buy Outsourcing Framework

2. BACKGROUND

IT Outsourcing as a Corporate Strategy and as a Means of Competition

Outsourcing is a choice that lies in the corporate policy, not just business strategy,

area, as it modifies the firm's boundaries as a legal entity and generally involves top management decision makers. Affecting company-wide resource allocation policies and asset management practices, outsourcing decisions often involve several divisions in large, diversified companies, as in the case of IT outsourcing operations. Several factors are at work simultaneously that are likely to increase outsourcing: rapid technological change, increased risk and the search for flexibility, greater emphasis on core corporate competencies, and globalization. In this broader context, outsourcing is the result of a complex change in the cost boundaries facing firms as they choose between inside and outside production (Deavers, 1997)

According to Winkleman et al. (1993) there are two basic drivers behind the growth of outsourcing, cost reduction and a strategic shift in the way organizations are managing their businesses. Gupta and Gupta (1992) add two further drivers for outsourcing; market forces and technical considerations. Hiemstra and van Tilburg (1993) indicate four motives for outsourcing: costs, capital, knowledge and capacity. Aarts et al. (1995) added one more main motive, "less sorrows", which indicates that outsourcing is led by strategic considerations to concentrate on core business activities.

Outsourcing occurs when an organization contracts with another organization to provide services or products of a major function or activity (Belcourt, 2006). Outsourcing is not just a costing exercise; it has a strategic dimension as the organization attempts to find the right size to fit new environments (Rothery and Robertson, 1995). Work that is traditionally done internally is shifted to an external provider, and the employees of the original organization are often transferred to the service provider. Outsourcing differs from alliances or partnerships or joint ventures in that the flow of resources is one-way, from the provider to the user. Typically, there is no profit sharing or mutual contribution.

Outsourcing has also helped companies ameliorate competitive pressures that squeeze profit margins and eliminate investments in fixed infrastructure. It has also allowed for improved quality and efficiency: increased access to functional expertise; potential for creating strategic business alliances, and fewer internal administrative problems. The key to

deciding what to outsource rests with those elements that differentiate the organization, especially in the areas of value and quality. While management must own those operations that define a company's core business and its core business processes, other functional areas that are non-core should be considered potential candidates for outsourcing. By outsourcing non-critical functions, a company can leverage its financial resources, share its financial risk, and allow management to concentrate more fully on core business activities.

IT outsourcing services has sometimes been the focus of best practices reporting (Rottman and Lacity, 2006). The impact of outsourcing has three interrelated dimensions: scope of outsourcing, act of outsourcing, and impact of outsourcing (see Figure 2). The first dimension of scope or 'what to outsource?' is an important issue that companies often face at the beginning of an outsourcing or make-or-buy decision. Cost savings may be offset by hidden transaction costs (Rottman and Lacity, 2006) and there may be other factors driven by outsourcer's customers' needs. There is a strategic element of choice that is involved in this issue. A company like Bank of America that sees IT as its core to offering innovative customer solutions may choose to outsource some IT functions to be at the cutting edge of technology. Being core to its business, it sees IT outsourcing as strategic (McCue, 2004). The second issue of how the outsourcing is implemented or managed is critical to its success. Poor management of the outsourcing relationship can lead to a complete relationship failure (Martin, 2007). The other dimension of outsourcing relates to the overall impact of outsourcing on the business and its environment that is beyond the realm of performance in an outsourcing contract.

Figure 2: Three dimensions of Outsourcing

The decision by firms to outsource may also be driven by as well as drives (i.e., IT influenced by and facilitates) the emergence of specialist organizations in various fields and cost efficiencies. While much of the discussion relating to outsourcing IT focused on the cost of performing an activity within the boundaries of the firm versus entrusting to a third party, situations in which cost may not be the principal consideration in a firm's outsourcing decisions also merit consideration (Varadarajan, 2008).

Companies could also outsource their IT to streamline the management agenda and focus on the firm's core business (Slaughter and Ang, 1996). Senior executives often consider the IT function a commodity service best managed by a large supplier. Using a value chain analysis, this eliminates/outsources activities that do not provide primary value to the organization. If managers do not see a strategic role for IT then IT outsourcing is viewed as a means of conserving managerial effort and focusing on areas with greater strategic potential. Firms can outsource a significant portion of the IT infrastructure and still retain aspects such as critical applications development that are viewed as strategic (Weaver et al., 2000).

IT Investment and Management

One of the problems in explaining the continuity of large-scale IT outsourcing is that existing studies apply theoretical approaches, which offer limited explanatory power. For example, it is argued that firms externalize their IT activities because they can either save on costs/risks (the transaction cost perspective) or focus on their core competences (Lacity et al., 1994a). Little attention has been paid to wider changes in production systems. While there have been a number of contributions examining the nature and impact of IT outsourcing (Lacity and Hirschheim, 1993) and its implications for IT management (Huber, 1993), less attention has been paid to IT outsourcing in the context of broader organizational strategy and the implications for innovation and the distribution of expertise in emergent organizational forms. Companies often outsource IT to generate cash and enhance liquidity (Lacity et al., 1994 and McFarlan and Nolan, 1995). For firms considering divestitures, outsourcing can liquidate an asset that IT unlikely to be recognized in the deal (McFarlan and Nolan, 1995). On the other hand, firms considering acquisitions often see outsourcing as a means of generating capital to partially fund the acquisition (Smith et al., 1998).

A rapidly advancing technological environment often forces organizations to consider outsourcing whereby they effectively surrender control of the IT function to external suppliers. Such surrenders are usually motivated by short-term considerations where the organization providing the outsourced services does not have any incentive to become a

"partner" in the business process. This leads to the surrender of mission-critical IT functions to external parties. Furthermore, the recovery of such critical IT functions once surrendered to outside providers often proves far more difficult once the in-house expertise has left the organization (Weaver et al., 2000). This may leave firms' IT departments lacking in current technical expertise and equipment.

Whether an activity adds to an organization's competitive advantage must be measured in the marketplace. Chamberland (2003) suggests a metric to assess activities in four major categories of strategic importance, ranging from "key activities which are more apt to add the greatest strategic value to the organization, to "commodity activities," which are readily available in the marketplace and contribute no strategic value to the organization. He states that these key activities should generally be performed in-house while others become prime candidates for outsourcing. Whether an activity can be performed well internally depends on an organization's internal resources. Those resources are measured against a valuation metric that he ranks from a "weak" to a "strong" capability (as represented in the figure 3). This two-dimensional matrix helps assess whether a particular activity should be outsourced. The criteria on the matrix help decide whether an activity is both key to the organization and an important source of competitive advantage to it, and therefore worthy of being performed in-house. If it is found that an activity only provides a negligible (if any) competitive advantage to the organization, depending on the organization's ability to perform it in-house, it is more likely to be outsourced outright, or handled through some type of third-party relationship.

Figure 3: Internal Capability of Enterprise to perform an activity

The Make-Buy Outsource Decision

The question of what to produce internally and what to outsource is often asked (Ahern, 2009). Over the last two decades, organizations have sought to enhance efficiencies and expand their capabilities by giving larger role to their suppliers in creating and delivering value to their end customers. Moving beyond the traditional 'make' or 'buy' decisions, companies sought to view their vendors as partners that signaled a shift from

adversarial arms length relationships to deeper cooperative relationships.

Outsourcing can be considered as a continuum. At one extreme outsourcing can be seen in the form of hiring temporary labor or machines and at the other extreme, complete responsibility for the regular and continuous design, build and delivery of manufactured parts for integration within other assemblies. In the middle are various forms of consultancy and skills provision. Time is reflected across the continuum with short-term market exchanges at one end and long-term, relational exchanges at the other.

IT Outsourcing Strategy: Make vs Buy

Technological developments in the macro environment can be a driver of a firm's decision to outsource an activity that was previously performed in-house. Technology can also be a driver of a firm's decision to perform in-house an activity that had been outsourced. By leveraging technology to automate, it might be possible to make redundant an outsourced activity. If contracting out parts of the operation is cheaper than doing it yourself, it is a clear case for outsourcing. This enables organizations to not only make efficiency gains but also allows them to focus more clearly on those activities that it can better perform in-house (Hendry, 1995).

Bhattachary (2003) suggests three models that can be used to understand managerial motivations for IT outsourcing. These models are (1) the antecedent firm characteristics of IT outsourcing proposed by Smith et al. (1998); (2) the Four-S Outsourcing Model (Zucchini, 1992); and (3) the Reengineering-Outsourcing Decision Matrix (Behara et al., 1995).

Smith et al. (1998) investigate outsourcing firms' financial characteristics and explicitly classifies firm-specific drivers of IT outsourcing into five categories: (1) cost reduction; (2) focus on core competence; (3) liquidity needs; (4) IT capability factors; and (5) environmental factors. Cost reduction and control are often offered as internal reasons for outsourcing IT (Smith et al., 1998). In some instances an outside vendor can provide the same level of service at a lower cost than the internal IT department (Bhattacharya et al., 2002). The vendor could have better economies of scale, tighter control over fringe benefits, better access to lower cost labor pools, and more

focused expertise in managing IT. Capability factors also motivate outsourcing (Smith et al., 1998). Environmental factors' roles in the outsourcing decision (Hu et al., 1997) include factors that are not specific to the firm, but exist in its industry or in the economy at the time of outsourcing. For instance, the decision to outsource IT may be driven by imitative behavior among firms and or by a mix of external media, vendor pressure, and internal communications at a personal level among managers. The availability of qualified vendors willing to provide the service at a reasonable price, pressure from vendors, positive stock market reaction to the phenomenon are other factors that also influence the decision.

The Four-S Outsourcing Model (Zucchini, 1992) provides a second framework to help guide a firm's outsourcing decision in a managerial context. The model (see Figure 4) is comprised of four quadrants, varied along two dimensions where one addresses the organization's objective in making the decision (Economics/Expertise) and the other indicates the utility of the decision (Functional/Dysfunctional). The resulting quadrants represent application types and are identified as Scale, Specialty, Sale, and Surrender.

Figure 4. The Four-S Outsourcing Model (Zucchini, 1992).

The scale factor comes into play when an IT outsourcer is able to provide the same service at a cost that is lower than the outsourcing company could achieve through in-house operations. Outsourcing decisions based on scale are usually viewed as a rational decision. According to this model, sound outsourcing decisions are also made when the rationale for decision making is based on taking advantage of the outsourcer's specialized technological or operational expertise (Weaver et al., 2000). While outsourcers may initially maintain personnel whose skills have been outsourced within the organization, such personnel are soon reassigned to other projects once the outsourcing engagement takes effect.

The Reengineering-Outsourcing Decision Matrix (Behara et al., 1995) provides a third framework when considering the outsourcing decision within a business process engineering environment (see Figure 5). Reengineering is broadly defined here as IT-based process redesign, and includes the myriad of issues related to the design and implementation of

change along the technological, human, and organizational dimensions. The model addresses the outsourcing decision within this context by developing a framework based on the nature of IT applications and the organizational areas in which they exist. Dispersion or the organizational footprint is used to represent the organizational areas in which IT are implemented, while the extent of innovativeness of the applications is used to reflect the nature of IT applications.

Figure 5. Reengineering-Outsourcing Decision Matrix (Behara et al., 1995, pp. 46–51)

Cross-functional IT applications are becoming the norm with an increased focus on business processes at an enterprise level. Implementing such application requires a greater amount of coordination and cooperation between participating groups within the firm. When dealing with innovative IT applications, there is an added challenge related to the emerging and dynamic nature of the application itself. This compounds the need for effective integration of the various business processes and IT parties involved. Under these circumstances, it may be appropriate to in-source or keep the IT application in-house. This is exemplified by the implementation of Enterprise Systems solutions in organizations. However, when dealing with established IT applications, outsourcing may be an appropriate option due to the reduced uncertainty that IT experienced when dealing with a known application. The tentative approach by some companies to outsource Enterprise Systems through Application Service Providers (ASPs) is an example. When IT applications are limited to specific business functions, outsourcing-established applications is most suitable as it represent the most sustainable approach. However, the ability of the outsourcers to deliver innovative solutions in narrow functional areas should be carefully evaluated before the outsourcing decision is made.

In many situations outsourcing describes corporations' search for cheap labor and reflects a belief about the motives and consequences of economic restructuring, not careful analysis.

3. RESEARCH QUESTIONS AND METHODOLOGY

To investigate the ramifications of make-buy decisions on organizational effectiveness, we offer the following research questions:

Research Question 1: Does an organization's preference for buying software vs. developing in-house have a relationship with their decisions regarding **outsourcing of IT functions or future plans to offshore labor to reduce costs?**

Research Question 2: Does an organization's preference for buying software vs. developing in-house have a relationship with their **perceptions on the strategic importance of IT and the role of IT as a basis for differentiation with competition?**

Research Question 3: Does an organization's preference for buying software vs. developing in-house have a relationship with their **perceptions on the success of IT investments, the management of IT projects, and the mechanisms that effectively measure and justify IT expenditures?**

Research Question 4: Does an organization's preference for buying software vs. developing in-house have a relationship with **perceptions on the effectiveness in the collection, storage, and dissemination of data to support business operations and the use of technological resources to help decision makers gain strategic insights.**

To investigate these research questions, personal interviews were conducted with 228 senior level executives. The interviews were conducted primarily in face-to-face settings. The subjects were offered confidentiality so their names and affiliations are not revealed in the data set. Most of the interviews were conducted with executives in a relatively large city in the Midwestern United States. Thus, the findings in this research paper may be limited if there are regional differences in perspectives. Consistent with other academic empirical research, the subject pool was not limited to one respondent per organization, thus the results should be interpreted with the potential that large companies may have multiple entries.

The executives were asked to comment on a series of questions about IT strategy and provide a rating on Likert scale (5=strongly

agree, 3=neutral, 1=strongly disagree). The questions included the following which are relevant to this study:

- In examining major software investments, we typically seek to purchase solutions rather than develop them in-house.
- We are looking increasingly at outsourcing many of our IT functions.
- We are looking increasingly to reduce costs by using offshore IT outsourcing.
- Information Technology is very important to the strategic success of our organization.
- Our use of IT helps differentiate us from our competitors.
- Most of our investments in IT have been successful.
- We have implemented mechanisms that effectively measure and justify IT expenditures.
- We manage IT projects effectively.
- We are efficient in the collection, storage, and dissemination of data to support business operations.
- We are able to use our technological resources to help decision makers gain strategic insights.

4. ANALYSIS AND FINDINGS

Two basic statistical tests, a Pearson Correlation and a t-test for equality of means, were conducted to examine the research questions. The t-test for equality of means was formed by dividing the sample into two groups. Those who responded that they "agreed" or "strongly agreed" with question 1 (that typically seek to purchase solutions rather than develop them in-house) were placed in one group while the remaining subjects were placed in another. The sample included 120 executives who fell into the "Buy" group while 101 fell into the "Make" group.

The Pearson Correlation is a measure of linear dependence between two variables. Since the data used in the study is Likert-scaled, with end points of "strongly agree" to "strongly disagree", it is common in academic literature to perform statistical tests that test linear, continuous relationships among the variables. The t-test of equality allows for comparisons of

sub-groups of data be tested for differences in mean that are useful in illustrating the results. For example, if one were to examine the relationship between age and income, a Pearson Correlation might show a positive significant correlation between those variables while a t-test of equality could be used to illustrate that groups age 40 or older (for example) earn an average of X, while those under age 40 earn an average of Y.

Research Question 1

The practice of outsourcing IT, particularly when it includes offshore labor has received a great deal of attention in recent years. Research Question 1 examines the relationship between the make-buy decision and the practices of outsourcing and offshoring of IT. As shown in Table 1, there is statistically significant positive correlation between organizations that buy software and their practices of outsourcing and offshoring. As shown in Table 2, the Buy group had higher mean ratings for both outsourcing and offshoring of IT. However, the statistical significance was stronger for outsourcing than for offshoring. It is possible that relationship between offshoring of IT labor and the practice of buying off-the-shelf software is not as clear cut. In general, the mean rating on the use of offshore labor reflects the finding that the practice is not perceived as being widespread by interview respondents. The relatively weak significance of the t-test may also be attributed to the inability of offshore labor to assist organizations in the implementation of major software projects (e. g., ERP implementations) while conversely, offshore computer programmers could be utilized in software development projects or maintenance of existing systems. In general, however, the results suggest that buying packaged software is consistent with an overall philosophy of seeking to outsource IT resources.

Research Question 2

The question as to whether IT is a strategically important resource has generated a great deal of controversy in recent years, primarily due to the publication of the article "IT Doesn't Matter" in Harvard Business Review (Carr, 2003). Table 1 reveals that there is no statistically significant correlation between organizations that buy software and perceptions on the strategic importance of IT and the use of IT to differentiate from competitors. Table 2 shows that there is

strong agreement that IT is, in fact, regarded as strategically important and that most organizations agree that IT is used as basis for competition. The importance of IT appears strong regardless of whether organizations buy or develop software. While the mean for both items was slightly greater among the group that develops software, the lack of significance is a potential important finding.

Those who subscribe to the arguments set forth in "IT Doesn't Matter" may view the common practice of buying software from vendors as evidence that that IT is declining in strategic importance due to the equal availability of IT resources among competing firms. The results of this study would not support this view due to the lack of a statistical relationship between buying software and decreased perceived importance of IT as a basis for competition. Of course, the overall high mean results for strategic importance of IT and IT as basis for differentiation also serve to refute some of the conclusions of "IT Doesn't Matter" and related literature.

Research Question 3

Major software projects have historically been scrutinized for failing to successfully meet the intended goals and for failing to be completed within the original cost estimates of the projects. In recent years, there has been greater focus on the accountability of IT expenditures and, in turn, an increased effort to measure and track metrics of IT projects in a consistent manner. Table 1 reveals that there is no statistically significant correlation between organizations that buy software and perceptions regarding the success of IT investments, the effectiveness of IT project management, and the use of mechanisms that effectively measure and justify IT expenditures. The mean values depicted in Table 2 also reveal little differences between the two groups on these bases. This lack of difference and the relatively high overall mean values are surprising given the general perception that (historically) internal software development projects do not have a positive reputation for meeting goals and being completed within projected time and cost estimates. Of course, there is also a wealth of literature documenting that it is difficult and costly to implement major packaged software solutions (e. g., ERP implementations).

Given the deliberate steps and financial considerations that most organizations

undertake in the course of selecting vendors for major software investments, it is somewhat surprising that there is not a greater difference among the groups for the item related to measurement and justification of IT expenditures. An important extension to this study would be to further investigate the different success factors between buyers and developers on these bases, including comparative best practices for system life cycle approaches, project management success factors, and appropriate metrics and system review techniques for different styles of software acquisition.

Research Question 4

Among the most important trends in the use of IT resources in recent years has been the widespread popularity of business intelligence (BI) systems that enhance the ability of organizations to produce interactive reports and to conduct analysis of business data to improve tactical and strategic decision making. BI systems can only be successful if data is collected and stored effectively as a basis for organizational decision making and if the decision makers are given the tools and training to use BI effectively. Table 1 reveals that there is a statistically significant, negative correlation between the the practice of buying software and perceptions regarding the efficiency of collection, storage, and dissemination of data to support business operations. The finding is also reflected in Table 2 which reveals a statistically significant difference in means between software developers and software buyers. These results indicate that organizations that develop software internally are viewed as being more efficient in the collection, storage, and dissemination of data to support business operations.

When an organization develops software internally, they are able to customize the processes and data structures to match the business requirements of the system. Conversely, there is a limited ability to select, configure, and customize a packaged off-the-shelf software solution to closely match an organization's business requirements. Customizing packaged software can be complex and problematic due to the cost of the customization, the difficulties in upgrading to new releases of the packaged application, and the potential impact on vendor support or warranty issues. As a result, the practice of

buying off-the-shelf software often requires that an organization adjust its business processes rather than customizing the software. Thus, the inability of packaged applications to meet specific functional requirements of system users could serve as an explanation for this finding. However, the result is still somewhat surprising since packaged software is purported to improve the integration of business data while in-house systems are often viewed as being outdated and inadequate.

While Table 1 reveals that the correlation between the practice of buying software and perceptions regarding the use of technological resources to help decision makers gain strategic insights is also negative, the correlation is not statistically significant. Table 2 also confirms that there is a not a statistically significant difference in mean values between the groups. The overall mean values near 4.0 for both groups show that executives generally agree that they are using technology to gain strategic insights. The lack of correlation and difference in means is somewhat surprising given the potential synergies between packaged software and BI. Major software vendors such as SAP and Oracle market both business software and BI solutions. It also would seem likely that organizations that tend to buy software would be more likely to implement and use BI solutions than organizations that develop software internally.

Table 1

Table 2

5. CONCLUSIONS

The landscape of IT continues to evolve away from the historical practice of in-house developed software towards packaged and outsourced software solutions. As we continue this evolution, it is important for researchers and practitioners to understand the ramifications of making versus buying software and the potential impact these decisions can have on the success of an organization. This research provides insights into the potential differences and commonalities among organizations that tend to buy software and those that develop software internally.

The key findings of this study can be summarized as follows:

- Organizations that buy packaged software are more likely to outsource IT functions and are more likely (but to a lesser extent) to utilize offshore IT resources as compared to organizations that develop software internally.
- Organizations that buy packaged software do not differ from those who develop software internally in their perceptions on the strategic importance of IT and the ability of IT to differentiate from competitors.
- Organizations that buy packaged software do not differ from those who develop software internally in their perceptions on the success of IT investments, the management of IT projects, and the mechanisms that effectively measure and justify IT expenditures.
- Organizations that buy packaged software are perceived as being less efficient than those who develop software internally in the collection, storage, and dissemination of data to support business operations but do not differ in perceptions on the use of technological resources to help decision makers gain strategic insights.

There are a few potential limitations to this study. The packaged software market is continually evolving, thus the findings of this study could be valid for only a short period of time. As best practices for packaged software implementations and new methods of integrating outsourced solutions (e.g., software as a service) continue to emerge, perceptions on the success or failure of these solutions may adjust accordingly. Interviews for this study were conducted primarily in one metropolitan city in the mid-western part of the United States. The perceptions of the respondents may not reflect the national or worldwide view of the subject matter. While interview subjects were granted assurances that results were confidential, there may be inherent bias in the results if respondents were reluctant to express criticism of their software systems or the role of IT in their organization.

Despite these limitations, these findings provide an important foundation for future research on the role of packaged software compared with internally developed software.

While this study attempted to assess organizational software development into discrete make vs. buy organizations, in reality, organizations rarely fit neatly into either category. Future research could focus on the best practices, success factors, or ramifications of make vs. buy software decisions at the individual project level rather than as an overarching organizational philosophy. The methodology of this study, given the relatively short list of questions, did not lend itself to multivariate statistical analysis. Future studies could expand on this research to develop models, and analyze in a more complex and rigorous nature, the issues raised in this exploratory study.

6. REFERENCES

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APPENDIX

Figure 1: Make-Buy Outsourcing Framework

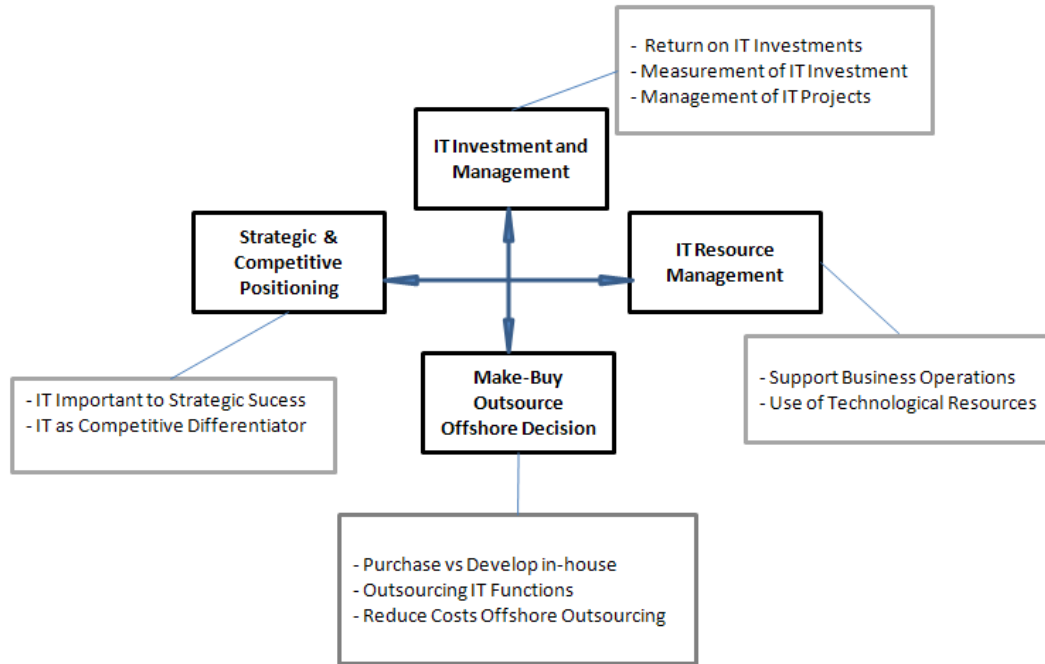


Figure 2: Three dimensions of Outsourcing

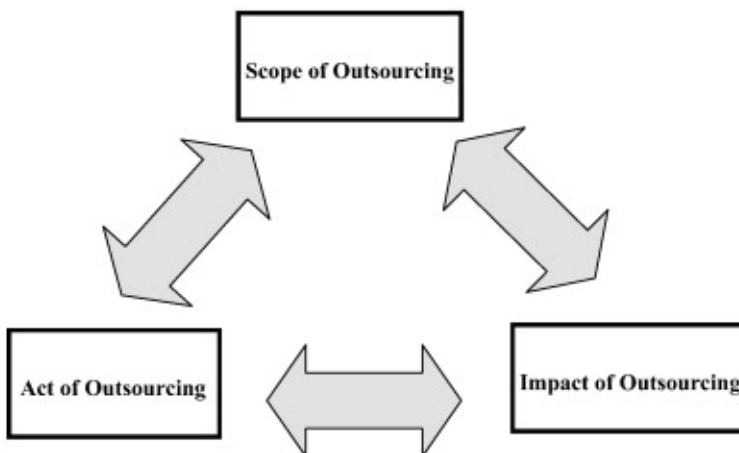


Figure 3: Internal Capability of Enterprise to perform an activity

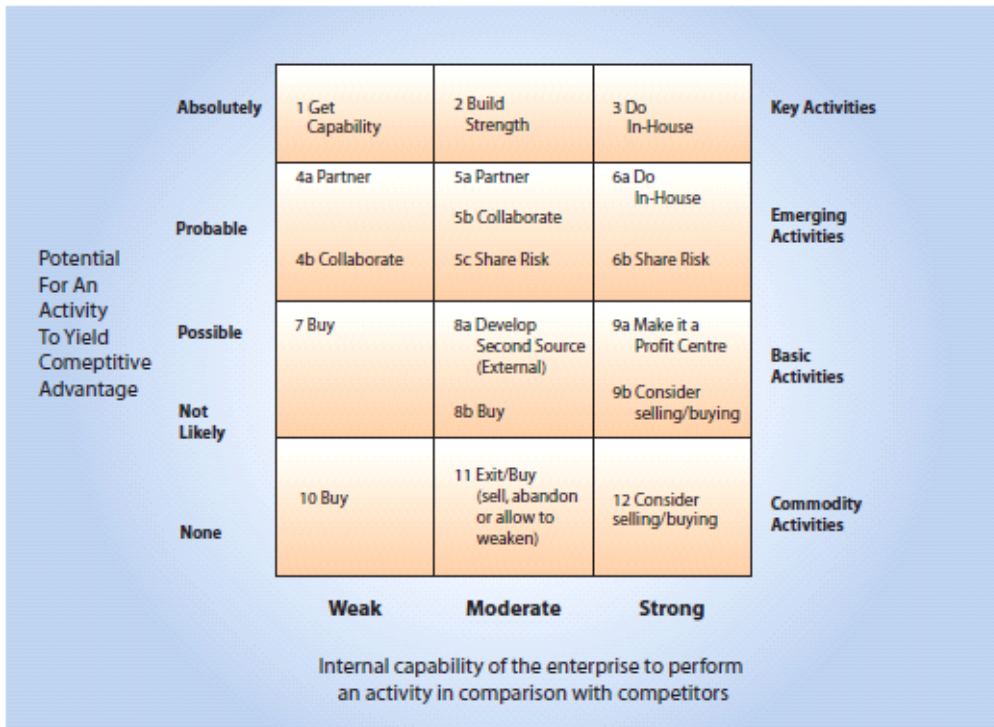


Figure 4: The Four-S Outsourcing Model (Zucchini, 1992).

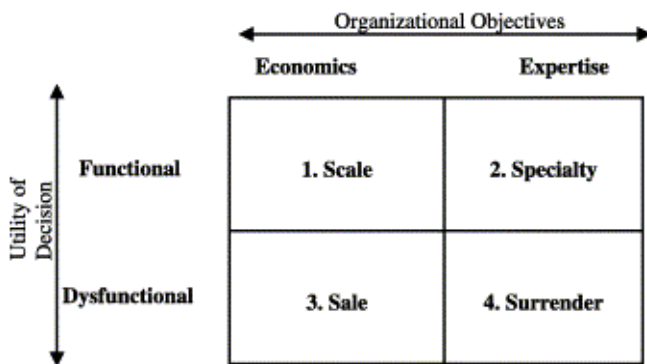


Figure 5: Reengineering-Outsourcing Decision Matrix (Behara et al., 1995, pp. 46-51)

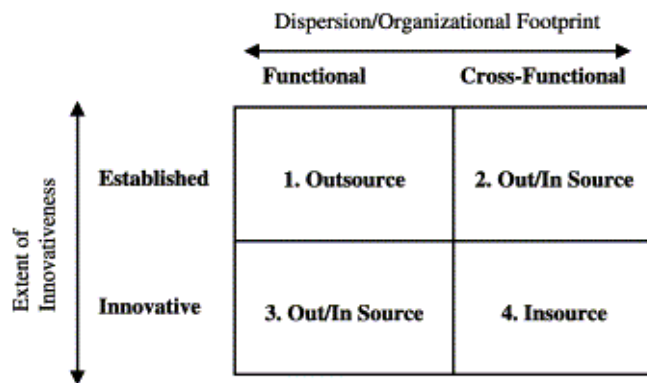


Table 1: Correlation Between Organizations that Buy Software and Strategic IT Perspectives

Item	Correlation with “buying” software
We are looking increasingly at outsourcing many of our IT functions	R=.228 (p=.001)
We are looking increasingly to reduce costs by using offshore IT outsourcing	R=.197 (p=.005)
Information Technology is very important to the strategic success of our organization	R=-.107 (p=.112)
Our use of IT helps differentiate us from our competitors	R=-.088 (p=.196)
Most of our investments in IT have been successful	R=.000 (p=1.00)
We have implemented mechanisms that effectively measure and justify IT expenditures	R=.082 (p=.227)
We manage IT projects effectively	R=.018 (p=.797)
We are efficient in the collection, storage, and dissemination of data to support business operations	R=-.147 (p=.031)
We are able to use our technological resources to help decision makers gain strategic insights	R=-.067 (p=.330)

Table 2 Test of Means: Organizations That Buy Software vs. Those That Develop Software

Item	Mean (Buy)	Mean (Make)	T-test of Difference
We are looking increasingly at outsourcing many of our IT functions	3.04	2.6	T=2.47 (p=.014)
We are looking increasingly to reduce costs by using offshore IT outsourcing	2.68	2.31	T=1.72 (p=.081)
Information Technology is very important to the strategic success of our organization	4.7	4.81	T=-1.56 (p=.120)
Our use of IT helps differentiate us from our competitors	3.83	3.97	T=-1.03 (p=.306)
Most of our investments in IT have been successful	3.78	3.83	T=-.495 (p=.621)
We have implemented mechanisms that effectively measure and justify IT expenditures	3.57	3.49	T=.572 (p=.568)
We manage IT projects effectively	3.69	3.72	T=-.193 (p=.847)
We are efficient in the collection, storage, and dissemination of data to support business operations	3.59	3.92	T=-2.39 (p=.018)
We are able to use our technological resources to help decision makers gain strategic insights	3.95	4.09	T=-1.14 (p=.256)

* 5 point Likert Scale (1 = strongly disagree... 5=strongly agree)